Article

Does Perceived Similarity Between Present and Future Self Predict Well-Being? A Reanalysis and Replication of Reiff et al. (2020)

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Abstract

Reiff and colleagues found that perceived similarity between one's present and future self is positively associated with life satisfaction 10 years later, using a difference-score approach to operationalize similarity. This study further evaluated the similarity effect by reproducing the original longitudinal association with a difference-score method, by using more sophisticated analyses (i.e., polynomial regression and response surface analyses), and by replicating the association in a newly collected sample. We were able to reproduce and replicate the findings based on a difference-score approach. However, we did not find a similarity effect in either sample using more sophisticated approaches. The current results show that previously reported support for the association between perceived similarity and well-being is driven by the statistical main effects of personality reports.

Does perceived similarity between one's present and future self predict later happiness? Reiff and colleagues (2020) examined this question and found that when people reported that their future personality traits were closer to their present personality traits, higher life satisfaction was reported 10 years later. This similarity effect remained robust after controlling for demographic variables and current life satisfaction ratings.

The study by Reiff et al. (2020) had several important strengths, including the use of longitudinal data, a large sample, and openly available data and analysis code. A potential limitation of the original study, however, is the use of a difference score as the similarity measure. Methodologists have identified several concerns with difference scores (e.g., Edwards, 2001; Griffin et al., 1999) and suggested polynomial regression and response surface analysis as rigorous alternatives (e.g., Edwards, 1994, 2002) Specifically, the difference score may reflect the statistical effects of the constituent variables rather than something unique about the similarity of those two variables. Thus, the original result may reflect previously established associations between self-reports of personality and well-being (e.g., Anglim et al., 2020) rather than something unique about the similarity of present and future personality traits. The goal of this study was to evaluate the similarity effect

reported by Reiff and colleagues by first reproducing the original analyses, then using the alternative approach with the original data (i.e., methodological extension), and finally, replicating the effect using different, cross-sectional data as a robustness check.

Prior Research on Future Self-Continuity

Perceiving similarity between one's present and future self (i.e., future self-continuity; Sedikides et al., 2023) has been associated with many positive attributes: delayed gratification (Bartels & Rips, 2010), long-term decision-making (Urminsky, 2017), ethical behavior (Hershfield et al., 2012), sense of meaning in life (Chu & Lowery, 2023), and physical health (Sedikides et al., 2023). Lower future self-continuity, on the contrary, might explain procrastinating behaviors (Sirois & Pychyl, 2013) and is linked with more psychopathological symptoms (Sokol & Serper, 2019).

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Taken together, the benefits of higher self-continuity between the present and the future self might lead to higher well-being.

While self-continuity is a compelling concept, it is challenging to measure. Previous studies have used several methods and study designs, including observational and experimental designs. For example, participants' perception of self-continuity was measured by their evaluation of how similar they think they are to their perceived future selves (Bartels & Rips, 2010; Hong et al., 2024; Sedikides et al., 2015; Sokol & Serper, 2019). The Venn Diagram Measure of Self-Continuity (Ersner-Hershfield et al., 2009) is another frequently used measure in which participants are presented with the two circles each representing the present and future self, respectively, and participants choose the amount of overlap that best represents their future self-continuity. Finally, implicit measures of self-continuity have also been employed, for which participants respond to descriptive words about the present and future self with "me" or "not me" ratings (e.g., Rutt & Löckenhoff, 2016).

Methodological Issues

In the study of Reiff et al. (2020), participants were asked about their perceptions of their present and future selves in terms of six traits each. Using these 12 items, the authors employed a difference score to measure future self-continuity.

There are several concerns with using difference scores when testing similarity effects (e.g., Edwards, 2001; Edwards & Parry, 1993). One concern is that difference scores do not simultaneously control for the contribution of the individual components (e.g., the contribution of the present and future self) in predicting the outcome variable (e.g., well-being). For example, to receive a large discrepancy between the present and future self on an item like "energetic," participants must necessarily have high levels in "energetic" either for their present or future reports, and it is likely that a high score on energy drives the effect on well-being (Anglim et al., 2020). Thus, the difference score alone cannot establish whether a similarity effect exists beyond the individual contributions of the two predictors. In the case of Reiff et al. (2020), similarity between the present and future self could drive the effect on well-being, or it could be attributable to the contributions of the present and/or future self. Moreover, the use of the difference scores rests on the assumption that the difference between two variables is comparable at any given level. For instance, a difference on a higher level (e.g., $10 - 8 = 2$) is assumed to be equivalent to a difference score on a lower level (e.g., $3 - 1 = 2$; Edwards, 2001).

An alternative approach for testing similarity effects is to use polynomial regression and response surface analyses (e.g., Edwards, 1994; Humberg et al., 2019). These methods include different effects (e.g., individual contribution of predictors, their difference score, and their additive effect) and evaluate whether the similarity between two components is predictive of an outcome variable beyond each predictor's unique (or added/subtracted) contribution. Response surface analyses provide a powerful tool for clearly delineating and illustrating the effect patterns that are combined in a typical difference score.

