

## ORIGINAL ARTICLE

# Reciprocal relationships between personality traits and psychological well-being

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Email: [mjoshanloo@gmail.com](mailto:mjoshanloo@gmail.com)**Abstract**

This study used an American sample collected over a period of approximately 2 decades (at 3 time points) to examine the temporal relationships between psychological well-being and personality traits (i.e., neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience). The random-intercept cross-lagged panel model was used to separate between-person and within-person sources of variation. Between-person correlations were comparable to those of previous studies. New insights were gained at the within-person level. There were reciprocal relationships between psychological well-being and openness and extraversion, suggesting the joint development of plasticity-related traits and well-being over time. The relationships between psychological well-being and conscientiousness and agreeableness were unidirectional, with psychological well-being preceding these traits. Despite a strong between-person association between neuroticism and psychological well-being, the two were not related at the within-person level.

**KEYWORDS**

big five, MIDUS, psychological well-being, RI-CLPM, temporal, traits, within-person

## BACKGROUND

Personality traits are stable patterns in the way people think, feel, and behave (Cervone & Pervin, 2015). Traits remain fairly constant over time and across contexts, but this stability is not complete. There is now ample evidence to suggest that traits change across the lifespan (Bleidorn et al., 2019). The scientific community has now generally agreed on a taxonomy of personality traits: the “Big Five” dimensions (John, 2021). These five traits are commonly referred to as neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience. The Big Five “represent a viable balance between conceptual breadth, descriptive fidelity, and generalizability across samples and measures and, to a certain degree, also across cultures” (Bleidorn et al., 2019, p. 1508). Traits are reliably associated with important life outcomes (Roberts et al., 2007), such as mental well-being (Anglim et al., 2020). Indeed, traits are among

the strongest predictors of various aspects of well-being (Diener, 1996; Joshanloo et al., 2012; Schmutte & Ryff, 1997).

Eudaimonic well-being is an aspect of mental well-being that is usually contrasted with subjective/hedonic well-being (Ryan et al., 2008). Rather than focusing on emotional experiences as the primary indicator of well-being, models of eudaimonic well-being emphasize the importance of a life of contemplation and virtue, the pursuit of human excellence, and the development of one's potential (Niemiec, 2014; Ryff et al., 2021). The eudaimonic concept of well-being has evolved from models and theories in clinical, developmental, existential/humanistic psychology, and Greek philosophy. In the language of modern social science, eudaimonic well-being consists of the acquisition and practice of psychological and social skills that facilitate coping with life's daily challenges (Joshanloo, 2018b). Based on points of convergence among different psychological theories and models, Ryff (1989) developed a multidimensional model of eudaimonic well-being, commonly referred to as psychological well-being. This integration resulted in six dimensions that express what it takes to cope with life's common challenges: Being aware of one's weaknesses and still feeling good about oneself (self-acceptance); establishing and maintaining trusting and warm interpersonal relationships (positive relationships with others) and improving one's environment to meet one's goals and desires (environmental mastery); achieving a sense of self-determination and independence (autonomy); finding a purpose in one's endeavours (meaning in life); making the most of one's strengths and abilities and striving for improvement (personal growth). Psychological and eudaimonic well-being are used interchangeably in this article.

## Personality traits as predictors of psychological well-being

Previous studies have primarily used personality traits as predictors of well-being rather than vice versa. McCrae and Costa (1991) argued that personality traits play an important role in creating conditions that promote or impair well-being. For example, conscientious people are more likely to be competent and hardworking, which leads to better performance on work and life tasks, which in turn contributes to higher well-being. This notion has been supported by empirical research concerning psychological well-being. A recent meta-analysis (Anglim et al., 2020) showed that neuroticism was negatively and the other traits were positively associated with psychological well-being, with effect sizes ranging from weak to strong. However, cross-sectional studies do not provide information on temporal relationships between variables. Should we also expect personality traits to predict psychological well-being over time? Given that traits are not static (Bleidorn et al., 2022), it may be that changes in traits may also lead to changes in people's lifestyle and performance, which in turn may affect well-being. In fact, a few longitudinal studies have found that traits do predict future well-being (e.g., Abbott et al., 2008; Martin & Keyes, 2015; Osafo Hounkpatin et al., 2014).

