# Psychological well-being within eating disorder patients

Validation of the Dutch scales of psychological well-being and relations with maladaptive personality functioning

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## Abstract

Although psychological well-being (PWB) has been found to be substantially impaired within eating disorder patients, the Dutch scales of PWB have not been psychometrically tested in a clinical population yet. The theoretical concept of PWB includes six dimensions: Purpose in Life, Personal Growth, Autonomy, Environmental Mastery, Self-Acceptance, and Positive Relationships with Others. The aim of this study was to examine the factorial validity, internal consistency, convergent validity, and incremental validity of the PWB scales. In addition, relations between PWB and maladaptive personality functioning were explored.

The sample consisted of 502 patients seeking treatment at a specialized center for eating disorders. Cross-sectional data from the intake were used to test the psychometric properties of the 8/9-item per scale version. The factor structure was explored through principal component analyses with oblimin rotation, internal consistencies were obtained through Cronbach's alpha analyses, and incremental validity was tested through multivariate linear regression analyses. Convergent validity and correlations with maladaptive personality functioning were examined through bivariate correlation tests.

About two-third of the items loaded on the expected six dimensions of PWB indicating partial support of the 6-factor structure. Internal consistencies of the scales were fair to good. Correlations with other measures were significant and mostly in accordance with expectations. PWB dimensions explained 3.1% additional variance in eating pathology above and beyond psychopathological symptoms, specifically Autonomy and Self-Acceptance. Beyond this, multiple significant correlations were found between PWB dimensions and domains of maladaptive personality functioning.

The construct of PWB can be measured in a fairly reliable and valid way through the Dutch PWB scales. A confirmative factor analysis is recommended to test the factor structure more extensively and to examine the instrument's invariance between groups to interpret group differences. For the purpose of routine outcome monitoring, further research is also recommended on test-retest reliability and the scales' capabilities to measure changes over time. Present findings supported incremental validity, but additional support may be obtained from a longitudinal study. The relationship between PWB and maladaptive personality functioning needs to examined into more depth considering the possible implications for the treatment of patients with comorbid personality disorders.

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## Introduction

It is only recently that psychological well-being (PWB) has become a research focus in the study and treatment of eating disorder patients (De Vos, LaMarre, Radstaak, Bijkerk, Bohlmeijer, & Westerhof, 2017; Tomba, Offidani, Tecuta, Schumann, & Ballardini, 2014; Tomba, Tecuta, Schumann, & Ballardini, 2017). Although the World Health Organization (1948) has stressed the positive dimension of mental health since decades, most research exclusively focussed on psychopathological dysfunction. Only at the beginning of this century, positive mental health in eating disorders was addressed in terms of quality of life and subjective well-being (Jenkins, Hoste, Meyer, & Blissett, 2011).

A more comprehensive approach to well-being, however, addresses the degree to which a person is fully functioning (Ryan & Deci, 2001). Besides the tendency to focus on happiness in terms of pleasure attainment and pain avoidance (*hedonia*), people are driven to fulfill their talents and potentialities (*eudemonia*). In other words, life is not merely about having a pleasant life but also about having a good life encompassing meaning and self-realization. The theoretical conceptualization of PWB (i.e. positive psychological functioning) was pioneered and developed by Ryff (1989, 1995) and generated from multiple frameworks. Included in the model are six core dimensions: the belief that life has a purpose and meaning (Purpose in Life), a sense of growth and development (Personal Growth), a sense of self-determination (Autonomy), the capacity to manage one's life effectively (Environmental Mastery), positive self-evaluation (Self-Acceptance) and the holding of warm and qualitative relationships with other people (Positive Relationships with Others). The operationalization of each dimension is shown in Table 1.