The Present Study

We pre-registered three different approaches to test whether similarity to one's future self predicts well-being 10 years later (https://osf.io/ja3wc). First, we reproduce the original method used by Reiff et al. with their original code and data. Second, using the original data, we use polynomial regression and response surface analyses to evaluate whether we find support for the original hypothesis using alternative methods. Third, we collected cross-sectional data from 1,250 college students to conduct data robustness checks using both difference scores and polynomial regression and response surface analyses. The rationale of these new analyses was to show that the potential artifactual association between the difference scores and the outcomes, the potential change in results when more sophisticated analyses are used, is robust.

Study 1

Method

Procedure and Participants. The Midlife in the United States study (MIDUS) is an ongoing longitudinal research project that follows a national probability sample of U.S. adults recruited using random digit dialing in the 48 contiguous states (Brim et al., 2004). Three waves of data are available for public use (Time 1: 1995–1996; Time 2: 2004–2006; and Time 3: 2013–2015). In each wave, participants took part in a phone interview and two self-administered questionnaires that assess behavioral, psychological, social, and biological indicators of aging. Following the original study, we use data from the first two waves in this study.

The original sample of Reiff et al. (2020) included everyone who participated at both Time 1 and Time 2 ($N = 4,963$). The sample was on average aged 46.5 years (range = 20–75 years). The sample included 53.3% female participants. We used the same sample.

Measures

Perceived Personality Similarity. Perceived personality similarity between the present self and the future self was assessed with 12 items: six items asked the participants to rate how they are now (calm and even-tempered, willing to learn, energetic, caring, wise, and knowledgeable) and the other six items asked participants how they think they will be 10 years from now. Items were rated on a 10-point scale ranging from 1 (*not at all*) to 10 (*very much*). These items were assessed at Time 1. To create a difference score, the

original authors used the absolute difference scores between each of these traits' present and future ratings and reverse-coded them with higher values reflecting more similarity. These were aggregated across traits into a percentage score. To prepare variables for the polynomial regression and response surface analyses, we created five scores: Two mean scores that are aggregated across the six items for the present ($\alpha = .77$) and the future self ($\alpha = .81$), their squared (higher order) terms, and interaction term (see Analytic Strategy section for more details).

Life Satisfaction. Life satisfaction was measured with a five-item scale, asking how satisfied respondents were with their work, health, relationship with spouse/partner, relationship with children, and life overall. Participants responded to each question using an 11-point scale, ranging from 0 (*the worst possible*) to 10 (*the best possible*; Prenda & Lachman, 2001). Data from both time points (i.e., Times 1 and 2) were used for this study.

Control Variables. Consistent with the original research, control variables included age, gender, household income (log-transformed), education, and life satisfaction measured at Time 1.

Analytic Strategy

We first reproduced the association between perceived similarity, and later (i.e., Time 2) life satisfaction, using the approach from the original study (and using the original authors' code: https://osf.io/yqxme). Specifically, we tested whether the difference-score-based similarity index predicted life satisfaction at Time 2 on its own, when controlling for demographic variables, and when controlling for demographic variables and initial (i.e., Time 1) levels of life satisfaction.

Next, we used polynomial regression and response surface analyses to test the similarity hypothesis while controlling for the components of the similarity score (Humberg et al., 2019). For that purpose, we created a mean score for "Present Personality" across all six personality traits rated for the present self, and a mean score for "Future Personality" across all six personality traits rated for the future self.[1] These mean scores reflect the two base predictors of later life satisfaction. We included them into a polynomial regression equation (see Equation 1): Life satisfaction 10 years later (Z) is regressed on the Present Personality (X) and the Future Personality (Y), the higher order term of the Present Personality (X^2), the interaction between the Present Personality and the Future Personality (XY), and the higher order terms of the Future Personality (Y^2).

$$Z = b_0 + b_1 X + b_2 Y + b_3 X^2 + b_4 XY + b_5 Y^2 + e \quad (1)$$

Using these polynomial regression coefficients, we can compute response surface parameters (i.e., $a1$, $a2$, $a3$, and $a4$) to plot the data on a three-dimensional plot. The parameters $a1$, $a2$, $a3$, and $a4$ are computed based on the regression coefficients of the polynomial regressions (see example plots in Figure 1). This response surface plot includes the line of congruence and the line of incongruence. The line of congruence is based on the parameters $a1$ and $a2$ and displays how the agreement of two variables—in our case the present and the future self—are related to an outcome (e.g., well-being). The $a1$ parameter signifies whether the line of congruence is above the point (0, 0) and is created from the polynomial regression coefficients ($b1 + b2$). In isolation, this effect is an additive effect of both predictor variables. The parameter $a2$ signifies whether the line of congruence is linear or curvilinear and is created from the polynomial regression coefficients (i.e., $b3 + b4 + b5$). In isolation, if $a2 = 0$, $a1$ signifies the slope of a linear line. In this case, if $a1$ is positive and significant, it indicates a rising ridge or additive effect suggesting that the effect is characterized by the main effects of the two variables (e.g., present and future self; see Figure 1A).

