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Do time perspectives predict unique variance in life satisfaction beyond personality traits?

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ABSTRACT

In this study we compared the relationships between time perspectives, the Big Five personality traits, and life satisfaction. Our results replicated past work in that personality traits and time perspectives were both associated with life satisfaction. Individuals high on extraversion and those having a past positive and a present hedonism time perspective were more satisfied with their lives; individuals high on neuroticism and those having a past negative time perspective were less satisfied with their lives. Further, hierarchical regression analyses demonstrated that time perspectives accounted for an additional 13.7% of the variance in life satisfaction beyond personality traits; whereas, personality traits accounted for an additional 4.4% of the variance in life satisfaction beyond time perspectives. Mediation models demonstrated that time perspectives partially accounted for the personality and life satisfaction relationship. We discuss the possibility that most of the association between personality traits and life satisfaction may be due to individual differences in cognitive time frames.

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1. Introduction

The relations between personality traits and life satisfaction are well documented (Diener & Lucas, 1999; Schimmack, Oishi, Furr, & Funder, 2004). For example, there are robust associations between the Big Five personality traits and life satisfaction with extraversion and neuroticism as the most consistent predictors (DeNeve & Cooper, 1998; Steel, Schmidt, & Schultz, 2008). However, the mechanisms to explain these relations are not fully understood. Traditionally, two theoretical approaches have been proposed to explain the strong correlations between personality traits and subjective well-being (see McCrae & Costa, 1991, for a review). The top-down (or temperament) approach emphasizes direct associations between personality traits and life satisfaction. The bottom-up (or instrumental) approach suggests that the relations are indirect and different situations, circumstances, and events in people's lives lead to differences in well-being (Lucas & Baird, 2004).

However, though only about 10% of the variance in life satisfaction is accounted for by objective life circumstances and relevant events (Diener, Suh, Lucas, & Smith, 1999), it appears that when people judge their life satisfaction they reflect on their feelings about these life circumstances and events (Schimmack, Diener, & Oishi, 2002). This would suggest that the emotional experiences

associated with life circumstances are likely better predictors of subjective well-being (SWB) than merely the experiences of the circumstances themselves. Thus, it is possible, and even likely, that the cognitive processes by which individuals remember, experience, and anticipate the circumstances in their life explain important variance in life satisfaction (Lyubomirsky, 2001). Also, individual differences in the cognitive evaluation of one's past, present, and anticipated future may be the mechanisms by which personality traits lead to increased life satisfaction. For example, chronically accessible information, such as past emotional experiences, strongly predicts life satisfaction (Ross, Eyman, & Kishchuck, 1986). Thus, an extension of the bottom-up approach would be to examine the emotional experiences and cognitive evaluations of one's life circumstances as mediators of the robust link between personality traits and SWB.

1.1. Constructing life satisfaction through mental evaluations of life circumstances

The sustainable happiness model (Lyubomirsky, Sheldon, & Schkade, 2005) proposes that intentional activities (i.e., behavioral decisions and mental evaluations) may increase one's happiness. For example, two of the strategies that individuals use to increase their SWB are: (a) savoring the positive life experiences from their past (Liberman & Trope, 2008) and (b) reinterpreting negative events in a more positive light (Lyubomirsky & Tucker, 1998). Specifically, reframing a negative situation and counting one's blessings leads to increased SWB because these activities promotes

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savoring of positive events (Lyubomirsky et al., 2005). To assess individual differences in the judgment of events across temporal distances (i.e., mental evaluations of life circumstances), Zimbardo and Boyd (1999) suggested that time perspectives be measured. Time perspectives represent an individual's relation with time and are a subjective process whereby individuals parcel their personal and social experiences into temporal categories (Boyd & Zimbardo, 2005). It is theorized that how individuals utilize their temporal thinking styles is closely associated with their personality (Fortunato & Furey, 2009) and when such cognitive time frames develop into a tendency they become part of the individual's disposition. For these reasons we suggest that time perspectives may assess the individual differences in typical mental evaluations of life circumstances.