The relation between PWB and mental illness has been addressed in several studies. For example, multiple indicators of depression (i.e. dysfunctional energy and dysfunctional affect) showed negative associations with all dimensions of PWB, in particular with Self-Acceptance and Environmental Mastery (Ryff & Keyes, 1995). Also, symptoms in patients suffering from a panic disorder showed negative associations with Environmental Mastery, Personal Growth, Purpose in Life and Self-Acceptance (Fava, Rafanelli, Ottolini, Ruini, Cazzaro, & Grandi, 2001). Although positive psychological functioning is related to mental illness, the 'two-continua model of mental health' states that this relation is not perfect (Keyes, 2005). Experiencing many psychopathological symptoms may increase the chance of decreased positive functioning, but this is not necessarily always the case. An individual suffering from a mental illness may still have a high degree of PWB at the same time and vice versa. In other

words, a lack of psychopathological symptoms does not imply optimal functioning (Lamers, Westerhof, Bohlmeijer, Ten Klooster, & Keyes, 2011). The complementary role of positive functioning to mental illness points out the need of assessing PWB in addition to psychopathological symptoms in patients suffering from a mental disorder.

Table 1

*Dimensions of psychological well-being*

| | |
|---|---|
| Purpose in Life | Has plans and goals in life and a sense of directedness. Feels there is a meaning to present and past life and holds beliefs that give life a certain purpose. |
| Personal Growth | Has a feeling of continued development and the perception of oneself as growing and developing. Has an open attitude towards new experiences and a sense of realization of potentialities. |
| Autonomy | Is self-determined and independent. Resists social pressure to think or act in a certain manner and regulates behaviour from within. Also, uses personal standards for self-evaluation. |
| Environmental Mastery | Has a sense of mastery and competence in managing environmental demands and controlling complex activities. Uses effectively surrounding opportunities and chooses and creates contexts which suit personal needs and values. |
| Self-Acceptance | Has a positive attitude towards oneself and the acknowledgement of multiple aspects of the self including positive and negative characteristics. Has a positive feeling on the past and course of life. |
| Positive Relationships with Others | Has warm, trustful relationships with others and is involved in the well-being of others. Has capabilities like empathy, affection and intimacy as well as an understanding of the concept of give and take of human relationships. |

Suffering from an eating disorder has a profound impact on patients' lives, as research revealed that people with eating disorders have the lowest levels of quality of life of all psychiatric illnesses (Jenkins et al., 2011). With increasing prevalence rates and a peak age of onset between 14-19 years, eating disorders are among the most prevalent disorders in adolescence and often take a chronic course (Herpertz-Dahlmann, 2015). Most eating disorders are characterized by disturbed eating or eating-related behaviour and weight changes which very often involves continuous preoccupation with eating and weight-control practices. The main types of eating disorders include anorexia nervosa (AN), bulimia nervosa (BN) and binge-eating disorder (BED) (DSM-5; APA, 2013). Although eating-related behaviour differs between AN and BN, self-evaluation in both types is highly influenced by the overevaluation

of and dissatisfaction with one's body weight and shape. As a result, patients with AN persistently restrict energy intake leading to significant low body weight (DSM-5; APA, 2013). The severe and prolonged starvation, particularly present in AN-patients, can seriously influence the brain and bone development (Herpertz-Dahlmann, 2015). Of all mental illnesses, AN has the highest mortality rate (Hoek, 2006). BN-patients experience recurrent episodes of binge eating (i.e. uncontrolled overeating) followed by inappropriate compensatory behaviour such as self-induced vomiting or misuse of laxatives. Although BED-patients also display severe and uncontrolled overeating behaviour in recurrent episodes, they do not engage in inappropriate compensatory behaviours like BN-patients (DSM-5; APA, 2013). Lifetime prevalences for AN and BN within a Dutch nationally representative survey (NEMESIS-2) were respectively 2.0% and 1.1% among women, and 0.0% and 0.2% among men (Bijl, Ravelli, & Van Zessen, 1998). In the US, a nationwide representative survey demonstrated lifetime prevalence rates for AN, BN and BED of 0.9%, 1.5%, and 3.5% among women, and 0.3%, 0.5%, and 2.0% among men (Hudson, Hiripi, Pope, & Kessler, 2007). The age of onset in BED-patients tended to be later (around the age of 25) than those in AN- and BN-patients. Additionally, comorbidity with other disorders such as mood, anxiety, impulse-control, and substance use disorders was found to be common. Also, meta-analysis showed frequent comorbidity with personality disorders (Martinussen et al., 2017).