The line of incongruence is based on the parameters $a3$ and $a4$ and displays how the disagreement or incongruence of two variables (e.g., present and future self) is related to an outcome variable (e.g., well-being score). The parameter $a3$ is based on $b1 - b2$ (i.e., the difference or discrepancy between the predictor variables), whereas $a4$ is based on $b3 - b4 + b5$. Similar to the parameters $a1$ and $a2$, $a3$ indicates whether the line of incongruence is above the point (0, 0) whereas $a4$ indicates whether the line of incongruence on the surface is linear or curvilinear (i.e., the curvature of the line of incongruence; see Edwards & Parry, 1993; Humberg et al., 2019; Shanock et al., 2010 for more details). Figure 1B shows a strict similarity or congruence effect with a flat ridge (line of congruence). This effect is what we believe Reiff et al. (2020) were hypothesizing and testing: irrespective of people's position on the personality dimension, if the present self is similar to the future self, the highest well-being ratings should be obtained.

We followed the guidelines provided by Humberg and colleagues (2019) about how to determine whether a strict similarity effect (i.e., no additional main effects of the predictors; see Figure 1B) is present based on the results of the polynomial regressions. Specifically, we computed the response surface parameters $a1$ to $a4$ and, in addition, the parameters $p10$ and $p11$ that relate to the first principal axis (i.e., the ridge of the response surface).

For that purpose, Humberg et al. (2019) formulated six criteria, two regarding the principal axis or ridge of the surface (which should correspond with the line of congruence), two regarding the line of incongruence, and two regarding the line of congruence. Thus, a congruence or similarity effect is present if (1) the $p10$ parameter is nonsignificant, (2) the confidence interval of $p11$ includes 1, (3) the $a4$
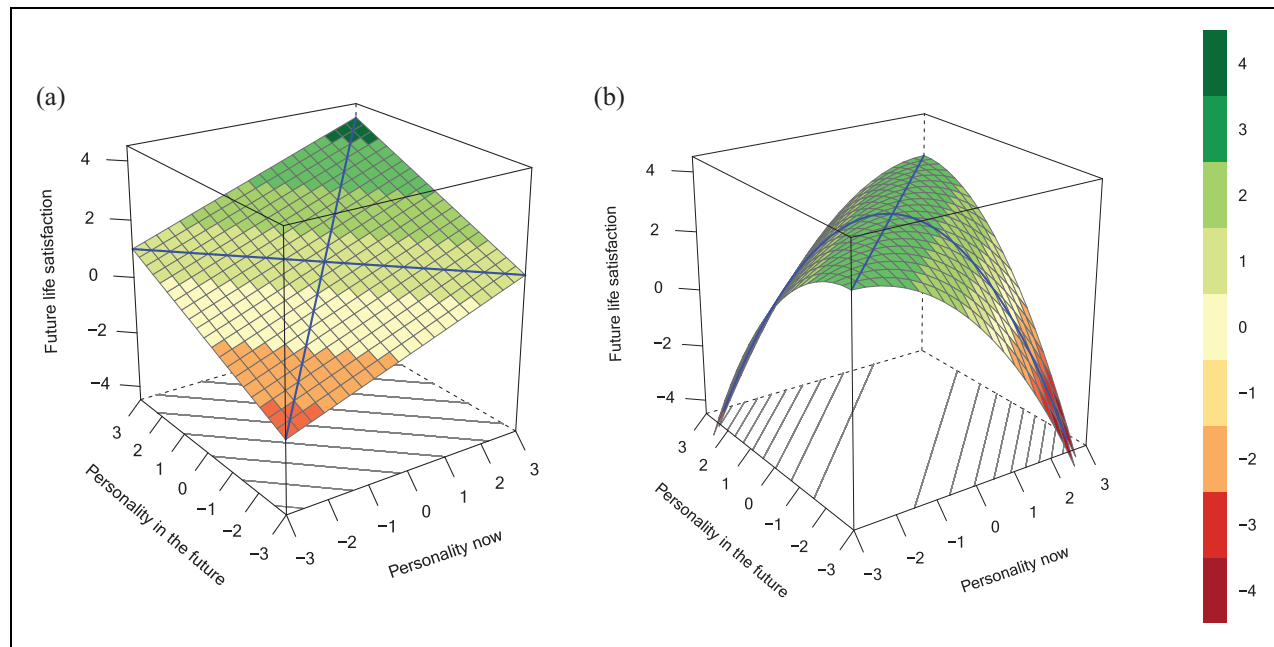
Figure 1. *Similarity Effect for Personality Now and in the Future Life Satisfaction 10 Years Later*
Note. The line of congruence runs from the front corner to the back corner, whereas the line of incongruence runs from the left corner to the right corner. Figure 1A displays a rising ridge or additive effect, whereas Figure 1B shows a similarity effect.

Table 1. *Correlations for Continuous Variables of Reproduction of Reiff et al. (2020), Using the Original Data*

Variable		M	SD	1	2	3	4	5
1	1995 perceived similarity	92.56	5.49					
2	2005 life satisfaction	7.82	1.14	**.21** [.18, .24]				
3	1995 life satisfaction	7.82	1.15	**.23** [.20, .26]	**.52** [.49, .54]			
4	1995 log income	10.94	0.92	**.07** [.04, .10]	**.15** [.12, .18]	**.13** [.10, .16]		
5	1995 education	2.91	0.97	**.08** [.05, .11]	**.09** [.06, .12]	.01 [−.01, .04]	**.31** [.28, .34]	
6	1995 age, years	46.46	12.51	**.17** [.14, .19]	**.15** [.12, .18]	**.19** [.16, .22]	**−.11** [−.14, −.08]	**−.13** [−.16, −.10]

Note. Values in square brackets indicate the 95% confidence interval. Correlations in bold are significant ($p < .05$).

parameter is significantly negative, (4) the $a3$ parameter is nonsignificant, (5) the $a2$ parameter is nonsignificant, and (6) the $a1$ parameter is nonsignificant.

