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RESEARCH PAPER

Predicting Psychological and Subjective Well-Being from Personality: Incremental Prediction from 30 Facets Over the Big 5

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Abstract This study investigated the relationship between the Big 5, measured at factor and facet levels, and dimensions of both psychological and subjective well-being. Three hundred and thirty-seven participants completed the 30 Facet International Personality Item Pool Scale, Satisfaction with Life Scale, Positive and Negative Affectivity Schedule, and Ryff's Scales of Psychological Well-Being. Cross-correlation decomposition presented a parsimonious picture of how well-being is related to personality factors. Incremental facet prediction was examined using double-adjusted r^2 confidence intervals and semi-partial correlations. Incremental prediction by facets over factors ranged from almost nothing to a third more variance explained, suggesting a more modest incremental prediction than presented in the literature previously. Examination of semi-partial correlations controlling for factors revealed a small number of important facet-well-being correlations. All data and R analysis scripts are made available in an online repository.

Keywords Subjective well-being · Psychological well-being · Personality · Big 5 · Personality facets

1 Introduction

Understanding the relationship between personality and well-being is of fundamental importance for both theoretical and applied reasons. For one, the relationship of personality to well-being may shed light on the temporal stability of well-being. It can also be helpful to understand the role of personality when designing interventions targeted at increasing

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well-being. However, at present, it is unclear whether facet-level or factor-level personality analysis is superior for understanding well-being. Researchers need an unbiased assessment of this issue, given the reduction in parsimony that results when moving away from broad models of personality such as the Five Factor Model. In addition, little is currently known about the relationship between psychological well-being and personality facets. In what follows, we describe subjective well-being (SWB), psychological well-being (PWB) and the Five Factor Model (FFM), and review previous work on personality and well-being before outlining the objectives for the current study, which illustrates a new approach for assessing the incremental variance of personality facets over factors.

1.1 Subjective and Psychological Well-Being

The literature on SWB is expansive (Diener 2009; Diener et al. 1999, 2003; Lucas and Diener 2008). SWB has been defined and measured in a variety of ways and can include happiness and quality of life measures, but a common approach is to operationalize SWB as a composite of satisfaction with life, high positive affect, and low negative affect (Deci and Ryan 2008; Diener 1984; Lucas et al. 1996). This operationalization is adopted in the current study.

The construct of PWB was developed in response to a perceived failure of SWB to capture various humanistic concepts of well-being related to identity, meaning, and relatedness (McGregor and Little 1998; Ryan and Deci 2001; Ryff and Keyes 1995). Ryff (1989) proposed a six dimensional model of PWB composed of autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance. The same author also developed a measure of these six dimensions that has subsequently been used in several studies (for a review see, Keyes et al. 2002). Studies have shown that environmental mastery and self-acceptance overlap substantially with SWB (Compton 1998; Keyes et al. 2002; McGregor and Little 1998; Ryff and Keyes 1995) but that the other dimensions are more distinct, correlating only moderately with SWB measures (Compton 1998; Keyes et al. 2002; McGregor and Little 1998; Ryff and Keyes 1995).

While situational factors lead to short-term fluctuation and in some cases long-term change in well-being, substantial research has supported a dispositional perspective of well-being. Building on ideas such as the "hedonic treadmill" (Brickman and Campbell 1971). Headey and Wearing (1992) proposed that while life events can temporarily alter well-being, well-being has a set point which varies between individuals. Genetic and twin studies have established a hereditary basis for the stable component of well-being (Bouchard and Loehlin 2001; Lykken and Tellegen 1996; Weiss et al. 2008). Furthermore, a 17 year longitudinal study (Fujita and Diener 2005) found that satisfaction with life showed substantial stability over time, albeit at about half the level of personality traits. Thus, personality traits provide an important means of understanding the stability in well-being.

1.2 Personality

Historically, trait research began with a proliferation of traits which was later followed by various attempts at data reduction and eventually a movement to the Big 5 (Costa and McCrae 1992; Goldberg 1993; McCrae and John 1992), typically labeled neuroticism, extraversion, openness, conscientiousness, and agreeableness. More recently, researchers responding to the success of the Big 5 have called for even higher level factor models (Digman 1997; Musek 2007) and more detailed lower level models (Paunonen and Ashton

2001; Paunonen and Jackson 2000). Several test publishers have developed facet-level models of the Big 5, which aim to capture both the Big 5 and their constituent lower-level facets (Costa and McCrae 1992; Goldberg 1992; John and Srivastava 1999). Despite some discontent over the dominance of the Big 5, the taxonomy provides an organizing framework for understanding different traits.

1.3 Personality Factors and Well-Being

The relationship between personality and SWB has received substantial research attention, with neuroticism and extraversion emerging as important correlates. DeNeve and Cooper (1998) conducted a large meta-analysis of correlations between SWB and personality traits. As most of the included studies were conducted prior to the emergence of the Big 5 as a unifying framework, they categorized the studies according to the Big 5. More recently, Steel et al. (2008) conducted an updated meta-analysis presenting separate results using common measures of the Big 5. Both meta-analyses found that neuroticism had the highest correlation with life satisfaction and negative affectivity while extraversion had the highest correlation with positive affect.

Only a few studies have examined correlations between personality and PWB (Bardi and Ryff 2007; Butkovic et al. 2012; Grant et al. 2009; Keyes et al. 2002; Schmutte and Ryff 1997). Such studies suggest that neuroticism, extraversion and conscientiousness are the major correlates for most PWB dimensions. More generally, dimensions of PWB tend to be better predicted by personality than are SWB dimensions, and PWB tends to correlate with more of the Big 5 dimensions.

In order to compare Big 5 correlates of SWB versus PWB, Grant et al. (2009) used a model constraints approach. After reversing neuroticism and negative affect, they found support for a model where personality traits varied in their average correlation with well-being, and well-being dimensions varied in their average correlation with personality. Average well-being correlations were largest for neuroticism ($r = -.44$), followed by extraversion ($r = .31$), conscientiousness ($r = .29$), openness ($r = .12$), and agreeableness ($r = .11$). PWB variables tended to correlate more with personality than did SWB variables. There were also several unique combinations of personality factors and well-being variables that had larger correlations than would be expected from their component averages. These were neuroticism with negative affect, extraversion with positive affect and positive relations, conscientiousness with personal growth and purpose in life, agreeableness with positive relations, and openness with personal growth. In the opposite direction, autonomy correlated less with agreeableness than would be expected by component averages.