Further, there are consistent relations between time perspectives and SWB (Boniwell, Osin, Linley, & Ivanchenko, 2010; Zhang, Howell, & Maciej, 2010). Past research has demonstrated lower life satisfaction for those with a past negative time perspective as well as a higher life satisfaction for those with a past positive time perspective (Boniwell et al. 2010; Drake, Duncan, Sutherland, Abernethy, & Henry 2008). The pleasure seeking nature of the present hedonistic time perspective has been found to be positively associated with positive affect (Zimbardo & Boyd, 1999). Also, Dunkel and Weber (2010) showed that there may be links from personality traits to time perspectives; for example, extraversion was positively correlated to the past positive and present hedonistic time perspectives while being negatively correlated to the past negative time perspective. Also, Dunkel and Weber demonstrated that neuroticism was positively correlated with having a past negative time perspective and negatively correlated to having a past positive time perspective. Therefore, given that personality traits are strongly related to life satisfaction (Diener & Lucas, 1999), different time perspectives are related to life satisfaction (Boniwell et al., 2010; Drake et al., 2008; Zhang et al., 2010), and personality traits and time perspectives are correlated (Dunkel & Weber, 2010), the relations between personality traits and life satisfaction as well as time perspectives and life satisfaction may not be independent.

Finally, despite the widely replicated relations between extraversion and neuroticism with life satisfaction, the mechanisms linking these personality traits and life satisfaction have not been fully verified. Given that to the extent that life can be judged in the past, present, and future (Ehrhardt, Saris, & Veenhoven, 2000), individuals may form life satisfaction judgments based on the ratio of remembered, experienced, or anticipated pleasant and unpleasant events. Also, given that extraversion has been linked to having a past positive time perspective, and neuroticism has been linked to having a past negative time perspective (again see Dunkel & Weber, 2010), and having a past positive time perspective is linked with increased life satisfaction while having a past negative time perspective is linked with decreased life satisfaction (again see Boniwell et al. 2010; Drake et al., 2008), it may be that time perspectives mediate the relations between personality traits and life satisfaction. For these reasons, the aims of this study are to: (a) predict life satisfaction from both personality traits and time perspectives and (b) test time perspectives as the mediators of the robust relations between personality traits and life satisfaction.

2. Method

2.1. Participants & procedures

A sample of 754 undergraduate students participated in the study. There were 530 females and 194 males (30 students did

not report their gender) of typical college age ($M = 25.02.42$, $SD = 9.16$). Thirty percent of participants indicated that they were Caucasian. Participants were enrolled in multiple sections of undergraduate psychology courses and participated for extra credit. After providing informed consent, participants completed the online questionnaire, which contained measures assessing their personality traits, time perspectives, satisfaction with life, and basic demographic information.

2.2. Measures

See Table 1 for the means, standard deviations, reliability coefficients, and inter-correlations of all the variables in the study.

2.3. Life satisfaction

The Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) assessed participants' perceived satisfaction with life. It is a five-item measure rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). An example of a question is "in most ways my life is close to my ideal." High scores on the SWLS indicate greater satisfaction with one's life.

2.4. The Big Five

Saucier's (1994) 40-item mini-markers was used to measure the personality dimensions of the Five Factor Model of personality. The dimension of Extraversion is made up of specific traits such as being talkative, bold, and energetic. The dimension of Agreeableness includes being sympathetic, warm, and cooperative. Conscientiousness includes being organized, efficient, and practical. Neuroticism encompasses traits such as being moody, temperamental, and fretful. Openness, which is sometimes referred to as Intellect, includes traits such as being creative, philosophical, and imaginative. Saucier's (1994) instrument provides a list of 40 adjectives (eight for each personality dimension) such as those traits described above and asks the respondent to rate how accurately each trait describes him- or herself on nine-point Likert-type scale (1 = *extremely inaccurate*, 9 = *extremely accurate*). Some of these items are presented in reverse form (e.g., shy is a reverse item for Extraversion). For the present study, responses for traits associated with each of the personality factors were averaged, with reversed items being reverse-scored, to produce an aggregate score for each participant on each factor.

2.5. Zimbardo time perspective inventory

We measured time perspectives using the ZTPI developed by Zimbardo and Boyd (1999). This measure has been validated by multiple studies across domains and cultures (D'Alessio et al., 2003; Milfont, Andrade, Pessoa, & Belo, 2008; Worrell & Zeno, 2007). The ZTPI is a 56-item questionnaire and each time perspective is assessed using a 5-point scale (1 = *very untrue of me*, 5 = *very true of me*). Nine items measured the past positive perspective ("On balance, there is much more good to recall than bad in my past"). Ten items measured the past negative perspective ("I often think of what I should have done differently in my life"). Fifteen items measure the present hedonistic perspective ("I believe that getting together with one's friend to party is one of life's important pleasures"). Nine items measured the present fatalistic perspective ("Fate determines much in my life"). Thirteen items measured the future perspective ("I believe a person's day should be planned ahead each morning").