Prior to running the main polynomial regressions, we grand-mean centered all predictor variables and examined their variance inflation factor. A variance inflation factor below 5 suggests that there is little to no multicollinearity present between the predictors—an essential precondition for running regression analyses (James et al., 2013). In a first analysis set, we tested whether a similarity effect was detectable between the mean-scored present self and future self. We then repeated the same analyses, first including the demographic control variables and then including both the demographic control variables and initial levels of life satisfaction at Time 1. In a second analysis set, we tested each of these models with each personality trait separately (e.g., calm and even tempered, caring, and wise). All polynomial

regression models were computed with 10,000 bootstrap samples. Missing data were handled with a full-information maximum likelihood approach. The code for these analyses can be found on our accompanying OSF page (https://osf.io/8hz3s).

Results

Reproduction. Table 1 shows the descriptive statistics of the variables and Table 2 presents the full regression results. We exactly reproduced the correlations reported by Reiff and colleagues (2020) and their regression results: the similarity effects of perceived similarity on later life satisfaction ($\beta = .204$, 95% confidence interval [CI] = [.169, .238]), controlling for demographic variables ($\beta = .163$, 95% CI = [.128, .198]), and controlling for demographic variables and Time 1 life satisfaction ($\beta = .066$, 95% CI = [.034,

Table 2. *Reproduction of Regression Analyses of Reiff et al. (2020) Using Original Data Predicting Life Satisfaction*

	Dependent variable								
	2005 life satisfaction								
	Model 1			Model 2			Model 3		
Variable	b	95% CI	p	b	95% CI	p	b	95% CI	P
1995 perceived similarity	**0.204**	[0.169, 0.238]	< .001	**0.163**	[0.128, 0.198]	< .001	**0.066**	[0.034, 0.099]	< .001
1995 log income				**0.149**	[0.114, 0.184]	< .001	**0.081**	[0.050, 0.111]	< .001
1995 education				**0.057**	[0.022, 0.091]	.001	**0.065**	[0.035, 0.095]	< .001
1995 age				**0.156**	[0.123, 0.189]	< .001	**0.079**	[0.049, 0.109]	< .001
1995 gender				**0.072**	[0.041, 0.103]	< .001	**0.047**	[0.019, 0.075]	.001
1995 life satisfaction							**0.478**	[0.446, 0.510]	< .001
Constant	0.020	[−0.012, 0.051]	.218	0.002	[−0.029, 0.033]	.898	−0.006	[−0.034, 0.022]	.656
Observations		3,578			3,578			3,578	
R^2		.042			.089			.291	

Note. Gender is contrast coded with female (1) and male (−1). All other variables are standardized. Coefficients in bold are significant ($p < .05$). CI = confidence interval.

Table 3. *Variance Inflation Factors of the Models Tested*

Study	Present personality	Future personality	Present personality^2	Present x future personality	Future personality^2
Study 1	3.36	4.06	**5.33**	**7.71**	3.44
Study 2	2.81	3.09	**5.45**	**15.19**	**7.06**

Note. Values in bold are above the recommended variance inflation factor of 5 (Fox, 2016; Humberg et al., 2019).

Table 4. *Response Surface Parameters for Future Life Satisfaction (MIDUS Data) with no Control Variables*

Predictor	Present personality (b1)			Future personality (b2)			Present personality^2 (b3)			Present × future personality (b4)			Future personality^2 (b5)		
	b	95% CI	p	b	95% CI	P	b	95% CI	p	b	95% CI	p	b	95% CI	P
Study 1															
Personality	**.38**	[.33, .43]	<.001	**−.07**	[−.12, −.02]	.010	.03	[−.01, .06]	.189	.03	[−.01, .08]	.240	**−.03**	[−.06, −.02]	.001
Personality with control	**.30**	[.24, .35]	<.001	.01	[−.05, .06]	.869	.03	[−.01, .08]	.138	.01	[−.03, .07]	.798	−.02	[−.04, −.01]	.056
Personality with control and stability	**.12**	[.06, .17]	<.001	.00	[−.05, .05]	.960	.03	[−.01, .07]	.104	−.01	[−.05, .04]	.592	−.01	[−.03, .01]	.365
Study 2															
Personality	**.50**	[.42, .57]	<.001	−.04	[−.13, .05]	.364	−.05	[−.13, .02]	.197	.12	[−.01, .27]	.088	−.05	[−.14, .03]	.218
Personality with control	**.49**	[.41, .57]	<.001	−.04	[−.13, .05]	.397	−.04	[−.12, .02]	.251	.11	[−.01, .26]	.104	−.05	[−.14, .02]	.213

Note. Coefficients in bold are significant ($p < .05$). MIDUS = Midlife in the United States study; CI = confidence interval.