The role of PWB within eating disorders was first investigated by Tomba et al. (2014). Through a controlled study, involving a sample of 245 outpatients covering the main eating disorders, they found that PWB was substantially impaired. Compared to healthy controls, patients with eating disorders showed lower scores on Autonomy, Environmental Mastery, Positive Relationships with Others, and Self-Acceptance. The findings also showed differences between diagnostic groups. For example, BN-patients reported lower scores on all dimensions than healthy controls whereas BED-patients only scored lower on Autonomy, Environmental Mastery, and Self-Acceptance. AN-patients showed impaired PWB regarding Positive Relationships with Others and Self-Acceptance, but similar scores to healthy controls on the other dimensions of PWB (Tomba et al., 2014).

The additional value of positive functioning is reflected by previous findings showing that positive scores on PWB protect against future psychopathological symptoms in general and contribute to relapse prevention (Lamers, Westerhof, Glas, & Bohlmeijer, 2015; Schotanus-Dijkstra, Ten Have, Lamers, De Graaf, & Bohlmeijer, 2016). In an exploratory study on outpatients with eating disorders it was found that, in addition to standard measurement of BMI, symptomatology and behavioural parameters, treatment outcome in eating disorders may

benefit from changes in positive functioning such as PWB. In particular, the enhancement of warm relationships and self-acceptance may strengthen treatment outcome (Tomba et al., 2017). Moreover, a systematic review and qualitative meta-analysis by De Vos et al. (2017) showed that former eating disorder patients rate PWB as a key criterion for recovery in addition to symptom remission. Self-Acceptance, Positive Relationships with Others, Personal Growth and Autonomy were the most frequently mentioned dimensions of PWB. Given these findings, it was recommended by the researchers to include measurements of PWB in future outcome studies and in routine outcome measurement in addition to measuring pathology change or remission.

The theoretical construct of PWB was operationalized into the Scales of Psychological Well-Being (SPWB; Ryff, 1989). Initially, this self-report assessment instrument consisted of 32-items per dimension. Examined in a general population sample of 321 young, middle-aged and older adults, items that showed low correlations with their own scale were deleted. This resulted into an instrument with 20 items per scale with high internal consistency coefficients for all six subscales. Besides reliability, preliminary evidence for construct validity was provided. Correlations with other measures of positive functioning (i.e. life satisfaction, affect balance, self-esteem, internal control, and morale) were weakly to strongly positive and correlations with other measures of negative functioning (i.e. powerful others, chance control, depression) were weakly to moderately negative. Although correlations between some of the PWB scales were found to be rather strong (Self-Acceptance correlated strongly with Environmental Mastery and Self-Acceptance correlated strongly with Purpose in Life), initial evidence supported the view that different underlying constructs were involved. This was illustrated by the facts that items of each scale correlated most strongly with their own scale, the scales had differential patterns of associations with other measures, and items loaded on different factors of well-being. This pilot-study resulted into different versions ranging from 14-items per scale to 3-items per scale. Following this, the psychometric properties were tested in a nationwide sample using the 3-item per scale version. Internal consistencies of the scales were found to be low to modest this time, but confirmatory factor analyses supported the 6-factor model (Ryff & Keyes, 1995). A few years later, the 6-factor structure was confirmed for the same short version in another large sample (Clarke, Marshall, Ryff, & Wheaton, 2001). Although the SPWB is a popular measure in practice, it is controversial in the literature. Not all analyses supported a 6-factor structure or even multidimensionality, especially when using a longer version (Kafka & Kozma, 2002; Springer & Hauser, 2006; Triadó, Villar, Solé, & Celdrán, 2007; Van Dierendonck, 2004). Van Dierendonck (2004) examined the psychometric

properties of different versions (3-items, 9-items and 14-items per scale) in two Dutch samples consisting of students (*N*=233) and professionals (*N*=420). Whereas factorial validity was only supported by the 3-items per scale version, internal consistencies were not acceptable. On the other hand, good reliabilities were found for the longer 14-items per scale version, but findings did not support factorial validity. The length of the scales was therefore constrained to 6-8 items per scale which showed the best overall psychometric quality (Van Dierendonck, 2004).

Until now, psychometric testing of the PWB scales has been almost completely limited to non-clinical populations. Psychometric assessment of the Dutch PWB scales in a clinical population, in particular within eating disorder patients, has not been conducted so far. Although former patients indicated that PWB plays an important role in recovery, the incremental value of PWB in explaining pathological symptoms has not been explored either.