Making a distinction between two categories of traits is useful for hypothesizing about which traits might have a greater impact on future eudaimonic well-being. The three traits of conscientiousness, agreeableness, and (low) neuroticism form the meta-trait called stability, which is a person's ability and tendency to avoid interruptions to ongoing goal-directed activity (i.e., distraction avoidance). Extraversion and openness, on the other hand, form a meta-trait called plasticity (DeYoung, 2010, 2015), reflecting the tendency to actively engage with the potential of the environment by both producing and attending to new aspects of ongoing experience. Plastic exploration is driven by a desire for positivity, novelty, and pleasure rather than an aversion to pain and threat. Plasticity can be described as the extent to which the personality system tends to develop new goals, new interpretations of the current state, and new strategies for pursuing existing goals (DeYoung, 2010). It appears that changes in plasticity traits are more likely to affect future changes in eudaimonic well-being. The reason for this expectation is that the concept of eudaimonic well-being differs from other types of well-being essentially in that it focuses on the exploration and realization of one's potential rather than on the maintenance of psychological equilibrium. Vittersø's (2016) argues that while the function of subjective/hedonic well-being is to maintain homeostatic stability, eudaimonic well-being has a non-homeostatic function that focuses on developing

one's ability to cope with an ever-changing environment, planning, and potentially altering the environment. Elements of eudaimonic well-being (e.g., environmental mastery, continuous personal growth, and creating meaning in life) are skills that need to be continually practiced and refined in the face of new information and challenges, and across context and time. Therefore, a curious, open, and plastic approach will foster the development and maintenance of these skills. Accordingly, increases in plasticity traits (extraversion and openness) are more likely than increases in stability traits to pave the way for an increase in psychological well-being.

## Psychological well-being as a predictor of personality traits

Psychological well-being has hardly been studied as a predictor of personality traits. Can changes in psychological well-being predict future changes in personality traits? No previous study has directly examined this question. However, studies of other aspects of well-being have shown that changes in well-being may precede changes in personality traits or that personality and well-being change together over time. For example, social well-being reflects how well individuals function in society, how well they cope with the social challenges of daily life, and how well they interact with their neighbours, colleagues, and fellow citizens (Cicognani, 2014; Keyes, 1998). Social well-being is typically recognized as the social aspect of eudaimonic well-being. Joshanloo (2022) found that higher-than-usual social well-being was associated with higher future extraversion and conscientiousness. Soto (2015) found significant correlations between baseline levels and rates of change in subjective/hedonic well-being and rates of change in personality traits. Thus, there is evidence that changes in well-being, in general, can lead to trait change over time. Given that all aspects of mental well-being are interrelated (Joshanloo, 2021), eudaimonic well-being could also have the same effect on personality trait change. As models of trait change emphasize changes in behavioural patterns (Hudson et al., 2019), and eudaimonic well-being promotes certain stable behavioural patterns, changes in the levels of eudaimonic well-being likely contribute to trait change. For example, individuals with high eudaimonic well-being exhibit a range of adaptive behaviours across life domains, including relationships, work, and health (Ryff, 2013), suggesting that eudaimonic well-being facilitates successful engagement in important social roles, which is recognized as a driver of personality maturation in adulthood (Roberts & Nickel, 2021).

Hennecke et al. (2014) describe three conditions that enable people to change their personality traits through self-regulating efforts. First, individuals must want to change their trait-related behaviours. Second, individuals must be convinced that changing their behaviour is possible and that they are able to make the necessary adjustments. Finally, the behaviour change must become a habit to develop a stable trait. A close examination of the elements of eudaimonic well-being reveals that eudaimonic well-being contributes to all these conditions. For example, personal growth promotes a willingness to change; autonomy, environmental mastery, and purpose in life contribute to the belief that change is possible; and environmental mastery and purpose in life contribute to sustained efforts to achieve life goals. Thus, another mechanism by which eudaimonic well-being may lead to subsequent trait change is by strengthening motivation to change and facilitating self-regulation and the pursuit of meaningful goals.

## A within-person approach

The longitudinal studies that have directly examined the relationship between psychological well-being and the Big Five traits have generally not separated the within-person level from the between-person level. Instead, methods have been used that do not allow clear inferences about the direction of the temporal relationships. Kokko et al. (2013) used a method to separate between-person and within-person associations between traits and psychological well-being. However, because there were no individual differences in the rate of change of psychological well-being in their sample, the authors were unable to examine the associations between trajectories of psychological well-being and personality traits. Thus, studies are

lacking, and not much is known about the strength and direction of temporal within-person associations between psychological well-being and personality traits. The present study aimed to fill this gap.