.099]), using a difference score as the measure of future self-continuity. Without control variables, a 1-*SD* increase in perceived similarity statistically predicted a 0.204 *SD* increase in life satisfaction 10 years later. With control variables, this effect was reduced to 0.163, and dropped to 0.066 when also controlling for initial levels of life satisfaction.

Methodological Extension

Table 3 shows the variance inflation factors of the five predictors of present and future self. Notably, two of the five variance inflation factors were above the recommended threshold of <5.0, suggesting that multicollinearity between predictors might be present. Table 4 shows the individual effects for each predictor: present personality, future personality, their interaction, and quadratic terms.[2]

Present personality was a positive predictor of life satisfaction 10 years later, whereas future personality was a negative predictor, and a negative quadratic predictor of life satisfaction 10 years later. However, when controlling for the covariates, and when adding initial levels of life satisfaction as predictors, only present personality was a significant predictor of life satisfaction 10 years later.

Table 5. *Response Surface Parameters for Future Life Satisfaction (MIDUS Data) With No Control Variables*

Predictor	a1			a2			a3			a4		
	b	95% CI	p	B	95% CI	p	b	95% CI	P	b	95% CI	P
Study 1												
Personality	**.32**	[.28, .35]	<.001	**.02**	[.01, .04]	.015	**.45**	[.35, .54]	<.001	−.03	[−.14, .04]	.475
Personality with control	**.30**	[.27, .33]	<.001	**.02**	[.01, .04]	.012	**.30**	[.19, .40]	<.001	.01	[−.11, .09]	.865
Personality with control and stability	**.12**	[.09, .15]	<.001	.01	[−.00, .03]	.110	**.12**	[.02, .22]	.022	.04	[−.08, .12]	.440
Study 2												
Personality	**.46**	[.40, .51]	<.001	.02	[−.02, .06]	.275	**.54**	[.38, .69]	<.001	−.22	[−.52, .03]	.113
Personality with control	**.45**	[.40, .51]	<.001	.02	[−.02, .05]	.325	**.53**	[.37, .69]	<.001	−.21	[−.50, .03]	.131

Note. Coefficients in bold are significant (*p* < .05). Response surface parameters are computed as the following: *a*1 = *b*1 + *b*2; *a*2 = *b*3 + *b*4 + *b*5; *a*3 = *b*1− *b*2; and *a*4 = *b*3 −*b*4 + *b*5. MIDUS = Midlife in the United States study; CI = confidence interval.

Table 6. *Response Surface Parameters (p10 and p11) for Future Life Satisfaction (MIDUS Data) With No Control Variables*

Predictor	p10			p11		
	B	95% CI	p	b	95% CI	p
Study 1						
Personality	**−2.10**	[−3.45, −.50]	.004	0.22	[−.05, .70]	.265
Personality with control	−0.39	[−3.46, 5.09]	.999	0.06	[−.21, .76]	.812
Personality with control and stability	0.99	[−9.99, 17.87]	.997	−0.15	[−.42, .79]	.862
Study 2						
Personality	−2.40	[−31.84, −.60]	.998	0.98	[−.12, 2.95]	.952
Personality with control	−2.43	[−35.59, −.63]	.999	0.94	[−.40, 2.96]	.995

Note. Coefficients in bold are significant (*p* < .05). MIDUS = Midlife in the United States study; CI = confidence interval.

Table 7. *Checking the Humberg et al. (2019) Criteria for the Polynomial Regression Results With Life Satisfaction (MIDUS Data) With No Control Variables*

	Study 1			Study 2	
Humberg et al. (2019) criteria	Personality	Personality with control	Personality with control and stability	Personality	Personality with control
1. *p*10 parameter is nonsignificant	X	✓	✓	✓	✓
2. The confidence interval of *p*11 includes 1	X	X	X	✓	✓
3. The *a*4 parameter is significantly negative	X	X	X	X	X
4. The *a*3 parameter is nonsignificant	X	X	X	X	X
5. The *a*2 parameter is nonsignificant	X	X	✓	✓	✓
6. The *a*1 parameter is nonsignificant	X	X	X	X	X

Note. MIDUS = Midlife in the United States study. Cells in gray are criteria that were not fulfilled.

Table 5 shows the *a*1 to *a*4 parameters and Table 6 shows the *p*10 and *p*11 parameters, which inform the response surface analysis. Across the different models, the additive effect (i.e., *a*1 parameter) and the difference score (i.e., *a*3 parameter) were positive predictors of life satisfaction 10 years later. In other words, participants reported the highest life satisfaction 10 years later if their present and future self were rated highly. In addition, and in line with the original difference-score approach, the difference between the present and future personality was linked to

life satisfaction. However, it needs to be mentioned that the *a*1 and *a*3 effects seem to be driven by the main effect of the present self (i.e., *b*1, see Table 4). The checklist shown in Table 7 corroborates that no strict similarity effects were obtained for any of the three models.