1.4 Personality Facets and Well-Being

While the Big 5 provides a useful organizing framework for personality research, several researchers have raised concerns that a more detailed model of personality is required to adequately predict criteria of interest such as well-being (Paunonen and Ashton 2001; Paunonen and Jackson 2000). To provide a richer model of personality, many personality tests include both high-level factors, such as the Big 5, and nested lower-level facets. For example, the NEO-PI-R (Costa and McCrae 1992) includes six facets for each factor of the Big 5. So for example, the neuroticism factor is composed of the facets of anxiety, hostility, depression, self-consciousness, impulsiveness, and vulnerability to stress. As a result, many studies have examined facet-level correlations with a range of outcome

variables (e.g., Paunonen and Ashton 2001), and a few have examined facet-level correlations with well-being (e.g., Quevedo and Abella 2011; Schimmack et al. 2004).

Initial research on facet-level prediction of SWB suggested that facets enable a dramatic increase in prediction of SWB (Quevedo and Abella 2011; Schimmack et al. 2004; Steel et al. 2008), yet critical analysis suggests that incremental prediction may be more modest. For example, Quevedo and Abella (2011) examined prediction of SWB by NEO Big 5 and 30 facets as well as additional scales of optimism, self-esteem, and perceived social support. Using stepwise regression predicting life satisfaction they found that adjusted r^2 was .16 with the NEO Big 5 as predictors, .22 with NEO 30 facets as predictors, and .29 with NEO 30 facets and additional non-NEO scales including self-esteem and perceived social support as predictors. They interpreted their results as indicating that facets explain double the variance of factors. However, an alternative interpretation is that self-esteem and perceived social support are not personality traits in the traditional sense, and thus the adjusted r^2 comparison of .16 for factors versus .22 (i.e., 37.5 % increase) for facets is a more reasonable estimate. A second example is provided in the meta-analysis of Steel et al. (2008), based on pooled correlations, which suggested very large incremental prediction for extraversion and neuroticism facets over corresponding factors. However, the authors acknowledged that the obtained estimates of incremental prediction were unreasonably large, suggesting that the process of pooling correlations across studies may have led to unreliable estimates.

In relation to PWB, to our knowledge, Siegler and Brummett (2000) provide the only facet-level analysis to date. They used data from a pre-existing study, and although this included items for the 30 NEO facets, dimensions of PWB were approximated based on available items rather than established PWB scales. The study reported facet-level correlations with the constructed indices of PWB. No estimate of incremental prediction of facets over factors was provided.

1.5 The Current Study

There are several problems with existing approaches to performing facet-level analysis. First, much of the broader facet-analysis literature has relied on small samples with fewer than 200 respondents, which has produced uncertain estimates of incremental prediction and increased the biasing effect that can result from having many more facets than factors as predictors. Second, methods for assessing the incremental prediction of facets have been employed without explicit articulation of the population parameter being estimated. Thus, it has been difficult to evaluate the potential bias and uncertainty in parameter estimates due to stepwise regression with different *p*-entry rules, adjusted or non-adjusted r^2, and use of only some or all factors. Third, existing research has involved different types of factor-facet comparisons. Specifically, studies vary in their use of facet-level test inventories, the number of Big 5 factors included, and their inclusion of variables that are arguably not personality traits. Finally, many studies have only reported zero-order correlations between facets and criteria, instead of controlling for variance explained by factors. This leads to a dramatic loss of parsimony without evidence of whether a facet-level analysis is superior.

In summary, there is a need to provide a realistic picture of the value of a facet-level analysis for understanding the relationship between personality and SWB and PWB. Some existing studies suggest that facets may explain double the variance of factors, yet the combination of methods used and minimal research suggest that this may be an overestimate, at least when limited to facets within a Big 5 inventory.

The aim of the current study was to examine the relationship between personality and well-being, focusing particularly on the degree to which 30 personality facets provide incremental prediction of well-being over and above Big 5 personality factors. To provide a more comprehensive perspective, both SWB and PWB were examined. To provide more accurate estimates, we applied new methods for obtaining unbiased estimates and confidence intervals of incremental facet prediction.

Using a moderately large sample, we measured the Big 5 factors and 30 facets of personality, SWB, and Ryff's (1989) six dimensions of PWB. To overcome issues with previous studies, we applied methods to get both point estimates and confidence intervals for incremental prediction of facets over factors for SWB and PWB. We also assessed incremental facet prediction using semi-partial correlations controlling for the Big 5. In general, we predicted a more modest prediction of facets over factors in the range of almost none to a third more variance explained. We expected facet-level semi-partial correlations to highlight a small number of meaningful incremental facets, with a factor-level explanation capturing most of the main story.

Specifically, to overcome previous limitations, we define the parameter of interest as the population incremental variance explained, $\Delta\rho^2$, by facets, $\rho^2_{(\text{facets})}$, over factors, $\rho^2_{(\text{factors})}$. Thus, $\Delta\rho^2 = \rho^2_{(\text{facets})} - \rho^2_{(\text{facets})}$. Since adjusted r^2 is designed to provide an unbiased estimate of ρ^2, we recommend using $R^2_{adj(\text{facets})} - R^2_{adj(\text{facets})}$ as the estimator for $\Delta\rho^2$. We use a double-adjusted-r^2 bootstrap procedure for providing confidence intervals on the incremental population prediction of facets. Finally, we examine semi-partial correlations between facets and criteria, where facets are adjusted for factors, in order to assess incremental contribution of facets in a more parsimonious way than only reporting zero-order correlations.

In addition to the facet-level analysis, we also examined the relationship between personality factors and well-being. We decomposed cross-correlations between personality factors and well-being in order to identify the unique profile of personality correlations for each type of well-being, thereby replicating and extending previous work by Grant et al. (2009), who included only four dimensions of PWB. We examined cross-correlations using all six PWB dimensions. In particular, we were interested in whether the unique combinations of correlations between personality factors and well-being would replicate.

2 Method

2.1 Participants and Procedure

The sampling method was based on convenience sampling and, as such, participants were mostly undergraduate psychology students drawn from two Australian universities. The final cleaned sample for this study included 337 participants (24 % male, 76 % female). Ages ranged from 16 to 55 ($M = 21$, $SD = 8.8$). The study was completed online using Inquisit 3.0 (2012). After reading a plain language statement and providing informed consent for participation, participants completed demographics, the IPIP-NEO, SWLS, PANAS, and PWB. The final sample was drawn from an initial sample of 420 participants. Participants were excluded if any of the following criteria were met: (1) they took less than 500 ms to respond to 10 or more items out of the 409 personality and well-being items ($n = 72$), or (2) they failed to answer one or more personality or well-being items ($n = 14$).