Furthermore, little is known about the relation between PWB and personality functioning. Comorbid personality disorders are common in patients with eating disorders and previous findings suggested that they worsen the long-term outcome (Martinussen et al., 2017). Hence, it may help to consider associations between personality functioning and PWB in order to better understand the etiology of eating disorders and to maintain and develop effective treatments (Farstad, McGeown, & Von Ranson, 2016). The dimensional personality disorders model conceptually differentiates impaired personality functioning from the presence of pathological traits (section III, DSM-5; APA, 2013). A strong association between the two was found, but they also showed incremental validity above each other in predicting personality disorders (Bastiaansen, De Fruyt, Rossi, Schotte, & Hofmans, 2013; Berghuis, Kamphuis, & Verheul, 2012). The generic and changeable components of maladaptive personality functioning, thus assumed to be present in all personality disorders, include Self-Control, Identity Integration, Responsibility, Relational Capacities and Social Concordance (Verheul et al., 2008). Although previous studies suggested that aspects of PWB are linked to identity status (Helson & Srivastava, 2001), self-enhancing cognitions (Taylor, Lerner, Sherman, Sage, & McDowell, 2003a, b), emotion regulation (Gross & John, 2003), general personality traits (Lopes, Salovey, & Straus, 2003; Schmutte & Ryff, 1997), coping strategies (Kling, Seltzer, & Ryff, 1997), and social comparison processes (Heidrich & Ryff, 1993; Kwan, Love, Ryff, & Essex, 2003), so far knowledge on possible associations between PWB and maladaptive personality functioning is limited. The establishment of a relation between these two, however, may give some indication for the treatment of eating disorder patients with a comorbid personality disorder.

Following all this, the aim of this study was to evaluate the psychometric properties of the PWB scales within a Dutch clinical population of eating disorder patients. Specifically, the factorial validity, internal consistency, convergent validity, and incremental validity were examined. In addition, possible associations between the dimensions of PWB and the dimensions of maladaptive personality functioning were explored.

## Method

*Participants and procedure*

Participants were Dutch patients seeking treatment for an eating disorder and meeting the diagnostic criteria as such (DSM-5; APA, 2013). Only patients aged 16 years and older, with a referral from the general practitioner, were included. Somatic instability was an exclusion criterium. Comorbidity was common within participants (i.e. mood and personality disorders), but only in the case of a second diagnosis. All participants gave their informed consent to anonymously use their data for research purposes. Ethical approval was obtained from the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences of the University of Twente.

Data were collected through routine outcome monitoring by the Human Concern Foundation, a specialized treatment center for eating disorders in The Netherlands. The cross-sectional data from intake (i.e. prior to treatment) were collected between January 2016 and August 2017. At the time of registration, participants first provided some demographic information followed by a screening of pathological symptoms. Patients were then invited for an intake day, consisting of several interviews with different therapists (e.g. dietician, experience professional, psychiatrist). Based on all information, patients were diagnosed by the psychiatrist according to the criteria of the DSM-5 (APA, 2013). In addition, participants filled out several self-report questionnaires, mostly online.

*Measures*

The Dutch self-report questionnaire *Positieve Geestelijke Gezondheidsschaal* (PGGS; Van Dierendonck, 2011) measures PWB and spiritual well-being. It comprises 66 items and uses a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). For the purpose of this study, only the six original PWB scales were used (Ryff, 1989). These scales contained 52 translated items (Appendix A). Purpose in Life (‘I sometimes feel as if I have done all there is to do in life’), Personal Growth (‘I am not interested in activities that will expand by

horizons'), Self-Acceptance ('In general, I feel confident and positive about myself'), and Positive Relationships with Others ('Most people see me as loving and affectionate') are measured by 9 items each. Autonomy ('I tend to worry about what other people think of me') and Environmental Mastery ('In general, I feel I am in charge of the situation in which I live') are both measured by 8 items each. Higher scores on the subscales reflect higher well-being. Previous studies have shown conflicting results on the factor structure of the PWB scales. A 6-factor structure was found by Ryff (1989) for the 3-item per scale version whereas a Spanish study found a 15-factor structure for the 9-item per scale version (Triadó et al., 2007). Good internal consistencies were found for the 8/9 items per scale version, ranging from 0.73 to 0.83. Only for the Personal Growth scale, reliability was found to be low ($\alpha = 0.65$) (Van Dierendonck, 2004). The psychometric properties of the PWB scales in this study will be described in the Results section.