Figure 2 depicts the response surfaces. As shown in Figure 2A, the highest life satisfaction scores 10 years later were reported by individuals who had high ratings in their present and future personality. This effect was attenuated when covariates were entered (see Figure 2B), and further

Table 8. *Correlations for Continuous Variables of Replication Using New Data*

Variable		M	SD	1	2
1.	Perceived similarity	86.95	5.91		
2.	Life satisfaction	6.51	1.60	**.31** [.25, .35]	
3.	Age, years	19.47	1.22	.05 [−.00, .11]	.03 [−.03, .08]

Note. Values in square brackets indicate the 95% confidence interval. Correlations in bold are significant ($p < .05$).
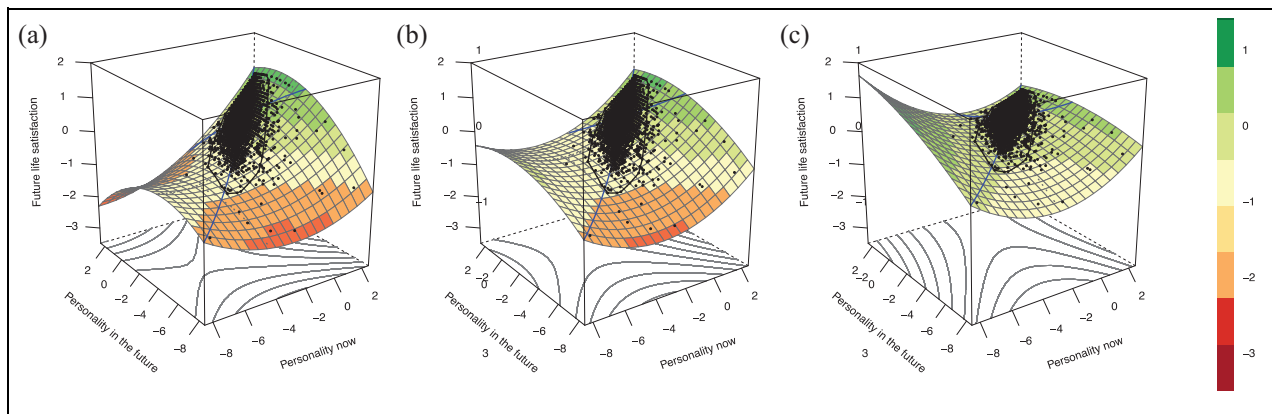
Figure 2. *Study 1: Response Surfaces for Personality Now and in the Future Life Satisfaction 10 Years Later*
Note. The figures show the response surfaces for the prediction of the ratings for the present self (personality now) and future self (personality in the future) on future life satisfaction. The underlying regression model of Figure 2A included no control variables; for Figure 2B, it included income, education, age, and gender, and, for Figure 2C, it included income, education, age, gender, and initial life satisfaction levels. The line of congruence runs from the front corner to the back corner, whereas the line of incongruence runs from the left corner to the right corner.

attenuated when additionally controlling for initial levels of life satisfaction (see Figure 2C). Based on these analyses, a similarity effect on life satisfaction 10 years later is not supported.[3]

Study 2

The goal of Study 2 was to examine the robustness of results from each analytic approach (i.e., the difference-score results obtained by Reiff et al., 2020, and the polynomial regression and response surface analyses) with new data. In contrast to the original study, the data from Study 2 is a cross-sectional student sample. Although these data have limitations, they are adequate for testing the robustness of the methodological issues identified in Study 1. Moreover, previous research suggests that the positive outcomes of future self-continuity can be measured contemporaneously and in a student sample (e.g., Zhang & Chen, 2018).

Method

Procedure and Participants. We recruited 1,250 undergraduate students at Michigan State University. Recruitment and data collection took place between March and April 2022.

Participants filled out an online survey administered by Qualtrics and received course credit for their participation. The mean age of the sample was 19.5 years, with an age range of 18 to 29 years. Four individuals did not disclose their age. The majority of the participants were female (72.00%), followed by male (26.16%), nonbinary (1.28%), male/nonbinary (0.08%), and gender-fluid (0.08%). Some individuals preferred not to describe their gender (0.16%) or did not enter their gender information (0.24%).

Measures

Perceived Personality Similarity. Perceived personality similarity was measured with the same 12 items used for Study 1.

Life Satisfaction. We slightly adjusted the original items used by Reiff et al. (Prenda & Lachman, 2001) because not all domains were expected to be relevant for our student population (e.g., relationship with children). Thus, we asked the students how satisfied they were overall, with their schoolwork/academic achievement, with their health, with their relationship with spouse/partner, and with their relationship with their friends. All items were rated on an 11-point scale ranging from 0 (*worst possible*) to 10 (*best possible*). The item about satisfaction with the relationship

Table 9. *Replication of Regression Analyses of Reiff et al. (2020) Using New Data Predicting Concurrent Life Satisfaction*

	Dependent variable			Life satisfaction		
	Model 1			Model 2		
	b	95% CI	*p*	*b*	95% CI	*P*
Perceived similarity	**.30**	[.24, .36]	< .001	**.30**	[.24, .36]	< .001
Age				.01	[−.05, .06]	.771
Gender (female, male)				−.02	[−.08, .04]	.542
Gender (binary, nonbinary)				NA	NA	NA
Constant	.02	[−.03, .07]	.457	.03	[−.03, .09]	.364
Observations			1,193			1,193
R^2		.09			.09	

Note. Gender is contrast coded with (1) female and (−1) male as well as (−1) binary and nonbinary (1). All other variables are standardized. The coefficients for gender (binary, nonbinary) could not be computed in this set of analysis. CI = confidence interval.

with their spouse/partner was not answered by 344 (27.5%) participants. We created mean scores across these items, irrespective of whether students rated all items or not.