2.2 Instruments

2.2.1 *International Personality Item Pool (IPIP) Scales Measuring Constructs Similar to 30 NEO-PI-R Facet Scales*

This inventory provides a measure of both Big 5 personality factors (neuroticism, extraversion, conscientiousness, agreeableness, openness) as well as 30 facets representing six facets per factor (Goldberg 1999; Goldberg et al. 2006). The 30 facets are closely aligned with those of the 30 item NEO-PI-R (Costa and McCrae 2008). The IPIP measure has the advantage of being in the public domain permitting full disclosure of item content and sharing of raw data. The test is composed of 300 items, 10 items per facet, and 60 items per factor. Each item is rated on a 5-point scale measuring the degree to which it accurately describes the participant (1 = very inaccurate, 2 = moderately inaccurate, 3 = neither inaccurate nor accurate, 4 = moderately accurate, 5 = very accurate). Scales were computed as the mean of items after any required item-reversal. Initial evidence regarding the reliability and predictive validity of the IPIP scales is favorable (Goldberg 1999). The scales have an average coefficient alpha of .80 and an average correlation with corresponding NEO-PI-R scales of .73, or .94 when corrected for attenuation due to the unreliability of the scales in each pair (Goldberg 1999). The IPIP scales show good predictive utility for health-related criterion variables. Johnson's (2000) factor analysis (principal components) of the IPIP facet-level scales showed that a five-factor solution accounted for 64.9 % of the variance. Facets generally loaded as expected, and the five factors were clearly defined by the five sets of six facet scales, with the facet scales within a given domain showing primary loadings on the domain factor in 27 out of 30 cases.

2.2.2 *Scales of Psychological Well-Being (Ryff 1989)*

This inventory measures six dimensions of PWB: positive relations, autonomy, environmental mastery, personal growth, purpose in life, and self-acceptance. Each item was rated on a 6-point Likert-style response scale (1 = strongly disagree, 2 = disagree somewhat, 3 = disagree slightly, 4 = agree slightly, 5 = agree somewhat, 6 = strongly agree). Responses were scored as the mean after any required item-reversal. The 14-item per scale version was used to ensure reliability for high quality measurement. Specifically, for the 14-item version, Ryff and Essex (1992) report internal consistency alpha coefficients ranging from .86 to .93. Factor analytic evidence suggests that (a) self-acceptance and environmental mastery are closely related to traditional SWB measures, (b) personal growth, positive relations with others and purpose in life share a higher order factor, and (c) autonomy is more distinct, being more related to variables concerned with power and control (Ryff 1989).

2.2.3 *Satisfaction with Life Scale (Diener et al. 1985)*

This well-established 5-item scale was used to measure global life satisfaction. Each item was rated on a 7-point Likert-style response scale (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree). The scale scores were computed as the mean of the items. Diener et al. (1985) reported high internal consistency and high temporal reliability for the scale. The two-month test–retest reliability in their study was .82 with a Cronbach's alpha of .87. Item loadings ranged from .61 to .84, with a single factor accounting for 66 % of the

variance. In addition, the scale correlated significantly with related measures (e.g., personality, self-esteem, symptom checklist) and was uncontaminated by social desirability.

2.2.4 Positive and Negative Affectivity Schedule (PANAS; Watson et al. 1988)

The PANAS consists of two subscales that measure positive and negative affect. In the current study, the instrument was administered using "past few weeks" time instructions. Participants rated the extent to which they had experienced each of 20 emotions over the past few weeks on a 5-point scale (1 = very slightly or not at all, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely). Scales were scored as the mean of the items. Watson et al. (1988) reported that reliabilities (Cronbach's alpha) were within an acceptable range for both positive and negative affect (.86 to .90) and were unaffected by the time instructions used. Both subscales demonstrated satisfactory test–retest reliability over a 2-month period. The same authors reported a low (negative) correlation between positive and negative affect, with adjectives loading on the appropriate factor. The subscales showed good external validity, correlating significantly with measures of anxiety, depression, and distress.

2.3 Data Analysis

Data was analyzed using R 3.0.1 (R Core Team 2013). In the interests of reproducible research, all code used to perform the analysis and all data and metadata is available from figshare.com (Analysis for "Predicting Psychological and Subjective Well-Being"; doi:10.6084/m9.figshare.972885).

3 Results

3.1 Descriptive Statistics, Reliabilities, and Factor Analysis

Tables 1 and 2 report descriptive statistics and reliability for all scales used in the study. Reliability was generally very good with mean Cronbach's alpha of .81 for personality factors, .80 for personality facets, and .88 for well-being scales.

Exploratory factor analysis was performed on facet scale scores to examine whether the 30 facets loaded on the proposed five factors. Five factors were extracted using maximum likelihood estimation with Promax rotation. Overall, the factor solution showed good correspondence to the theorized structure. There was a clear drop in the scree plot after five factors and the parallel analysis also suggested five factors. Five factors explained 58.9 % of the variance. Of the 30 facets, 28 facets loaded above .35, and 25 loaded maximally on their theorized factor. Out of the 120 cross-loadings of facets on non-theorized factors, only 12 (10 %) loaded above .35. Prominent cross-loadings included self-consciousness (−.51), trust (.56), and altruism (.50) on extraversion; activity level (.59) on conscientiousness; dutifulness (.51) on agreeableness; and emotionality (.51) on neuroticism.

3.2 Correlations Between Big 5 Personality and Well-Being

The full correlation matrix between factors, facets, and well-being measures is available from the online repository mentioned in the Method. Table 3 shows the correlations

Table 1 Descriptive statistics and Cronbach's alpha reliability for personality factors and well-being scales

Variable	α	M	SD
Neuroticism	.85	2.91	0.59
Extraversion	.84	3.37	0.54
Openness	.72	3.64	0.41
Agreeableness	.79	3.64	0.45
Conscientiousness	.84	3.49	0.51
Satisfaction with life	.88	4.47	1.44
Positive affect	.89	3.47	0.79
Negative affect	.87	2.21	0.80
Positive relations	.89	4.42	0.90
Autonomy	.85	4.08	0.83
Environmental mastery	.88	4.07	0.87
Personal growth	.86	4.85	0.69
Purpose in life	.89	4.36	0.91
Self-acceptance	.94	4.06	1.07

between personality factors and well-being scales. To better understand the cross-correlations between personality factors and well-being, a decomposition was performed. First, neuroticism and negative affect were reversed, so that all variables were positively framed. Second, cross-correlations were obtained between personality factors and well-being variables denoted by r_{ij} where $i = 1, \ldots, I$, and $j = 1, \ldots, J$ indexing the $I = 5$ personality factors and $J = 9$ well-being variables respectively. Then, the overall average cross-correlation was obtained as

$$\bar{r}_{..} = \frac{1}{IJ} \sum_{i} \sum_{j} r_{ij},$$

as well as the average deviation for cross-correlations for each well-being variable

$$\bar{r}_{.j} = \frac{1}{I} \sum_{i} r_{ij}$$

and personality factor

$$\bar{r}_{i.} = \frac{1}{J} \sum_{j} r_{ij}.$$

Thus, observed correlations can be decomposed into the overall average correlation, average deviation of the personality correlations, average deviation of the well-being correlations, and a residual.