The Cross-Lagged Panel Model (CLPM) is a popular and powerful tool for analysing panel data. The CLPM is used for examining temporal relationships between two variables, while accounting for the prior values of each variable (Newsom, 2015). However, some critics argue that the CLPM ignores the fact that people change around their personal means over time, i.e., the CLPM ignores within-person changes (Mund & Nestler, 2019). In other words, the CLPM is designed to assess only changes around the group mean and not intraindividual variations around the personal mean. Therefore, the CLPM cannot distinguish between within-person and between-person sources of variation (Falkenström et al., 2020). To overcome the limitations of CLPM, the Random Intercept Cross-Lagged Panel Model (RI-CLPM) has been proposed (Hamaker et al., 2015). This model separates between- and within-person sources of variation and estimates the association between two variables at both levels. The RI-CLPM partitions the variance of variables into time-invariant trait components and time-varying state components. The estimated associations between trait components show the associations between two variables at the between-person level, which are not temporal. The estimated associations between state components, on the other hand, are temporal. The direction of the temporal relationship between two variables can only be inferred from the estimated cross-lagged effects between the state components (Hamaker et al., 2015; Mund & Nestler, 2019).

The focus of the present study is on within-person associations. The within-person cross-lagged effects determine whether a change in one variable is associated with a future change in the other variable. A change is defined here as an increase or decrease relative to the typical level of a variable (i.e., an individual's longitudinal mean). Accordingly, this study used the RI-CLPM (rather than the traditional CLPM) to estimate within-person associations in addition to between-person associations.

## METHODS

### Participants

Data from Wave 1 (collected 1995–1996, mean age = 46.827,  $SD = 12.929$ , females = 52.5%), Wave 2 (2004–2006, mean age = 55.628,  $SD = 12.426$ , females = 53.7%), and Wave 3 (2013–2014, mean age = 63.696,  $SD = 11.344$ , females = 55.1%) from the Midlife in the United States (MIDUS) project ([midus.wisc.edu](http://midus.wisc.edu)) were used. Six hundred fifty-six individuals (9.2%) were excluded from the analyses because they did not respond to any of the psychological well-being and personality variables in any of the study waves. The final sample included 6452 individuals who had data for at least one variable across all waves (age at wave 1, mean = 46.83,  $SD = 12.929$ , female = 52.5%). Of these, 2648 individuals (41.0%) participated in all three waves, 1514 (23.5%) participated in two waves, and 2290 (35.5%) participated in one wave. In total, 3804 individuals (59%) missed at least one wave.

### Measures

Internal consistencies and descriptive information are reported in Table 1.

#### Personality traits

The Midlife Development Inventory (MIDI) personality scale (Lachman & Weaver, 1997) was used to measure personality traits (for statistical characteristics, see Joshanloo, 2018a). Respondents indicated how well 25 adjectives described them on a scale of 1 (*a lot*) to 4 (*not at all*). Items were reverse-coded, with higher scores indicating greater levels of the traits.

TABLE 1 Descriptive statistics and alphas

Wave	Variable	<i>M</i>	<i>SD</i>	<i>a</i>
1	Autonomy	16.42	3.31	.48
	Mastery	16.14	3.45	.52
	Growth	17.88	3.12	.55
	Relations	16.19	4.08	.58
	Purpose	16.51	3.62	.36
	Acceptance	16.6	3.49	.59
	Neuroticism	2.24	0.66	.74
	Extraversion	3.20	0.56	.78
	Agreeableness	3.49	0.49	.80
	Conscientiousness	3.42	0.44	.58
2	Openness	3.02	0.53	.77
	Autonomy	16.53	3.09	.45
	Mastery	16.77	3.26	.54
	Growth	17.17	3.22	.54
	Relations	16.81	3.81	.63
	Purpose	16.21	3.42	.29
	Acceptance	16.31	3.80	.66
	Neuroticism	2.07	0.63	.74
	Extraversion	3.11	0.57	.76
	Agreeableness	3.45	0.50	.80
3	Conscientiousness	3.46	0.45	.58
	Openness	2.90	0.54	.77
	Autonomy	16.41	3.00	.42
	Mastery	16.91	3.23	.55
	Growth	17.31	3.09	.53
	Relations	16.81	3.72	.61
	Purpose	16.05	3.43	.32
	Acceptance	16.32	3.78	.67
	Neuroticism	2.06	0.63	.71
	Extraversion	3.09	0.58	.76
	Agreeableness	3.43	0.50	.77
	Conscientiousness	3.45	0.46	.56
	Openness	2.90	0.54	.77

## Psychological well-being

The 18-item version of Ryff's (1989) psychological well-being scale was used. Items are rated on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). The six dimensions are autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance, each measured by three items.