Control Variables. As control variables, we included age and gender (i.e., two variables including female/male and binary/nonbinary). We did not ask/control for education, given that all participants were undergraduate students.[4]

Analytic Strategy

We used the same analytic code as the original authors with one exception: We excluded participants who said that they had not answered all questions honestly or that they had not taken part in the study seriously (Aust et al., 2013). This helped to address concerns about the negative consequences of careless responding in survey research (e.g., Ward & Meade, 2023). The first model included perceived similarity between participants' present and future personality as a predictor of life satisfaction. The second model included perceived similarity as a predictor of life satisfaction, while controlling for age and gender.

A second set of analyses included polynomial regression and response surface analyses. We tested one model with the present and future self predicting well-being, and, the next, additionally controlling for age and gender. The collected data, materials, and code for these analyses are available on OSF: (https://osf.io/8hz3s).

Results

Replication. Table 8 shows the descriptive statistics of the variables. Using similar regression models based on the difference-score approach used by the original authors, we found that perceived similarity predicted higher levels of concurrent life satisfaction (β = .302, 95% CI = [.243, .361]). When controlling for age and gender, we also obtained virtually the same effect of perceived similarity on concurrent life satisfaction (β = .302, 95% CI = [.243,

.361]; see Table 9). In other words, with or without control variables, a 1-*SD* higher perceived similarity was associated with a 0.302-*SD* higher concurrent life satisfaction.

Table 3 shows the variance inflation factor results for present and future personality, their interaction, and squared effects. Again, not all predictors are exempt from concerns about multicollinearity. Table 4 presents the results of the polynomial regressions, Table 5 presents the response surface parameters, Table 6 presents the *p*10 and *p*11 parameters, and Table 7 presents Humberg's checklist. Similar to Study 1, we found that the additive effect (*a*1 parameter) and the difference score (*a*3 parameter) were significant; however, these effects were primarily driven by the main effect of the present personality (see Table 4). When examining the response surfaces of Figure 3A (i.e., uncontrolled model) and Figure 3B (i.e., controlling for age and gender), the pattern suggests that the obtained effect is more in line with an additive effect, rather than a similarity effect (see Note 4).

Discussion

This study aimed to directly reproduce, methodologically extend, and replicate the findings of Reiff et al. (2020). In other words, we examined the same measure of similarity used by Reiff and colleagues to test whether the original conclusions about a similarity effect are justified when using polynomial regression and response surface analyses. To that end, we used the original data and code (reproduction), the original data with polynomial regression and response surface analysis (methodological extension), and analyses on a new, cross-sectional sample (replication).

The original Reiff et al. (2020) findings suggested that similarity of the present and future self is predictive of well-being 10 years later. We were able to reproduce and replicate this similarity effect with the original sample and a new sample. The effect was also robust when controlling for demographic variables (Studies 1 and 2) and the stability of
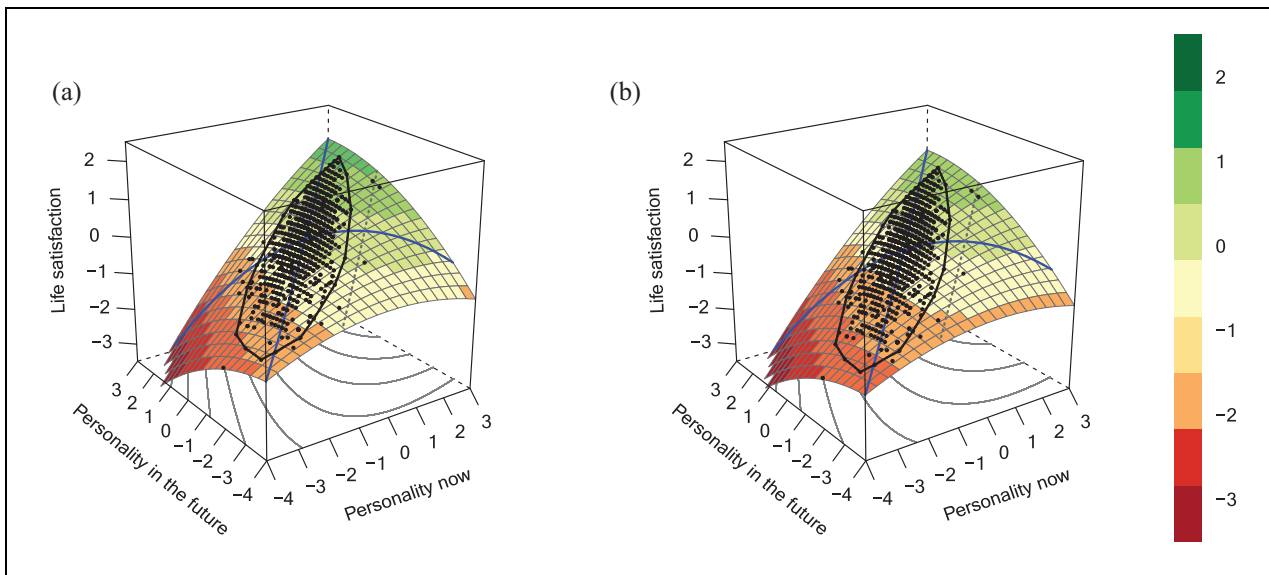
Figure 3. *Study 2: Response Surfaces for Personality Now and in the Future Predicting Life Satisfaction*
Note. The figures show the response surfaces for the prediction of the ratings for the present self (personality now) and future self (personality in the future) on future life satisfaction. The underlying regression model of Figure 3A included no control variables and for Figure 2B it included age and gender. The line of congruence runs from the front corner to the back corner, whereas the line of incongruence runs from the left corner to the right corner.

well-being across time (Study 1). Thus, using the difference-score approach of the original article across two different samples, we were able to corroborate the robustness of the association between future self-continuity and well-being.