Table 1
Descriptive Statistics, Internal Consistency, and Correlations for measured variables.

	Means	SD	α	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex	–	–	–	–											
2. Age	25.02	9.16	–	.12*	–										
3. Life Satisfaction	4.61	1.32	.88	–.01	.02	–									
4. Neuroticism	4.70	1.32	.82	–.14***	–.13**	–.38***	–								
5. Extraversion	5.56	1.34	.83	.01	.13**	.34***	–.21***	–							
6. Agreeableness	6.97	1.13	.81	–.13**	.14***	.22***	–.35***	.20***	–						
7. Openness	6.62	1.17	.82	.03	.11**	.18**	–.12**	.29***	.32***	–					
8. Conscientiousness	6.29	1.25	.83	–.03	.14***	.26***	–.35***	.20***	.36***	.24***	–				
9. Past Positive	3.50	.59	.74	–.01	–.03	.41***	–.17***	.17***	.25***	.19***	.19***	–			
10. Past Negative	3.06	.71	.83	–.02	–.11**	–.44***	.49***	–.30***	–.15**	–.07*	–.25***	–.24***	–		
11. Present Hedonism	3.36	.53	.82	–.04	–.13**	.15**	.07	.22***	.12***	.23***	–.14**	.22***	.17***	–	
12. Present Fatalism	2.51	.63	.77	.02	–.15**	–.20***	.25***	–.19**	–.27***	–.22***	–.29***	–.07*	.48***	.34***	–
13. Future	3.49	.51	.75	–.07	.20***	.15**	–.07	.11**	.24***	.15***	.54***	.17***	–.05	–.14***	–.29***

Note: $N = 754$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

3. Results

3.1. Data analysis

Standard parametric assumptions were tested and all assumptions were met. Pearson product moment correlation coefficients were computed to assess the relations between the Big Five personality traits, time perspectives, and life satisfaction. In addition, we conducted hierarchical regression analyses by regressing life satisfaction on the demographic variables, personality traits, and time perspectives. These analyses were carried out to determine the unique variance in life satisfaction explained by time perspectives controlling for personality traits and demographic variables. At step 1, age and sex were entered into the regression model, at step 2, the Big Five personality scores were entered into the model, and at step 3 the time perspective scores were entered. Next, a comparative hierarchical regression analysis was conducted to determine the unique variance in life satisfaction explained by Big Five personality traits controlling time perspectives and demographic variables. Lastly, we tested if time perspectives mediated the personality–life satisfaction relationship.

3.2. Bivariate correlations

Consistent with past research, personality traits are related to life satisfaction with neuroticism and extraversion being the strongest two correlates (again see Table 1). Also, each of the five time perspectives was associated with life satisfaction; the two strongest correlates of life satisfaction were having a past positive perspective ($r = .41$) and having a past negative perspective ($r = -.44$). Further, the majority of the time perspectives displayed a significant relationship with personality traits. The strongest relations were: (a) a positive relationship between having a future time perspective and conscientiousness ($r = .54$), (b) a positive relationship between having a past negative perspective and neuroticism ($r = .49$), (c) a negative relationship between having a past negative perspective and extraversion ($r = -.30$), and (d) a negative relationship between having a present fatalism time perspective and conscientiousness ($r = -.29$).

3.3. Predicting life satisfaction with demographics, personality traits and time perspectives

Two hierarchical regression analyses were performed to test whether time perspectives predicted unique variance in life

satisfaction beyond that explained by personality traits after controlling for demographic variables (see Table 2). The results demonstrated that the model was significant when personality and time perspectives were added to the regression model at steps 2 and 3. In step 1, demographic variables accounted for 0.1% of the variance in life satisfaction. The personality variables in step 2 accounted for an additional 24.2% of the variance. Finally, time perspective accounted for an additional 13.7% of the variance in life satisfaction even after controlling for demographic variables and personality traits. Next, we conducted a second hierarchical regression to investigate if personality traits predicted unique variance in life satisfaction beyond time perspectives. As shown in Table 2, after demographic variables, time perspectives accounted for an additional 33.5% of the variance. However the addition of personality traits in the last step only accounted for an additional 4.4% of the variance in life satisfaction after controlling for time perspectives.