The Dutch version of the *Mental Health Continuum-Short Form* (MHC-SF; Keyes et al., 2008; Dutch version: Lamers et al., 2011) was developed to assess positive mental health and comprises 14 items on emotional, psychological, and social well-being. All items measure the frequency of a feeling in the past month on a 6-point Likert scale (*never, once or twice a month, about once a week, two or three times a week, almost every day, every day*). Higher scores reflect higher well-being. The emotional well-being subscale comprises three items ('How often did you feel satisfied'), the social well-being subscale five items ('How often did you feel that people are basically good') and the psychological well-being subscale six items ('How often did you feel that you liked most parts of your personality'). Good psychometric properties were found for the MHC-SF, with good internal reliability for the total scale as well as the emotional and psychological well-being scale. Internal consistency of the social well-being scale was found to be fair (Lamers et al., 2011). In this study, internal consistency of the total scale was excellent ($\alpha$=0.90). Like previous findings, the subscales emotional well-being and psychological well-being showed good internal consistencies (respectively 0.86 and 0.83) whereas internal consistency of the social well-being subscale was fair ($\alpha$=0.72).

The Dutch version of the *Outcome Questionnaire-45* (OQ-45; De Jong, Nugter, Lambert, & Burlingame, 2009) is a 45-item instrument for screening psychopathological symptoms, often being used to monitor treatment response. Respondents rate the frequency of symptoms in the past week on a 5-point Likert scale ranging from 0 (*never*) to 4 (*almost always*), i.e. higher scores reflect more pathological symptoms. Symptom Distress (including depression and

anxiety, e.g. ‘I feel nervous’) comprises 25 items, Interpersonal Relationships (loneliness, conflict with others and marriage and family difficulties, e.g. ‘I feel irritated‘) comprises 11 items, and Social Role (difficulties in the workplace, school or home duties, e.g. ‘I work/study too much‘) comprises 9 items. Previous findings showed excellent (Symptom Distress), good (Interpersonal Relationships) and poor (Social Role) internal consistencies (De Jong et al., 2008). In this study, the total scale showed excellent internal consistency (α=0.93). Internal consistency of Symptom Distress was also excellent (α=0.91). Unlike previous findings, Cronbach’s alpha for Interpersonal Relationships was fair (α=0.75) whereas Social Role showed inadequate internal consistency (α=0.59).

The Dutch version of the *Eating Disorder Examination Questionnaire* (EDE-Q; Van Furth, 2000) is a self-report version derived from the Eating Disorder Examination Interview (Fairburn & Beglin, 1994). It was developed to measure pathological symptoms of eating disorders and comprises 36 items assessing the frequency of disordered eating attitudes and behaviors in the past 28 days. The measure contains four subscales: Restraint (‘Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?‘), Eating Concern (‘Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in?’), Shape Concern (‘Have you felt fat?‘), and Weight Concern (‘How dissatisfied have you been with your weight?‘). Higher scores on a 7-point Likert scale (*not a single day, 1-5 days, 6-12 days, 13-15 days, 16-22 days, 23-27 days,* and *every day*) reflect greater eating-related pathology. This study only used the global score (22 items) of the measure. The EDE-Q was found to be a valid instrument for assessing pathological symptoms when using this global score, showing excellent internal consistency (α = 0.95) (Aardoom, Dingemans, Op ‘t Landt, & Van Furth, 2012). This study also showed excellent internal consistency of the global score (α=0.90).