## Statistical analysis

### Model estimation and fit evaluation

Models were estimated under missing data theory using Robust Maximum Likelihood (MLR) in Mplus version 8.7. Adequate fit thresholds used in this study were a Comparative Fit Index (CFI) of .90, a Root Mean Square Error of Approximation (RMSEA) of .07, and a Standard Root Mean Square Residual (SRMR) of .08 (e.g., Kline, 2015).

### RI-CLPM

For each personality trait, a RI-CLPM was tested. The five personality traits were included as observed variables, while psychological well-being was included as a first-order latent variable indicated by its six subscales (i.e., autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance). Baseline age and gender were included as time-invariant predictors of the observed personality variables and the latent factors of psychological well-being in waves 2 and 3 in all models. Predictive paths between state variables were held equal over time.

### Measurement invariance

Whereas the traits were used as observed variables, psychological well-being was modelled as a latent variable indicated by six observed variables. This allows the investigation of the temporal invariance of the measurement model for psychological well-being. Longitudinal measurement invariance is critical to ensure that the latent variables retain the same meaning over time. Because the focus of the study is on regressive effects, which only concern the covariance structure and not the mean structure, metric invariance was considered necessary, while item intercept invariance was not (Newsom, 2015). Metric invariance means that factor loadings do not change across time points. The models with and without equality constraints on item loadings are compared to determine whether or not the addition of equality constraints across time significantly deteriorates fit. If the fit of the baseline model and the model with equality constraints are similar, it can be assumed that metric invariance holds.

### Missing data handling

Only those who did not respond to any of the variables in the three waves were excluded from this study. All other participants were retained. Of the sample, 41% participated in all three waves, and approximately 59% of participants missed at least one wave. The results of the *t*-tests reported in the supplementary material (Tables S1–S3) show that these two groups are significantly different on many of the study variables, with effect sizes ranging from .004 to .317. To account for this pattern of group differences, an auxiliary variable was added to all models in this study (a dummy variable, 0 = individuals with no missing wave, and 1 = individuals with at least one missing wave). Auxiliary variables are not central variables in the analysis. They are included because they are related to the values of variables with missing data. Their use can reduce parameter biases that might otherwise occur due to missing data, thereby improving the accuracy of parameter estimates (Asparouhov & Muthén, 2008; Kline, 2015; Newsom, 2015).

## RESULTS

### Measurement invariance of psychological well-being

The measurement invariance of psychological well-being was assessed in a longitudinal factor analysis model with three first-order factors indicated by six subscales of psychological well-being at three time

points. The model fitted the data well (Table 2). Factor loadings were above .390 and were considered acceptable (Table S4). In a second model (metric invariance model), equality constraints were imposed on factor loadings over time. With identical RMSEA values and a decrease of only .003 in the CFI (Table 2), the second model fitted the data almost as well as the configural model; thus, temporal metric invariance can be assumed (Schmitt & Kuljanin, 2008). The equality constraints on factor loadings were retained in the RI-CLPMs.

## RI-CLPMs

The temporal relationships between psychological well-being and personality traits were assessed in five RI-CLPMs, one for each personality trait. The fit of the six models to the data was adequate (Table 2). The between-person correlations between psychological well-being and each trait are shown in Table 3 and range from moderate to strong. Neuroticism had the strongest and agreeableness the weakest correlations with psychological well-being. These correlations exist between stable traits and therefore do not provide information about directionality and temporality. The  $R^2$  values for the within-person level (for state variables) are also shown in Table 3. Table 4 shows the autoregressive effects, all of which are significant. That is, higher or lower than usual values for the psychological well-being or personality variables are associated with higher or lower values for the same variable at the next time point. In other words, deviations from a person's typical levels are likely to persist to the next time point, indicating within-person stability beyond what is captured by the stable traits.