3.4. Do time perspectives mediate the personality–life satisfaction relation?

Because personality traits were strongly correlated with having different time perspectives as well as differing levels of life satisfaction, we examined two mediation models where time perspectives were tested as the mediators of the links from personality traits to life satisfaction (see Table 3). To test for mediation, the Baron and Kenny (1986) approach was used and mediation was tested using the Preacher and Hayes (2008) multiple mediation script. As seen in Table 3: (a) both extraversion and neuroticism were associated with different time perspectives; (b) time perspectives were associated with life satisfaction; and (c) the direct effect of extraversion and neuroticism on life satisfaction was significantly attenuated after time perspectives were entered into the model. The bootstrap results for extraversion and neuroticism ($Z = 8.43$ and $Z = 8.06$, respectively) demonstrate the statistical significance of both indirect paths. Specifically, the first mediation model suggests that extraverts have an increased tendency to have a sentimental view of their past (increased past positive), a decreased tendency to have an anguished remembrance of the past (decreased past negative), and tend to gravitate towards life's pleasures (increased present hedonism); differences in these time perspectives explain 56% of the link from extraversion to life satisfaction. The second mediation model suggests that, while neurotics have a decreased tendency to have a past positive time perspective, most of the negative association between neuroticism

Table 2
Predicting Life Satisfaction with Time Perspectives and Personality Traits.

	Hierarchical regression with personality Traits entered before time perspectives			Hierarchical regression with time perspectives entered before personality traits		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
	B	β	B	B	β	β
Gender	-.01	-.04	-.02	-.01	.01	-.02
Age	.03	-.07	-.04	.02	-.02	-.03
Neuroticism		-.29***	-.17***		-	-.17***
Extraversion		.25***	.13***		-	.13***
Agreeableness		.02	-.03		-	-.03
Openness		.03	-.01		-	-.01
Conscientiousness		.14***	.07		-	.07
Past Positive		-	.24***		.25***	.24***
Past Negative		-	-.27***		-.40***	-.27***
Present Hedonism		-	.13**		.17***	.13**
Present Fatalism		-	-.01		-.02	-.01
Future		-	.07		.12***	.07
Model ΔR^2	.001	.242***	.137***	.001	.335***	.044***

Note: N = 754.

* p < .05.

** p < .01.

*** p < .001.

Table 3
Testing Mediation of the Link between Personality Traits and Life Satisfaction through Time Perspectives.

	Standardized path coefficient (SE)						$\Delta\%$
	Extraversion to time perspectives (path a)	Time perspectives to life satisfaction (path b)	Indirect effects of personality trait on life satisfaction (ab paths)	Total effect of extraversion to life satisfaction (path c)	Direct effect of extraversion to life satisfaction (c-prime path)	Bootstrap results for indirect effects (test of ab paths)	
Past Positive	.17*** (.04)	.25*** (.03)	.04*** (.01)	.34*** (.04)	.14*** (.04)	.19*** (.03)	56
Past Negative	-.31*** (.04)	-.36*** (.04)	.11*** (.02)				
Present Hedonism	.22*** (.04)	.13*** (.04)	.03*** (.01)				
Present Fatalism	-.19*** (.04)	-.00 (.04)	.00 (.01)				
Future	.11** (.04)	.08** (.03)	.01** (.005)				
	Neuroticism to time perspectives (path a)	Time perspectives to life satisfaction (path b)		Total effect of neuroticism to life satisfaction (path c)	Direct effect of neuroticism to life satisfaction (c-prime path)	Bootstrap results for indirect effects (test of ab paths)	$\Delta\%$
Past Positive	-.17*** (.04)	.25*** (.04)	-.04*** (.01)	-.38*** (.03)	-.19*** (.03)	.19*** (.02)	50
Past Negative	.49*** (.04)	-.31*** (.04)	-.15*** (.02)				
Present Hedonism	.07 (.04)	.18*** (.04)	.01 (.01)				
Present Fatalism	.25*** (.04)	.02 (.04)	-.01 (.01)				
Future	-.07 (.04)	.10*** (.03)	-.01 (.005)				

Note: Mediation effect is supported when: (a) paths a and b are significant, (b) path c is significant, (c) path c-prime is significantly reduced, and (d) the bootstrapped results of the indirect effect is significant.

* p < .05.

** p < .01.

*** p < .001.

and life satisfaction (in these models) is explained by their increased tendency to have a past negative time perspective.

both cases the strongest mediator was having (and not having) a past negative time perspective.