$$r_{ij} = \bar{r}_{..} + (\bar{r}_{.j} - \bar{r}_{..}) + (\bar{r}_{i.} - \bar{r}_{..}) + u_{ij}.$$

So for example, the expected correlation between openness and personal growth was the grand mean (.39) plus the deviation from the grand mean of the average openness correlation (−.16) plus the deviation from the grand mean of the average personal growth correlation (.03) which equals .26, but the obtained correlation was .55; the residual was

Table 2 Descriptive statistics and Cronbach's alpha reliability for personality facets

Variable	α	M	SD
N1: Anxiety	.83	3.10	0.73
N2: Anger	.88	2.85	0.80
N3: Depression	.90	2.61	0.88
N4: Self-consciousness	.83	2.94	0.77
N5: Immoderation	.77	3.24	0.70
N6: Vulnerability	.85	2.73	0.75
E1: Friendliness	.88	3.60	0.78
E2: Gregariousness	.87	3.32	0.84
E3: Assertiveness	.84	3.24	0.74
E4: Activity level	.72	3.01	0.57
E5: Excitement seeking	.82	3.30	0.72
E6: Cheerfulness	.82	3.75	0.67
O1: Imagination	.82	3.73	0.71
O2: Artistic interests	.75	3.96	0.62
O3: Emotionality	.77	3.76	0.62
O4: Adventurousness	.76	3.47	0.59
O5: Intellect	.79	3.70	0.64
O6: Liberalism	.65	3.21	0.60
A1: Trust	.85	3.43	0.70
A2: Morality	.77	3.85	0.62
A3: Altruism	.79	4.03	0.57
A4: Cooperation	.75	3.55	0.67
A5: Modesty	.80	3.28	0.70
A6: Sympathy	.73	3.68	0.59
C1: Self-efficacy	.80	3.69	0.57
C2: Orderliness	.84	3.33	0.78
C3: Dutifulness	.69	3.94	0.50
C4: Achievement striving	.84	3.67	0.70
C5: Self-discipline	.89	3.01	0.83
C6: Cautiousness	.80	3.26	0.67

therefore $.55 - .26 = .29$. Table 4 reports this analysis. Large positive residual correlations indicate that the two variables correlate more with each other than would be expected based on how much the variables correlate generally with other variables. Thus, such correlations help to highlight the unique personality profile of each well-being variable.

The average correlation between personality and well-being was moderately large (.39). On the well-being side, there was not a lot of variation in average correlations with personality, although autonomy was lower than the others. The average absolute cross-correlation was larger for PWB scales (.41) than for SWB scales (.36). In terms of personality, the common ordering emerged of neuroticism being most important by some margin followed by extraversion and conscientiousness, and then with much weaker average cross-correlations for openness and agreeableness. In addition to these general patterns, there were several notable residual cross-correlations shown in Table 4. For

Table 3 Correlations between Big 5 personality and well-being scales

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Neuroticism	–												
2.	Extraversion	**−.47**	–											
3.	Openness	−.07	**.26**	–										
4.	Agreeableness	**−.21**	.02	**.23**	–									
5.	Conscientiousness	**−.54**	.14	.04	**.36**	–								
6.	Satisfaction with life	**−.57**	**.51**	.13	.11	**.35**	–							
7.	Positive affect	**−.52**	**.56**	**.22**	**.20**	**.45**	**.51**	–						
8.	Negative affect	**.76**	**−.40**	−.06	**−.22**	**−.42**	**−.51**	**−.35**	–					
9.	Positive relations	**−.48**	**.58**	**.25**	**.38**	**.28**	**.55**	**.43**	**−.45**	–				
10.	Autonomy	**−.53**	**.26**	**.27**	.04	**.34**	**.33**	**.27**	**−.49**	**.32**	–			
11.	Environmental mastery	**−.75**	**.56**	.13	**.22**	**.60**	**.69**	**.58**	**−.68**	**.64**	**.48**	–		
12.	Personal growth	**−.42**	**.43**	**.55**	**.31**	**.40**	**.44**	**.49**	**−.39**	**.56**	**.51**	**.55**	–	
13.	Purpose in life	**−.58**	**.50**	**.25**	**.28**	**.65**	**.63**	**.62**	**−.49**	**.63**	**.43**	**.78**	**.69**	–
14.	Self-acceptance	**−.74**	**.58**	**.20**	**.18**	**.46**	**.78**	**.56**	**−.64**	**.68**	**.54**	**.80**	**.60**	**.76**

$|r| \geq .11$ indicates $p < .05$; $|r| \geq .15$ indicates $p < .01$ and are bolded

Table 4 Decomposition of cross-correlations between well-being and Big 5 personality

	Personality					Mean well-being deviation
	N−	E	O	A	C	
	Residual Correlations					
Satisfaction with life	.04	.08	−.04	−.04	−.03	−.06
Positive affect	−.07	.08	−.01	−.01	.02	.00
Reversed negative affect	**.19**	−.06	**−.15**	.02	.00	−.02
Positive relations	−.12	.10	.02	**.17**	**−.16**	.00
Autonomy	.04	−.12	.14	−.08	.01	−.10
Environmental mastery	.09	.02	**−.16**	−.06	.10	.06
Personal growth	**−.21**	−.09	**.29**	.07	−.07	.03
Purpose in life	−.07	−.05	−.04	.01	**.15**	.06
Self-acceptance	.10	.06	−.06	−.08	−.02	.04
Mean personality deviation	.20	.09	−.16	−.18	.05	.39[a]

Mean deviations are the average cross-correlation for cross-correlations containing the focal variable minus the overall mean of cross-correlations. Residual correlations equal the actual cross-correlation minus the correlation predicted by summing the overall mean cross-correlations and the two mean deviations for the constituent variables

Absolute residual cross-correlations greater than or equal to 0.15 are bolded

N− reversed neuroticism; *E* Extraversion, *O* Openness, *A* Agreeableness, *C* Conscientiousness

[a] Overall mean cross-correlations between personality and well-being variables

example, the following correlated substantially more than was implied by average cross-correlations for constituent variables: personal growth with openness, positive relations with agreeableness, neuroticism with negative affect, and purpose in life with conscientiousness. Interestingly, there were several negative residual cross-correlations: openness with negative affect, personal growth with neuroticism, environmental mastery with openness, and positive relations with conscientiousness. Thus, for example, the profile of correlations for positive relations indicates stronger relations with agreeableness and weaker relations with conscientiousness than is typically the case for well-being variables.