However, when using a polynomial regression and response surface approach, a similarity effect between the present and future self did not emerge—neither in the original sample (Study 1) nor in the new sample (Study 2). The response surfaces indicated that there was not a strict similarity effect per se, meaning that similarity between the present and the future self at any point on the personality dimension (e.g., low ratings for present and future self; high ratings for present and future self) was not predictive of higher well-being. Rather, the findings suggest that the ratings of the present (and future self) predict well-being. In other words, if people rated themselves in a more positive light in the present and the future (e.g., high ratings), both ratings were associated with well-being concurrently (Study 2) and across 10 years (Study 1). This approach demonstrates that there is no unique statistical effect of the similarity between the two personality reports for predicting well-being. The original difference-score method is unable to reveal this pattern because it combines the main effects of the two sets of personality reports (present and future) with the difference between them. This is one reason why the difference-score approach is viewed critically (Edwards, 2001; Griffin et al., 1999).

Our findings have important implications for research on self-continuity specifically and similarity studies more broadly. Foremost, this study illustrates how difference

scores are limited in testing a similarity or congruence hypothesis. Namely, the main conclusion of Reiff et al. (2020) that "perceptions of similarity at one time point are positively linked to well-being 10 years later" (p. 6) is not supported by these analyses. The difference score reflects multiple and conceptually distinct sources of variance, so it is unclear to what degree well-being is associated with (1) present reports of personality, (2) future reports of personality, or (3) the difference between these two reports (i.e., self-continuity). The analyses conducted here provide an alternative interpretation to the Reiff et al. (2020) conclusion at odds with a self-continuity interpretation. We found that perceptions of the present and the future self are associated with reports of well-being 10 years later (Study 1) and cross-sectionally (Study 2) rather than finding that self-continuity per se is associated with well-being. Put differently, the individual perceptions of present and future personality rather than the similarity in these perceptions were associated with well-being in these data. Accordingly, we caution against using difference scores as a method to test similarity hypotheses.

To be clear, these findings only apply to research findings that rely on difference-score-based methods; we cannot draw conclusions about the association between self-perceived measures of future self-continuity and well-being (e.g., Ersner-Hershfield et al., 2009). Based on the original and new data, we conclude that similarity measures based on ratings about the present and future self might not be able to capture the essence of self-continuity and do not seem to be the driving factor in predicting future well-

being. Thus, future theorizing and empirical studies are needed to understand what measures are capturing and what components are driving the effects of future self-continuity.

Our study does not to rule out that a future self-continuity effect on well-being does not exist. Experimental findings suggest that increasing participants' present–future self-continuity is associated with positive outcomes (e.g., Chu & Lowery, 2023). Although these experiments might successfully manipulate directly measured future self-continuity, their manipulations have previously varied across studies (e.g., letter-writing task, thinking of the future, or creating a future profile) and have not yet been replicated. In addition, the question remains whether more direct measures of future self-continuity (the experiments' manipulation check) are independent of a person's self-reports of their personality.

In conclusion, similarity between the present and the future self is robustly predictive of well-being when using a difference-score approach. Findings based on polynomial regression and response surface analyses, however, do not corroborate the self-continuity hypothesis and do not suggest that similarity per se is predictive of well-being. Instead, these more stringent analyses suggest that perceptions of present and future personality traits are what seems to be associated with well-being. Thus, results that seem to support a self-continuity explanation may instead reflect previously known associations between self-perceived personality traits and well-being.

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Supplemental Material

Supplemental material is available in the online version of the article.

Notes

1. It might seem unusual to aggregate seemingly different traits into a single score. However, we would not expect these traits to be independent because of their evaluative nature. More importantly, it is necessary to aggregate to test whether the aggregated difference predicts later life satisfaction after controlling for the main effects.
2. We report the correlations between the individual personality items and their respective present and future personality scores (rs = .65–.76), as well as the individual personality items and life satisfaction 10 years later (rs = .15–.36) in Supplemental Table 16.
3. We pre-registered and conducted robustness analyses on the trait level (see supplemental material). Across all six traits, we did not find any indication of a similarity effect, suggesting that no similarity effect was masked when averaging across different traits.
4. Using an open answer format, participants were asked to apply increments of US$500 to describe their income of the past 12 months. The reported income range was between US$ 0 and US$401,000. This made it difficult to decipher whether students reported their income as the multiplicator of income (e.g., report of 24 = 24 × US$500), their actual income (e.g., US$15,000), or their parental income (e.g., US$401,000). Thus, income was not used in the analyses.

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