TABLE 2 Fit indices

Model	$X^2$	$df$	$p$	RMSEA [90% CI]	CFI	SRMR
Invariance (PWB)						
Configural	1068.748	114	.000	.036 [0.034–0.038]	.964	.036
Metric	1136.978	124	.000	.036 [0.034–0.037]	.961	.042
RI-CLPM						
Neuroticism	2620.541	209	.000	.042 [0.041–0.044]	.930	.054
Extraversion	2527.689	209	.000	.041 [0.040–0.043]	.934	.051
Agreeableness	3254.833	209	.000	.048 [0.046–0.049]	.909	.061
Conscientiousness	2561.253	209	.000	.042 [0.040–0.043]	.928	.051
Openness	2950.951	209	.000	.045 [0.044–0.047]	.920	.056

Abbreviation: CI, confidence interval, PWB, psychological well-being.

TABLE 3  $R^2$  values, between-person correlations, and within-person correlations

Model	$R^2$				Between-person correlation with PWB	Within-person correlations with PWB		
	PWB		Personality			W1	W2	W3
	W2	W3	W2	W3				
Neuroticism	.057	.103	.031	.026	-.612	-.475	-.380	-.361
Extraversion	.053	.118	.054	.091	.506	.356	.522	.456
Agreeableness	.049	.104	.032	.048	.309	.261	.373	.316
Conscientiousness	.047	.097	.042	.054	.580	.272	.339	.327
Openness	.059	.125	.074	.112	.457	.316	.459	.367

Note:  $R^2$  values are only reported for the structural part of the RI-CLPMs. Between-person and within-person correlations are standardized covariances, all significant at  $p < .001$ . Within-person correlations are concurrent correlations between state components of PWB and the big five within each wave. Between-person correlations are between the trait components of PWB and the big five.

Abbreviations: PWB, psychological well-being; W, wave.



TABLE 4 Auto-regressive coefficients

Predictor	Outcome	Unstandardized coefficient	<i>p</i>	95% CI		Standardized coefficient
				Low	Up	
Neuroticism						
N1	N2	.120	.001	0.046	0.194	.207
N2	N3					.296
PWB1	PWB2	.253	.000	0.141	0.365	.140
PWB2	PWB3					.119
Extraversion						
E1	E2	.113	.008	0.030	0.196	.103
E2	E3					.115
PWB1	PWB2	.248	.000	0.141	0.355	.199
PWB2	PWB3					.289
Agreeableness						
A1	A2	.094	.022	0.014	0.174	.095
A2	A3					.095
PWB1	PWB2	.253	.000	0.146	0.359	.203
PWB2	PWB3					.295
Conscientiousness						
C1	C2	.178	.000	0.092	0.263	.164
C2	C3					.175
PWB1	PWB2	.243	.000	0.140	0.346	.197
PWB2	PWB3					.284
Openness						
O1	O2	.182	.000	0.094	0.270	.167
O2	O3					.181
PWB1	PWB2	.225	.000	0.118	0.332	.181
PWB2	PWB3					.260

Abbreviation: PWB, psychological well-being.

The primary focus of this study is on cross-lagged effects, which show the direction and strength of temporal within-person associations between the variables. A significant cross-lagged effect suggests that higher or lower than usual values on one variable are associated with higher or lower than usual values on the other variable at the next time point. These estimates are presented in Table 5 for the five models of the study. Neuroticism was not significantly associated with psychological well-being at the within-person level. However, some cross-lagged effects in models for the other four traits were significant. Extraversion and openness significantly and positively predicted future psychological well-being. Extraversion, agreeableness, conscientiousness, and openness were significantly and positively predicted by psychological well-being. Thus, increases in extraversion and openness precede increases in psychological well-being, and increases in psychological well-being precede increases in four of the traits. According to the guidelines provided by Orth et al. (2022), the cross-lagged effects observed in this study are medium to large.

## DISCUSSION

The between-person associations found in this study are consistent with previous studies. The temporal within-person results of the study, however, provided new insights. There were reciprocal within-person



TABLE 5 Cross-lagged coefficients

Predictor	Outcome	Unstandardized coefficient	<i>p</i>	95% CI		Standardized coefficient
				Low	Up	
Neuroticism						
PWB1	N2	-.031	.085	-0.066	0.004	-.060
PWB2	N3					-.073
N1	PWB2	-.112	.119	-0.252	0.029	-.055
N2	PWB3					-.055
Extraversion						
PWB1	E2	.084	.000	0.052	0.115	.175
PWB2	E3					.222
E1	PWB2	.192	.033	0.015	0.369	.067
E2	PWB3					.086
Agreeableness						
PWB1	A2	.057	.000	0.029	0.084	.131
PWB2	A3					.164
A1	PWB2	.144	.108	-0.032	0.320	.051
A2	PWB3					.059
Conscientiousness						
PWB1	C2	.036	.013	0.008	0.064	.086
PWB2	C3					.104
C1	PWB2	.158	.117	-0.040	0.357	.049
C2	PWB3					.063
Openness						
PWB1	O2	.076	.000	0.047	0.105	.168
PWB2	O3					.207
O1	PWB2	.340	.001	0.146	0.535	.114
O2	PWB3					.143