3.3 Facet-Level Correlations with Well-Being

Table 5 reports zero-order correlations between personality facets and well-being scales and semi-partial correlations between personality facets and well-being scales (see parentheses), where facets have been adjusted for their shared variance with personality factors. The zero-order correlations present a complex pattern with many large correlations often consistent with patterns at the factor-level. The semi-partial correlations focus purely on the incremental prediction of facets over factors. Notable semi-partial correlations are depression with satisfaction with life ($r = -.28$), positive relations ($r = -.20$), purpose in life ($r = -.24$), and self-acceptance ($r = -.37$); self-consciousness with autonomy ($r = .20$); assertiveness with autonomy ($r = .18$); excitement seeking with positive relations ($r = -.19$); cheerfulness with satisfaction with life ($r = .26$), cooperation with autonomy ($r = -.19$); and achievement striving with purpose in life ($r = .21$). The table also reports the proportion of variance in the facet that is not explained by factors. The mean proportion of unique variance was 35.6 %.

Table 5 Zero-order correlations between facets and well-being (semi-partial correlations with variance explained by factors removed from facets shown in parentheses)

	SWL	PA	NA	PR	AU	EM	PG	PL	SA	Unique[a]	Mean[b]
N1: Anxiety	−.47 (.02)	−.39 (.00)	.64 (−.01)	−.35 (.07)	−.41 (.06)	−.58 (.02)	−.29 (−.01)	−.38 (.05)	−.57 (.09)	.21	.03
N2: Anger	−.31 (.05)	−.29 (−.03)	.54 (−.02)	−.27 (.08)	−.25 (**.17**)	−.43 (.05)	−.22 (.04)	−.30 (.04)	−.39 (**.13**)	.33	.06
N3: Depression	−.67 (**−.28**)	−.56 (−.09)	.70 (.12)	−.59 (**−.20**)	−.45 (−.03)	−.76 (**−.14**)	−.48 (**−.13**)	−.70 (**−.24**)	−.86 (**−.37**)	.27	−.18
N4: Self-consciousness	−.46 (**.14**)	−.45 (.11)	.56 (−.02)	−.47 (−.02)	−.53 (**−.20**)	−.59 (.08)	−.40 (−.01)	−.48 (.05)	−.63 (.04)	.24	.02
N5: Immoderation	−.16 (.09)	−.16 (.05)	.32 (−.09)	−.07 (.07)	−.29 (.01)	−.32 (.07)	−.10 (.12)	−.24 (**.12**)	−.24 (.10)	.49	.08
N6: Vulnerability	−.49 (.00)	−.46 (−.03)	.65 (.03)	−.37 (.02)	−.49 (−.04)	−.68 (−.08)	−.37 (−.02)	−.50 (−.01)	−.61 (.04)	.27	−.02
E1: Friendliness	.44 (−.03)	.49 (−.03)	−.41 (.00)	.67 (**.17**)	.22 (−.02)	.55 (.04)	.37 (−.07)	.49 (.04)	.56 (.03)	.23	.01
E2: Gregariousness	.34 (−.05)	.34 (−.11)	−.27 (−.01)	.46 (−.01)	.03 (**−.15**)	.36 (−.04)	.19 (−.12)	.28 (−.06)	.37 (−.07)	.27	−.07
E3: Assertiveness	.39 (−.08)	.46 (−.03)	−.31 (.03)	.39 (.01)	.39 (**.18**)	.48 (−.03)	.41 (.10)	.45 (.00)	.50 (.01)	.29	.01
E4: Activity level	.33 (−.02)	.49 (.08)	−.30 (.01)	.35 (.01)	.26 (.05)	.51 (.04)	.38 (.07)	.53 (.06)	.44 (.03)	.55	.03
E5: Excitement seeking	.21 (−.03)	.23 (.01)	−.08 (.05)	.15 (**−.19**)	.05 (−.07)	.10 (**−.12**)	.15 (−.03)	.04 (**−.12**)	.16 (**−.13**)	.38	−.08
E6: Cheerfulness	.57 (**.26**)	.52 (.09)	−.41 (−.08)	.57 (.06)	.25 (.02)	.54 (**.12**)	.46 (.07)	.49 (.11)	.59 (**.16**)	.30	.11
O1: Imagination	.06 (.07)	.07 (.01)	.06 (.00)	.07 (−.04)	.08 (−.10)	−.04 (.00)	.25 (−.09)	.04 (−.02)	.02 (−.04)	.41	−.02
O2: Artistic interests	.06 (−.01)	.19 (.06)	−.05 (−.02)	.16 (−.04)	.08 (−.10)	.05 (−.06)	.32 (−.08)	.16 (−.06)	.13 (.01)	.54	−.03
O3: Emotionality	.01 (.04)	.13 (.02)	.16 (.03)	.25 (.14)	.10 (.14)	−.01 (.02)	.41 (.12)	.22 (**.12**)	.08 (**.13**)	.40	.08
O4: Adventurousness	.27 (−.01)	.29 (−.02)	−.27 (.01)	.30 (−.07)	.27 (−.04)	.31 (.00)	.51 (.11)	.32 (.02)	.34 (−.04)	.53	.00
O5: Intellect	.18 (−.06)	.25 (−.04)	−.19 (.04)	.21 (.00)	.44 (.14)	.31 (.02)	.50 (.05)	.33 (−.04)	.26 (−.08)	.45	.00
O6: Liberalism	−.10 (−.03)	−.08 (−.03)	.06 (−.04)	−.02 (.02)	.07 (−.02)	−.10 (.03)	.13 (−.07)	−.06 (−.02)	−.04 (.02)	.60	−.01
A1: Trust	.35 (.05)	.36 (.01)	−.38 (.00)	.59 (**.14**)	.13 (−.06)	.44 (.05)	.37 (.01)	.39 (.03)	.45 (.07)	.43	.03
A2: Morality	.05 (−.02)	.09 (−.07)	−.20 (−.06)	.21 (−.03)	.08 (.11)	.22 (.07)	.18 (−.02)	.28 (.06)	.15 (.07)	.31	.02
A3: Altruism	.26 (−.01)	.41 (.07)	−.24 (.07)	.52 (.03)	.15 (.04)	.37 (−.02)	.47 (.07)	.45 (.02)	.35 (.02)	.24	.02
A4: Cooperation	.07 (.03)	.08 (.00)	−.22 (−.03)	.17 (−.07)	−.06 (**−.19**)	.13 (−.04)	.14 (−.06)	.17 (−.01)	.11 (.00)	.33	−.03
A5: Modesty	−.32 (−.11)	−.22 (.01)	.14 (−.03)	−.17 (−.11)	−.15 (.09)	−.26 (−.01)	−.15 (−.04)	−.24 (−.09)	−.38 (**−.16**)	.43	−.04
A6: Sympathy	.09 (.07)	.14 (.00)	−.01 (.09)	.33 (.04)	.03 (.02)	.05 (−.07)	.36 (.06)	.20 (.01)	.11 (.04)	.32	.01
C1: Self-efficacy	.49 (.02)	.51 (−.05)	−.52 (.01)	.44 (.07)	.53 (.14)	.70 (.05)	.56 (.11)	.70 (.07)	.64 (.06)	.26	.05
C2: Orderliness	.07 (−.09)	.22 (.01)	−.17 (−.02)	.02 (−.05)	.06 (−.10)	.25 (−.09)	.11 (−.05)	.30 (**−.12**)	.13 (−.06)	.36	−.06
C3: Dutifulness	.14 (−.09)	.25 (−.07)	−.26 (.01)	.22 (−.05)	.23 (.11)	.37 (−.01)	.28 (−.02)	.41 (−.06)	.26 (−.01)	.35	−.02