4. Discussion

Previous research has focused on investigating the relationships between personality traits and life satisfaction (DeNeve & Cooper, 1998; Diener & Lucas, 1999; Steel et al., 2008) or time perspectives and life satisfaction (Boniwell et al., 2010; Zhang et al., 2010). Our regression models demonstrated that time perspectives explained a substantial amount of variance (13.7%) in life satisfaction even after controlling for demographic variables and personality traits. Further, we found that personality traits explained much less unique variance (4.4%) in life satisfaction after controlling for demographic variables and time perspectives. More importantly, mediation models using Baron and Kenny's (1986) approach and tested with Preacher and Hayes' (2008) multiple mediation script demonstrated that the paths from neuroticism and extraversion to life satisfaction were largely mediated by time perspectives. In

4.1. Explaining the personality-life satisfaction relation

The association between personality traits and life satisfaction is one of the most robust findings in the study of personality and well-being. The top-down model posits that the association is direct; the bottom-up model asserts that the association is mediated. While efforts have tested for various mediators, they have largely been unsuccessful in fully explaining the link from personality to life satisfaction. For example, though extraverts experience more positive emotions because of their increased engagement in social activities (Watson & Clark, 1997), Lucas, Le, and Dyrenforth (2008) demonstrated that social activity accounted for only 36% of the total association between extraversion and momentary positive affect. Further, the authors argued that other mediators should be examined: "[i]t is important to point out that simply showing that individual differences in social activity cannot account for

extraverts' greater happiness does not rule out other indirect explanations of the association." Given that life satisfaction is a product of cognitive evaluations (Cummins & Nistico, 2002), the assessments of one's life satisfaction should involve specific cognitive processes. Indeed, our results supported this expectation to show that time perspectives – an individual's cognitive relation with the past, present, and future – are significant mediators of the personality and life satisfaction association.

Consistent with the suggestion that past emotional experiences are important to life satisfaction judgments (Suh, Diener, & Fujita, 1996), having a past positive and past negative time perspective were both significant mediators of the relation between extraversion and life satisfaction (explaining a combined 45% of the link) as well as the relation between neuroticism and life satisfaction (explaining a combined 50% of the link). These two past time perspectives tap into the valence of temporal experience (Boniewicz et al., 2010); thus, the connection to the emotionality of experiences helps explain the connections between the past positive and negative time perspectives with life satisfaction. Further, in addition to having a past positive time perspective and tending to infrequently hold a past negative time perspective, the tendency to hold a present hedonism time perspective significantly mediated the relation between extraversion and life satisfaction. Those who have a present hedonistic time perspective tend to gravitate towards life's pleasures and individuals with this perspective are active seekers of life activities that bring joy and stimulation – all hallmarks of extraversion. Together, these models suggest extraverts are more satisfied with their lives because they hold a nostalgic, and not a pessimistic, view of the past while focusing on the appropriate pleasures in the present. However, these models suggest that neurotics are less satisfied with their lives because of their overwhelmingly negative view of the past.

4.2. Future directions

Our findings, that the past time perspectives are (a) the most significant predictors of life satisfaction and (b) mediators of the personality traits and life satisfaction relations, mirror the typical results from happiness-enhancing cognitive interventions. For example, individuals report higher levels of happiness when they savor or re-experience past positive experiences (Lyubomirsky, Sousa, & Dickerhoof, 2006) or when they take an optimistic perspective on life (Scheier, Carver, & Bridges, 1994). Additionally, individuals are happier when they reframe a situation in order to reduce negative thought patterns through forgiveness (McCullough, Fincham, & Tsang 2003) and when they count the blessings in their life in order to attain a more grateful outlook (Emmons & McCullough, 2003). Thus, the mechanism through which intentional activities increase happiness may be achieved by altering one's time perspective profile to be more past positive, less past negative, and more pleasure oriented in the present. Also, it may be the individual differences in how people process and manage their emotional experiences of the past and present explains the weak relations between life circumstances and SWB. That is, while life events may not strongly predict life satisfaction, how people temporally interpret their life circumstances appears to be crucial to the formation of life satisfaction (Schimmack et al., 2002).

5. Conclusion

Personality traits are strongly associated with subjective well-being and are the strongest predictors of current mood (Diener et al., 1999). Despite these widely replicated relations, the mechanism linking personality traits and subjective well-being is still an open question. The goal of this study was to investigate the relations between personality traits and time perspectives with life

satisfaction. The current study demonstrated that relations between personality traits and life satisfaction can, quite significantly, be explained by individual differences in time perspective – specifically, the past time perspectives. As a result, while personality traits are strongly associated with life satisfaction (Diener & Lucas, 1999) we suggest that at least some, if not most, of the association between an individual's disposition and their life satisfaction may be due to how they relate their personal and social experiences to time.

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