The Dutch version of the *Severity Indices of Personality Problems, Short Form* (SIPP-SF; Verheul et al., 2008) aims to assess the severity of the generic and changeable components of personality disorders, i.e. (mal)adaptive personality functioning. It is currently used for research purposes, especially in outcome research. The instrument comprises 60 items with a 4-point Likert scale, ranging from 1 (*fully disagree*) to 4 (*fully agree*). Respondents’ statements refer to the past three months. Lower scores reflect less adaptive personality functioning. The five subscales Self-Control (‘Sometimes I get so overwhelmed that I can’t control my reactions‘), Identity Integration (‘I am often confused about what kind of person I really am‘),

Responsibility ('I seem to lack the sense of responsibility necessary to meet my obligations'), Relational Capacities ('It is hard for me to show affection to other people'), and Social Concordance ('It is hard for me to control my aggression towards others') contain 12 items each covering 16 different facets. Unlike the SIPP-118 (long form), psychometric properties of the SIPP-SF are not available as yet. Internal consistencies of the SIPP-118 were promising with Cronbach alpha's ranging from 0.69 to 0.84 with a median of 0.77 for all 16 facets (Verheul et al., 2008). In this study, good internal consistencies were found for Self Control (α=0.81) and Responsibility (α=0.81) whereas internal consistency for Relational Capacities was fair (α=0.75). Social Concordance and Identity Integration showed respectively poor (α=0.67) and inadequate (α=0.56) Cronbach alpha's.

*Statistical analyses*

SPSS Statistics 23 was used to analyse the reliability and validity of the PWB scales and to explore relations between PWB and maladaptive personality functioning. Demographic characteristics of the sample were obtained through descriptive statistics and cross tabulations provided for information on gender and age within the four diagnostic groups. ANOVA tests and post hoc pairwise comparisons (Tukey) were used to examine differences in age and PWB subscale scores between the four diagnostic groups.

To test the structure of the PWB scales and explore whether dimensions were able to account for the correlation between the items, factors were extracted from the 52 items by means of a principal component analysis in the total sample. The Kaiser-Guttman criterion (eigenvalues greater than 1.0) and a scree test were used to identify the number of factors. A 6-factor structure was tested by constraining the number of factors to be extracted to six. To allow for correlations between the factors, oblimin rotation was applied to interpret the factor loadings.

Internal consistencies of the six subscales were obtained through Cronbach's alpha analyses in the total sample as well as in the four diagnostic groups. Values of 0.90 or higher were considered as excellent, between 0.80 and 0.89 as good, and between 0.70 and 0.79 as fair. Values between 0.60 and 0.69 were considered to be poor and below 0.60 to be inadequate (Cicchetti, 1994).

In accordance with prior findings, convergent validity of the PWB scales with another measure of well-being and with measures screening and assessing pathological symptoms was expected. Correlations ≥0.10 but <0.30 were considered as small, correlations ≥0.30 but <0.50 as moderate, and correlations ≥0.50 as strong (Cohen, 1988). Pearson correlation analyses were

conducted to test intercorrelations. The relation between the total scale of PWB and the total scale of the MHC-SF was expected to be positive and strong as the MHC-SF is another measure of well-being. With regard to the emotional well-being subscale of the MHC-SF, strong positive relations were expected for Self-Acceptance, Purpose in Life, and Environmental Mastery, moderate positive relations for Personal Growth and Positive Relationships with Others and a weak positive relation for Autonomy (Ryff, 1989). Weak positive relations were expected between PWB subscales and the social well-being subscale of the MHC-SF (Lamers et al., 2011). Strong positive relations were expected between PWB subscales and the psychological well-being subscale of the MHC-SF, considering this subscale was derived from the original SPWB (Lamers et al., 2011; Ryff, 1989). A moderate negative relation was expected between the total scale of PWB and the total scale of the OQ-45 as Lamers et al. (2011) found moderate relations between well-being and psychopathology in the general population. Strong negative relations were expected between Purpose in Life, Self-Acceptance, and Environmental Mastery and the subscale Symptom Distress of the OQ-45 as these subscales were found to correlate more strongly with depression, a key symptom of the subscale Symptom Distress. Moderate negative relations were expected for the other three PWB subscales and the subscale Symptom Distress (Ryff, 1989). Furthermore, a strong negative relation was expected between Positive Relationships with Others and the OQ-45 subscale Interpersonal Relationships considering the theoretical overlap between the two constructs. A moderate negative relation was expected between the total scale of PWB and the global score of the EDE-Q. Tomba et al. (2014) found that PWB dimensions negatively associated with eating disorder behaviour and cognitions, even when controlling for psychopathological aspects. Hence, the absence of psychological distress does not simply correspond to the presence of well-being. Moderate negative relations were expected for most PWB subscales except for Autonomy. The relation for this subscale was expected to be weak as previous findings found no significant relation (Tomba et al., 2014).