Table 5 continued

	SWL	PA	NA	PR	AU	EM	PG	PL	SA	Unique[a]	Mean[b]
C4: Achievement striving	.42 (.13)	.54 (**.16**)	−.31 (.07)	.30 (.01)	.33 (.04)	.57 (.04)	.47 (.12)	.72 (**.21**)	.48 (.08)	.29	.08
C5: Self-discipline	.41 (.05)	.49 (.08)	−.44 (.00)	.27 (−.04)	.30 (−.12)	.62 (.05)	.34 (−.06)	.60 (−.02)	.47 (−.03)	.25	−.01
C6: Cautiousness	.06 (−.01)	.03 (−**.15**)	−.22 (−.05)	.05 (.08)	.17 (.01)	.23 (−.01)	.11 (−.06)	.26 (−.04)	.12 (−.01)	.35	−.02

Significant semi-partial correlations ($p < .001$) are bolded

SWL satisfaction with life, *PA* positive affect, *NA* negative affect, *PR* positive relations, *AU* autonomy, *EM* emotional mastery, *PG* personal growth, *PL* purpose in life, *SA* self-acceptance

[a] Proportion of personality variance not predicted by Big 5 factors of personality

[b] Average semi-partial correlation for facet across well-being variables, where negative affect has been reversed

Table 6 Standardized regression coefficients predicting well-being scales from Big 5 personality

DV	Standardized beta				
	N	E	O	A	C
Satisfaction with life	**−.37**	**.31**	.02	−.01	.11
Positive affect	−.14	**.43**	.08	.03	**.31**
Negative affect	**.71**	−.07	.03	−.07	.00
Positive relations	**−.18**	**.49**	.03	**.33**	−.01
Autonomy	**−.51**	−.07	**.29**	**−.18**	.13
Environmental mastery	**−.42**	**.31**	.00	.01	**.32**
Personal growth	−.13	**.21**	**.45**	.08	**.25**
Purpose in life	**−.13**	**.33**	**.13**	.03	**.52**
Self-acceptance	**−.52**	**.29**	.09	.00	**.14**

Significant coefficients ($p < .01$) are bolded

Table 7 Variance explained in well-being scales by Big 5 personality and 30 facets of personality

DV	$R^{2(\text{factors})}_{\text{adj}}$	$R^{2(\text{facets})}_{\text{adj}}$	$\Delta\hat{\rho}^2$ (95 % CI)
Satisfaction with life	.40	.52	.12 [.06, .18]
Positive affect	.47	.51	.04 [.00, .09]
Negative affect	.58	.59	.01 [.00, .05]
Positive relations	.50	.57	.07 [.02, .13]
Autonomy	.36	.50	.14 [.07, .21]
Environmental mastery	.68	.73	.04 [.01, .08]
Personal growth	.51	.59	.07 [.02, .13]
Purpose in life	.62	.72	.11 [.07, .15]
Self-acceptance	.63	.78	.15 [.10, .20]

$\Delta\hat{\rho}^2 = R^{2(\text{facets})}_{\text{adj}} - R^{2(\text{factors})}_{\text{adj}}$

3.4 Prediction of Well-Being from Personality Factors and Facets

A set of linear multiple regressions (direct entry) was conducted predicting each well-being variable using the Big 5 as predictors. Table 6 reports the obtained standardized regression coefficients. Table 7 reports the corresponding estimate of population variance explained (i.e., $R^{2(\text{factors})}_{\text{adj}}$. In general, the Big 5 explained substantial variance. In all cases, the Olkin-Pratt formula for adjusted r^2 was used as it aligns with the assumption that the predictor variables are a random sample from a population. Average $R^{2(\text{factors})}_{\text{adj}}$ was .55 for PWB variables and .48 for SWB variables.

Table 7 reports the adjusted r^2 predicting each well-being scale, first with the five personality factors as predictors, and then with the 30 personality facets as predictors. Estimates of incremental population variance explained, $\Delta\rho^2$, were obtained by subtracting R^2_{adj} for factors from R^2_{adj} for facets. Confidence intervals were obtained using a double-adjusted-r squared bootstrap method. This method involves first sampling with replacement from the data to generate K bootstrap samples of equal size as the raw data. For each

bootstrap sample, $R^2_{(\text{factors})}$ and $R^2_{(\text{facets})}$ is obtained. Then for both R^2 values, the formula for adjusted r^2 is applied twice

$$\tilde{R}^2_{\text{adj}} = f\left(f\left(R^2\right)\right)$$

where $f(.)$ is the formula for adjusted r^2. The adjustment formula is applied twice, first to adjust for the bias associated with the bootstrap treating the sample as the population, and second to adjust for the standard bias in estimating ρ^2 from sample data. Finally the estimate is obtained for the particular bootstrap sample as $\Delta\hat{\rho}^2 = \tilde{R}^2_{\text{adj(facets)}} - \tilde{R}^2_{\text{adj(factors)}}$.To obtain 95 % confidence intervals, the .025 and .975 sample quantiles are obtained from the K bootstrap estimates.

The mean ratio of facets to factors adjusted r^2 was 1.17. The mean $\Delta\hat{\rho}^2$ was .08. In general, $\Delta\hat{\rho}^2$ was larger for PWB (mean $\Delta\hat{\rho}^2 = .10$) than for SWB (mean $\Delta\hat{\rho}^2 = .06$). In particular, negative affect, which correlated very highly with neuroticism, showed minimal incremental facet prediction. Positive affect and environmental mastery showed small amounts of incremental facet prediction. Autonomy and self-acceptance showed the largest amounts of incremental facet prediction.

4 Discussion

This study aimed to examine the relationship between personality and well-being. In particular, it examined the incremental prediction of personality facets over Big 5 factors. In general, personality and well-being showed substantial correlation. Facets accounted for additional population variance in well-being but the increase was often modest, ranging from almost no additional variance explained to around a third more variance explained. The subsequent discussion elaborates, first, on factor-level relationships, then on facet-level relationships, and finally on broader theoretical and methodological issues.