Abbreviation: PWB, psychological well-being.

relationships between psychological well-being and openness and extraversion. However, the relationships between psychological well-being and conscientiousness and agreeableness were unidirectional, running from psychological well-being to the traits. Neuroticism and psychological well-being were unrelated at the within-person level. Thus, there are significant temporal within-person associations between psychological well-being and personality traits, suggesting that changes in psychological well-being are associated with future changes in personality traits and vice versa.

## Traits precede psychological well-being

The present between-person results were consistent with the previous results (Anglim et al., 2020), showing positive relationships between psychological well-being and extraversion and openness. These two variables were also significant predictors of future psychological well-being at the within-person level. In other words, higher than usual levels of extraversion and openness predicted higher than usual levels of psychological well-being in the future. Extraversion and openness together form the meta-trait plasticity (DeYoung, 2010). Plasticity promotes a growth and approach orientation. The tendencies to be gregarious, adventurous, expressive, active, creative, and open to change are the driving forces behind

this orientation (Digman, 1997). As expected, the present findings suggest that plasticity prospectively predicts psychological well-being, whereas stability (the shared variance in the other three traits) does not. Eudaimonic well-being and plasticity are conceptually linked. The development of personal potential is the hallmark of eudaimonic well-being, resulting from enabling and pursuing growth and expansion (Vittersø, 2013). Openness and extraversion urge new inner and outer experiences that challenge one's understanding of life and broaden one's horizons of experience, paving the way for the development of greater psychological well-being. Thus, an increase in plasticity can help diversify one's life experiences, leading to a greater realization of one's best abilities, on which psychological well-being depends.

## Psychological well-being precedes traits

Higher than usual psychological well-being was associated with higher than usual future levels of extraversion, agreeableness, conscientiousness, and openness, suggesting that higher psychological well-being predicts development toward personality maturity. What might be the mechanisms for these temporal relationships? Two broad causes of personality trait change have been proposed: changes in daily behaviour (patterns of thoughts, feelings, and behaviours) and commitment to new identities (Hudson & Fraley, 2015). For example, one may become more conscientious by behaving more conscientiously in daily life and/or by adopting a more conscientious identity (e.g., seeing oneself as a more punctual and diligent worker). Psychological well-being promotes a variety of adaptive behavioural patterns and identities. It is related to adaptive beliefs, such as the belief that one has control over one's well-being (Joshi, 2019b), behaviours, such as volunteering and donating to charity (Choi & Kim, 2010), emotion regulation strategies (e.g., Balzarotti et al., 2014), and adaptive identity styles (e.g., Lilgendahl & McAdams, 2011). Psychological well-being thus promotes behavioural patterns and identities that can potentially contribute to personality trait change.

Furthermore, Bauer (2016) and Ryan et al. (2008) emphasize a process-oriented conceptualization of eudaimonic well-being: “eudaimonic conceptions focus on the content of one's life and the processes involved in living well, whereas hedonic conceptions of well-being focus on a specific outcome, namely the attainment of positive effect and an absence of pain” (Ryan et al., 2008, p. 140). This view implies that psychological well-being is essentially related to activity and process. Research shows that psychological well-being is strongly associated with active and conscious engagement in the growth process (Robitschek & Keyes, 2009). People who have high levels of psychological well-being tend to emphasize personal growth in their life stories (Bauer et al., 2006). With components such as personal growth, meaning in life, autonomy, and environmental mastery, psychological well-being also facilitates a growth and change orientation and increases the chances of adaptive change rather than stagnation or decline. Thus, psychological well-being not only promotes adaptive behaviours, perceptions, and identities, but also increases motivation to change. Moreover, people with high psychological well-being (e.g., environmental mastery, autonomy) also tend to see themselves as capable of change, i.e., believing that change is feasible and that one can implement the desired changes (Vittersø et al., 2007). In summary, higher psychological well-being may increase motivation to change and facilitate reflective processes and activities that help the process of change.