Multivariate linear regression analyses (method forced entry) were performed to determine which PWB dimensions independently associated with eating pathology (dependent variable as measured by the EDE-Q). Additionally, a stepwise multivariate linear regression analysis (method forced entry) was performed to examine whether PWB dimensions explained eating pathology above and beyond psychopathological symptoms (as measured by the OQ-45). In the first step, the three domains of psychopathological symptoms were entered. In the second step, the six dimensions of PWB were entered. Incremental validity was tested through the change in explained variance in the second step.

Finally, associations between PWB and maladaptive personality functioning were analysed. Intercorrelations between the subscales of PWB and the subscales of the SIPP-SF were tested through bivariate analyses followed by interpretation of the correlation coefficients (Cohen, 1988).

## Results

The majority of participants (*N*=502) were female (98.9%) and aged below 31 (73.6%). The mean age of the respondents was 27.3 years (standard deviation [SD] = 9.4). Of the respondents, 35.3% (*N*=177) were diagnosed with AN, 22.7% (*N*=114) with BN, 12.9% (*N*=65) with BED, and 29.1% (*N*=146) with OSFED (Other Specified Feeding or Eating Disorder). AN-patients were significantly younger than BN- and BED-patients (respectively M=25.1, SD=8.34, M=28.4, SD=9.4, and M=31.1, SD=10.4) whereas OSFED-patients (M=27.3, SD=9.3) were significantly younger than BED-patients. Demographic characteristics per diagnostic group are shown in Table 2.

Table 3 shows the mean scores on each PWB subscale stratified by the diagnostic groups. Residuals were normally distributed (Q-Q plots) and equal variances for the four groups could be assumed (Levene's tests). One-way ANOVA tests showed significant differences between groups on the subscale Personal Growth and Self-Acceptance. AN-patients scored significantly lower than BN-patients on Personal Growth ($p$=0.042) and Self-Acceptance ($p$=0.044).

Information on variation within items as well as means, standard deviations, and percentile ranks for PWB subscale scores are shown in Appendix B, Tables 1 and 2.

### *Factorial validity (Exploratory Factor Analysis)*

The structure of the Dutch PWB scales was explored by extracting factors from the 52 items by means of a principal component analysis (PCA) with oblimin rotation. Eleven factors were extracted based on the Kaiser-Guttman criterion (eigenvalues greater than 1.0), accounting for 59.0% of the total variance (Appendix B, Table 3). The scree plot showed no obvious visual bend to describe the factors. To test Ryff's proposed 6-factor structure, another PCA with oblimin rotation constrained to six factors was applied to the items. The obtained factor structure partially supported a 6-factor structure of PWB (approximately two-thirds of the items loaded on the expected factors), as shown in Table 4. Factor 1 (accounting for 24.6% of the variance) included items mainly coming from Self-Acceptance, but also from Environmental

Mastery, Personal Growth, and Purpose in Life. Factor 2 (6.7% of variance) seemed to correspond with Ryff's original Autonomy subscale. Factor 3 (4.8% of variance) included three items from Personal Growth. Most items that loaded on factor 4 (4.3% of variance) came from Positive Relationships with Others, only one item came from another subscale. Factor 5 (3.8% of variance) included items coming from Personal Growth and Purpose in Life. Factor 6 (3.5% of variance) largely corresponded to Ryff's subscale Environmental Mastery, although two items came from Purpose in Life.