4.1 Well-Being and the Big 5

There were several general patterns in the cross-correlations between Big 5 personality and well-being. First, neuroticism was clearly the largest and most consistent correlate of well-being; then came extraversion, closely followed by conscientiousness. These findings are generally consistent with DeNeve and Cooper (1998) and Steel et al. (2008), whose meta-analytic studies focused on SWB, and are consistent with Grant et al. (2009) and Keyes et al. (2002). While agreeableness and openness still had meaningful correlations, these were less consistent and generally smaller. Second, PWB dimensions showed a slightly stronger relationship with the Big 5 than did SWB dimensions. Butkovic et al. (2012) likewise reported that personality explained more variance in PWB than SWB. Third, consistent with Schmutte and Ryff (1997), PWB showed a more diverse relationship with personality than did SWB. In broad terms, SWB dimensions were often well predicted by neuroticism and extraversion, whereas agreeableness, openness, and conscientiousness were important correlates of several PWB dimensions (c.f. Grant et al. 2009). In addition, residual cross-correlations and standardized betas highlighted several relationships between PWB and the Big 5 that shed light on the nature of the PWB construct contributing to broader discussion regarding the meaning of PWB (e.g., Ryff and Singer 1998, 2006). These points are elaborated in more detail below. Taken together, the results

reinforce the notion that the key dispositional influences on well-being vary across well-being dimensions (Grant et al. 2009).

There were no significant residual cross-correlations for SWL, indicating that there were no personality variables that correlated more strongly with SWB than expected based on their correlations with other well-being variables. Neuroticism had the strongest standardized beta for SWL, which was also predicted by extraversion and to a lesser extent conscientiousness. In contrast, extraversion was the strongest predictor of PA, which was also predicted by conscientiousness and neuroticism. There were no significant residual cross-correlations for PA, but neuroticism and openness showed significant residual cross-correlations for NA. Neuroticism was the only significant predictor of NA. The finding that SWB dimensions were well predicted by neuroticism and extraversion is consistent with meta-analytic studies (DeNeve and Cooper 1998; Steel et al. 2008).

Personal growth had a positive residual cross-correlation with openness and a negative residual cross-correlation with neuroticism. Bardi and Ryff (2007) similarly reported that individuals who were higher on openness and lower on neuroticism reported higher personal growth. Standardized betas showed that personal growth was predicted by all five traits, with openness emerging as the strongest predictor. This strong relationship between personal growth and openness is consistent with Schmutte and Ryff (1997). Personal growth items include the perception that the individual is growing, a belief that change is possible, and valuing of change (Ryff 1989). Thus, beyond the pure well-being elements, the measure of personal growth also captures a disposition to the concept that growth and change is positive, which helps to explain the relationship with openness. Arguably, these more attitudinal elements go beyond pure well-being and actually suggest a humanistic value system regarding what is the good life.

Autonomy was one of the least well-predicted well-being dimensions. There were no significant residual cross-correlations for this dimension, although standardized betas indicated that the dimension was predicted by greater openness and conscientiousness and less neuroticism and agreeableness, with neuroticism being the strongest predictor. Previous studies have also primarily identified an association between autonomy and agreeableness or neuroticism (Grant et al. 2009; Schmutte and Ryff 1997), perhaps reflecting the focus of autonomy items on a lack of care for what others think or low self-consciousness. However, there is also arguably an implicit assumption that autonomy involves some degree of independent thinking. Items capture self-confidence and as well as a spectrum of not being excessively influenced by others to more extreme independence of thought. Emotional stability (the inverse of neuroticism) and antagonism (the inverse of agreeableness) capturinquie elements of self-confidence and independent thinking respectively. A readiness to not conform can go against being agreeable. The Ryff scale measures a relatively social conception of autonomy. While much of the autonomy construct captures positive aspects, there is an aspect that might actually result in less well-being. For instance, not listening to the views of others, never sacrificing one's needs for the needs of others, or an inability to accept the rituals and values of a society could have a range of negative consequences. Similarly, some individuals may place less value on independence of thought thereby further reducing the relationship between autonomy and well-being.

Positive relations had a positive residual cross-correlation with agreeableness and a negative residual cross-correlation with conscientiousness and it was predicted particularly by extraversion, agreeableness and neuroticism. Items for positive relations capture not only whether a person has good friends, but also whether the person values interactions with others and sees him or herself as capable of being a good friend. In this sense, extraversion relates to both social engagement and a desire to be social, and agreeableness

captures many aspects related to being friendly and accommodating. Consistent with this, previous studies have primarily linked positive relations to agreeableness and extraversion (Grant et al. 2009; Schmutte and Ryff 1997). However, the Ryff measure of positive relations goes beyond measuring presence of or satisfaction with interpersonal relationships, also measuring evaluative judgments about the importance of friendship and skills in friendship formation, suggesting that other personality dimensions are also important. Indeed, Siegler and Brummett (2000) linked positive relations with select facets of all Big 5 traits.

Purpose in life had a strong positive residual cross-correlation with conscientiousness. Conscientiousness also had the strongest standardized beta, followed by extraversion while neuroticism and openness showed a weaker relationship with purpose in life. The strong association between purpose in life and conscientiousness is consistent with previous work (Grant et al. 2009; Schmutte and Ryff 1997), and others have also documented the associations between this dimension and extraversion and neuroticism (Schmutte and Ryff 1997; Siegler and Brummett 2000). Purpose in life items focus on having longer term projects, getting pleasure from moving towards goals, and aspects of life satisfaction.

Self-acceptance and environmental mastery tended to have similar patterns to satisfaction with life, with significant betas for neuroticism, extraversion and conscientiousness (self-acceptance was also predicted by openness, though to a lesser extent). Environmental mastery had a significant residual cross-correlation with openness; there were no significant residual cross-correlations for self-acceptance. Both of these PWB dimensions have been flagged (Bouchard and Loehlin 2001) as more reflective of SWB than PWB. Self-acceptance items largely focus on self-esteem, positive comparison of self versus others, and elements of life satisfaction. Environmental mastery focuses on a sense control, with elements of life satisfaction.

It is noteworthy that the Big Five predicted self-acceptance and environmental mastery more strongly than they predicted satisfaction with life. Once again, this is consistent with previous work supporting a stronger relationship between personality and well-being for PWB than SWB (Butkovic et al. 2012; Grant et al. 2009) and reinforces the distinctiveness of these dimensions.