Research has shown that the effects of major life events on personality changes tend to be “small, scattered, and sometimes difficult to understand” (Costa et al., 2019, p. 436). Given that levels of eudaimonic well-being have been shown to have consequences for how people interact with life events (i.e., high psychological well-being facilitates an adaptive approach and better performance in coping with life challenges), the present findings suggest that how people interact with life events may be more important for personality trait change than the mere occurrence of life events per se. Reflective and transformative interaction with life events has been highlighted as important for trait change in several frameworks. Allemand and Flückiger (2017), for example, underscore the importance of these cognitive processes for trait change. They point out that personality traits change in response to certain life experiences, circumstances, and events, as well as how people perceive and understand these events. The ecological approach

to personality by Satchell et al. (2021) also emphasizes the importance of alterations in sensemaking processes and outcomes (i.e., perceptual shifts) for trait change. Psychological well-being has important implications for how people perceive and understand life events. People with high psychological well-being tend to view difficult life events as transformative experiences in which they gain new insights into life and themselves (Bauer et al., 2006; Ruini et al., 2012). For example, self-acceptance is a critical component of post-traumatic growth (Zhao et al., 2020). All six components of psychological well-being are associated with higher reliance on reappraisal and lower reliance on suppression as emotion regulation strategies (Gross & John, 2003).

It is also noteworthy that Joshanloo (2022), in a recent study using the MIDUS data and the RI-CLPM, examined the temporal within-person relationship between the Big Five and social well-being, the social aspect of eudaimonic well-being. Results showed that personality traits did not predict subsequent increases or decreases in social well-being. However, higher social well-being was associated with higher extraversion and conscientiousness over time. Two conclusions can be drawn from comparing the results of the present study with the results on social well-being. First, psychological well-being has temporal associations with more traits than social well-being. This may be because both traits and psychological well-being essentially capture private phenomena, whereas social well-being concerns broader social perceptions and behaviours. Second, none of the traits predicted future social well-being, whereas the plasticity traits predicted future levels of psychological well-being. This suggests that trait change has more influence on the private aspects of eudaimonic well-being and less on social well-being.

Although this is not an interventional or experimental study and it is not possible to draw causal conclusions from the present study, the results suggest that higher than usual levels of psychological well-being are associated with changes in traits toward maturity. It can be speculated that producing higher levels of psychological well-being through intervention may have the same effect. There is some evidence that interventions related to well-being may contribute to trait change. For example, Dweck (2021) provided a review of recent studies showing that interventions designed to promote a growth mindset can change specific actions and experiences that typically pertain to or characterize certain personality traits. Thus, the present findings could contribute to the development of trait change interventions.

Research on normative change in personality traits across the life course has shown that openness and extraversion tend to decline in adulthood, particularly at older ages (Bleidorn & Hopwood, 2019; Graham et al., 2020; Roberts et al., 2006), suggesting a growing decline in plasticity across the life course. This decline reflects continued disengagement from social and occupational roles, social and physical activities, and new relationships (Bleidorn & Hopwood, 2019). Although this decline reflects normative changes in expectations and experiences associated with aging, it may have some undesirable side effects as people age. Involvement in various activities is essential for mental and physical health in aging adults (World Health Organization, 2015). Extraversion is associated with more physical (Wilson & Rhodes, 2021) and social activity (Hirsh et al., 2009), which are per se protective against cognitive and physical decline in old age (James et al., 2011). Openness is associated with more diverse personal interests and exploratory tendencies (Matz, 2021) and cognitively stimulating activities (Schwaba et al., 2018) that facilitate better cognitive function (Stephan et al., 2020). Moreover, the present results suggest that a decline in plasticity traits may be associated with a future decline in psychological well-being. Overall, engagement in behaviours promoted by plasticity traits has far-reaching implications for the quality of life of older adults. This is an area in which the present findings can be applied. The results suggest that increases in psychological well-being are associated with future increases in plasticity traits. Therefore, participation in well-being-related activities and interventions could help individuals maintain or even increase their levels of extraversion and openness as they age. This possibility needs to be explored in future interventional studies.

## Neuroticism

Neuroticism is strongly associated with psychological well-being (Anglim et al., 2020). Consistent with these findings, the between-person correlation between neuroticism and psychological well-being in this

study was stronger than for other traits. The present study revealed, however, that there is no temporal within-person association between neuroticism and psychological well-being. This means that a higher or lower level of one of these variables does not predict deviations from typical levels of the other variable over time. These results imply that people with high neuroticism scores tend to have low psychological well-being on the between-individual level, yet neither variable precedes the other on the within-person level. This relationship is most likely caused by several common stable factors (environmental, psychological, or genetic) that influence both variables. This finding underscores the importance of separating the between and within levels of analysis.