At present, the Ryff scales seem to incorporate more than just whether the well-being aspects are present; they also embody a range of assumptions about what constitutes the good life. Of course, psychological theory underpins the importance of such dimensions, but each dimension captures a unique flavor of the concept of PWB and also seems to measure the degree to which that dimension is characteristically valued by the individual. Thus, open people may search for personal growth. Disagreeable people may be more willing to assert their opinion in defiance of what a group thinks. And conscientious people may value purpose in life and seek to achieve projects and plans. While any measure of well-being will have a particular orientation, there is a risk of imposing a humanistic value system on to people by labeling such dimensions as well-being rather than using the more theoretically neutral SWB dimensions.

4.2 Incremental Prediction of Well-Being by Facets

Overall, personality facets provided a meaningful increase in the variance explained in well-being over and above the personality factors. However, there was no doubling of explained variance as eluded to in the extant literature (see Quevedo and Abella 2011). Instead, increases ranged from almost nothing to around a third more. Well-being dimensions varied substantially in the size of this increase. Positive and negative affect

both showed minimal increases, which is inconsistent with the very large incremental prediction achieved for facets over factors for some traits in meta-analytic research (Steel et al. 2008). In contrast, self-acceptance, autonomy, satisfaction with life, and purpose in life showed fairly large increases. However, this is the first study to estimate the incremental prediction of facets over factors for PWB and the results await replication. Furthermore, the cause of the variation in incremental variance is not entirely clear and warrants exploration in future research.

Examination of the semi-partial correlations between facets and well-being helped to explain the incremental prediction by facets. For example, autonomy was associated with more anger and assertiveness, and less with self-consciousness, cooperation, and gregariousness, reinforcing the above notion that this dimension reflects the degree of importance placed on what others think and independent thought. Purpose in life had a strong link with achievement striving, reinforcing the goal-directed emphasis of this dimension. More generally, depression and cheerfulness emerged as incremental correlates for many well-being variables. In many cases, these correlates seemed to be related to overlap in the conceptual nature of the constructs (for further discussion of construct overlap in this context, see Schmutte and Ryff 1997).

Overall, the bootstrapping and the semi-partial correlations helped to explain the incremental contribution of facets. First, bootstrapping highlighted the uncertainty around estimates of incremental variance explained. While the size of the confidence intervals varied, the sample size of approximately 300 was sufficient for 95 % confidence intervals to provide a good understanding of the 'ball park' of the effect size. Also, the semi-partial correlations helped to yield a more parsimonious view of the incremental role of facets. Compared to zero-order correlations, semi-partial correlations flagged only a select few facets, taking factor correlations as a starting point and presenting a more parsimonious view. Compared to stepwise regression, the results were less binary in terms of inclusion of predictors.

4.3 Incremental Facet Prediction

Conclusions about incremental facet prediction in the present study are based on the inclusion of nested facets. As Quevedo and Abella (2011) found, inclusions of non-nested facets can substantially increase the incremental prediction of facets. There are several reasons for this. First, by construction, factors capture some of the variance of nested facets. So for instance, when comparing facets to the Big 5 from a given test, incremental prediction should be greater when facets come from a different test. However, by taking facets from a different test, some of the incremental variance would be obtained by the slightly different measurement of the Big 5. Second, the selection of facets in a personality test may be partially constrained by the need to fit within a Big 5 theoretical framework. Thus, personality traits not captured by the Big 5 might be omitted. However, alternatively, there is the potential to include variables that are not typically considered personality traits, or that get even closer to well-being related constructs.

This raises questions about what is a natural or useful way of framing incremental prediction of well-being from personality facets. It also relates to issues of how personality tests should be constructed in order to both reliably measure the Big 5 but also capture diverse facets that assist with incremental prediction. At the very least, it is necessary to be clear when describing estimates of incremental prediction as to what class of facets is being included.

Overall, the results of this study support the value of a facet-level analysis, but suggest that the contribution is more modest than some previous studies have suggested. The increases in estimated population prediction seen in this study are of a magnitude that justifies the increased complexity. Furthermore, in contrast to the complexity of zero-order correlation matrices, the semi-partial correlation analysis helps to provide a parsimonious picture of the relevant facets that support the incremental prediction.

4.4 Construct Overlap and Causal Pathways

Beyond identifying the correlations between personality and well-being, there is the broader issue of the degree to which such relationships are based on construct overlap or some form of causal relationship. Examination of item content strongly supports the idea that construct overlap explains many of the observed correlations. Neuroticism measures the tendency to experience a range of negative emotions, and clearly negative affect is almost synonymous with this tendency. In the case of extraversion, there is a mixture of items, some of which pertain directly to the experience of positive emotions whereas others pertain more to experiences that often elicit positive emotions. However, personality traits can be seen as more stable than well-being and thus as the cause of well-being. Arguments can also be made for how personality traits influence the motivation, environment, and interpretive lens of the individual, which in turn influences well-being. A recent study by Soto (2014) of the longitudinal relationship between the Big 5 and the SWB dimensions supported the notion that personality traits and well-being dimensions influence one another reciprocally over time.

In some respects a facet-level analysis provides greater scope for both forms of prediction, but perhaps greater construct overlap is particularly likely. The Big 5 is necessarily broad, yet the chance that a well-being scale is going to overlap substantively with a specific facet scale increases. For example, depression seems to be the aspect of neuroticism that most directly relates to a wide range of well-being measures. Likewise, specific facets like achievement striving overlap substantively with valuing an orientation to life that emphasizes personal growth (Ryff and Singer 2006).

The research also raises issues regarding the position of PWB in the causal and definitional system that contains personality and SWB. For example, Diener et al. (2003) proposed that there are a multiple pathways to well-being that may differ between people and across cultures. Generally, environmental mastery, self-acceptance and, to some extent, purpose in life substantially overlap with satisfaction with life. Satisfaction with life seems to be the more 'pure' measure of well-being in that the individual is free to evaluate their life on their own terms. Autonomy, positive relations, and personal growth seem to capture important pathways to SWB. Even if they are viewed as an essential part of well-being, care is needed when designing measures to ensure attitude to the dimension is not confounded with status on the dimension.

4.5 Conclusion, Limitations, and Future Research

This study has provided a more complete picture of the relationship between personality, SWB, and PWB. The results provide a balance between calls that only the Big 5 is necessary and claims that facets substantially improve prediction. In addition, our methodological approach provided a parsimonious explanation to the complex patterns of cross-correlations. By making available all data and data analysis code, others are encouraged to further explore the data to generate additional insights.

In terms of limitations, the research was conducted on a young adult sample, predominantly consisting of university students. Such a sample may have particular priorities and values in life, which may have influenced the pattern of correlations observed. Clearly more research is required to explore incremental facet prediction with different personality tests, and different kinds of facets. Furthermore, while the Ryff scales have proven very useful in advancing understanding of PWB, there may be a need to further refine measures of PWB to minimize inappropriate measurement of values and unnecessary confounding with life satisfaction and related measures.

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