Other studies found that neuroticism is associated with lower subjective well-being at the within-person level (Fetvadjev & He, 2019; Soto, 2015; Specht et al., 2012). Accordingly, this trait, along with extraversion, has been the focus of research on subjective well-being (Tauber et al., 2016). However, no within-person relationship was found between neuroticism and psychological well-being (this study) and social well-being (Joshanloo, 2022). This demonstrates the discriminant validity of dimensions of well-being and urges caution in generalizing results related to one dimension of well-being to other dimensions. Moreover, these results collectively imply that affective traits (neuroticism and extraversion) are of great importance for the development of subjective well-being, maybe because subjective well-being is essentially affective. Psychological well-being, on the other hand, is essentially functional (Vittersø, 2016), and this may explain why affective personality traits are less consequential for the development of psychological well-being. The fact that extraversion is a significant prospective predictor of psychological well-being appears to be primarily because it promotes more activity and engagement with the environment, rather than its association with more frequent positive affect. Indeed, subjective/hedonic well-being (including positive effect) does not prospectively predict psychological well-being (Joshanloo, 2019a).

## Limitations and future directions

Some limitations of the study should be noted. The study used brief measures of psychological well-being and personality traits, which prevents a complete and multidimensional examination of the constructs. Internal consistencies were not satisfactory for some of the variables. The moderate alpha coefficients reflect, to some extent, the small number of items per scale (to account for the time and cost constraints of a national survey) and the fact that the items were selected to optimize conceptual breadth within each construct rather than to maximize reliability (Ryff & Keyes, 1995). In any case, longer and more reliable and valid measures should be used in future studies to overcome this drawback. In addition, trait stability and change vary across cultures (e.g., Kitayama et al., 2020), and traits are differently associated with aspects of well-being in different cultures (e.g., Vazsonyi et al., 2015). Therefore, the current findings cannot be generalized to other cultural groups.

Another limitation is that the sample covered life stages beyond childhood, adolescence, and emerging adulthood. Although changes in stability levels over the life course are small, rank-order stability of personality traits is lower in childhood and adolescence than in adulthood (Bleidorn & Hopwood, 2019; Roberts & DelVecchio, 2000). There are also differences in mean-level change in personality traits at different life stages. For example, neuroticism tends to increase during adolescence, whereas it tends to decrease during young and middle adulthood (Bleidorn & Hopwood, 2019). Given these differences across life stages, the current findings cannot be generalized to the early life stages, including adolescence and emerging adulthood.

The interval of approximately 10 years between measurements is appropriate for this study, which aimed to examine long-term changes in well-being and traits. However, would the results be replicable with shorter intervals? Costa et al. (2019) note that the retest interval is important for rank-order stability of personality traits, but most of the decline in stability occurs within 3 years and the retest interval has little significance for the degree of stability beyond 3 years. A recent meta-analysis (Bleidorn et al., 2022) found that the amount of mean-level change in personality traits increased with longer time lags between assessments. In the absence of other studies, it is not possible to estimate how lag length effects the

magnitude of the cross-lagged effects between psychological well-being and personality traits. However, a study with a shorter time lag may yield smaller changes in mean levels of well-being and traits between time points. Therefore, future studies are needed with different lag lengths, particularly less than 3 years.

## CONCLUSION

This study shed light on the within-person relationships between the Big Five traits and psychological well-being. For extraversion and openness, there are reciprocal within-person associations with psychological well-being. For agreeableness and conscientiousness, however, the within-person associations are not reciprocal, but run from psychological well-being to traits. The effect sizes are moderate to strong. Due to the relatively long interval between assessments, the present results describe only the long-term interplay between psychological well-being and traits. Given that changes in psychological well-being are followed by changes in personality traits, it might be that changes in well-being through interventions may also result in changes in some of the traits. Similarly, changes in extraversion and openness due to interventions may be followed by changes in psychological well-being. These possibilities need to be explored in future research. Future studies also need to replicate the findings of this study with samples from different age groups and cultural contexts, using different lag lengths.

## AUTHOR CONTRIBUTIONS

**Mohsen Joshanloo:** Conceptualization; data curation; formal analysis; investigation; methodology; writing –original draft; writing –review and editing.

## CONFLICT OF INTEREST

All authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

All data and study materials are publicly available. More information is available at <http://midus.wisc.edu/data/index.php>.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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