Table 2

*Demographic characteristics per diagnostic group (N=502)*

| Variable | AN[ab] (*N*=177) | BN (*N*=114) | BED (*N*=65) | OSFED (*N*=146) | Total |
|---|---|---|---|---|---|
| *Gender*, n (%) | | | | | |
| Female | 174 (98.9) | 114 (100) | 64 (98.5) | 144 (98.6) | 496 (99.0) |
| Male | 2 (1.1) | - (-) | 1 (1.5) | 2 (1.4) | 5 (1.0) |
| *Age (years)*, M (SD) | 25.1 (8.34) | 28.4 (9.4) | 31.1 (10.4) | 27.3 (9.3) | 27.3 (9.4) |
| 16-20, n (%) | 71 (40.3) | 20 (17.5) | 7 (10.8) | 35 (24.0) | 133 (26.5) |
| 21-30 | 68 (38.6) | 63 (55.3) | 28 (43.1) | 77 (52.7) | 236 (47.1) |
| 31-40 | 23 (13.1) | 17 (14.9) | 21 (32.3) | 20 (13.7) | 81 (16.2) |
| 41-50 | 11 (6.3) | 10 (8.8) | 4 (6.2) | 7 (4.8) | 32 (6.4) |
| 51+ | 3 (1.7) | 4 (3.5) | 5 (7.7) | 7 (4.8) | 19 (3.8) |

*Note.* [a] = one missing value in gender; [b] = one missing value in age; AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation.

Table 3

*ANOVA differences between PWB subscale scores in diagnostic groups*

| Variable | AN | BN | BED | OSFED | *p* Value* |
|---|---|---|---|---|---|
| | M(SD) | M(SD) | M(SD) | M(SD) | |
| Purpose In Life | 3.91 (0.79)$_a$ | 3.95 (0.76)$_a$ | 3.92 (0.80)$_a$ | 3.94 (0.83)$_a$ | 0.97 |
| Personal Growth | 3.93 (0.65)$_a$ | 4.15 (0.64)$_b$ | 4.17 (0.74)$_{a,b}$ | 4.11 (0.73)$_{a,b}$ | 0.01 |
| Autonomy | 2.92 (0.91)$_a$ | 3.08 (0.84)$_a$ | 3.20 (0.79)$_a$ | 3.15 (0.99)$_a$ | 0.06 |
| Environmental Mastery | 3.44 (0.78)$_a$ | 3.34 (0.82)$_a$ | 3.33 (0.85)$_a$ | 3.50 (0.81)$_a$ | 0.32 |
| Self-Acceptance | 2.48 (0.83)$_a$ | 2.75 (0.82)$_b$ | 2.76 (0.80)$_{a,b}$ | 2.70 (0.92)$_{a,b}$ | 0.02 |
| Positive Relationships | 3.80 (0.87)$_a$ | 3.96 (0.83)$_a$ | 3.96 (0.83)$_a$ | 3.91 (0.86)$_a$ | 0.34 |

*Note.* * = significance level at 0.05; $_{a,b}$ = means within rows that do not share the same subscript are significantly different at the 0.05 significance level; AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation.

Table 4

*Exploratory principal component analysis of PWB restricted to six factors*

| Item | Subscale | Factor | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| 8 | Self-Acceptance | 0.68 | | | | | |
| 31 | Self-Acceptance | 0.64 | | | | | |
| 61 | Self-Acceptance | 0.64 | | | | | |
| 4 | Self-Acceptance | 0.62 | | | | | |
| 25 | Self-Acceptance | 0.62 | | | | | |
| 35 | Self Acceptance | 0.61 | | | | | |
| 57 | Self-Acceptance | 0.59 | | | | | |
| 43 | Personal Growth | 0.58 | | | | | |
| 14 | Self-Acceptance | 0.55 | | | | | |
| 50 | Self-Acceptance | 0.48 | | | | | |
| 29 | Personal Growth | 0.45 | | | | | |
| 64 | Environmental Mastery | 0.44 | | | | | |
| 30 | Purpose in Life | 0.39 | | | | | |
| 2 | Environmental Mastery | 0.38 | | | | | |
| 59 | Environmental Mastery | 0.37 | | | | | |
| 38 | Purpose in Life | 0.36 | | | | | |
| 28 | Autonomy | | -0.81 | | | | |
| 52 | Autonomy | | -0.80 | | | | |
| 11 | Autonomy | | -0.76 | | | | |
| 41 | Autonomy | | -0.64 | | | | |
| 63 | Autonomy | | -0.61 | | | | |
| 47 | Autonomy | | -0.57 | | | | |
| 17 | Autonomy | | -0.55 | | | | |
| 21 | Autonomy | | -0.52 | | | | |
| 23 | Personal Growth | | | 0.65 | | | |
| 19 | Personal Growth | | | 0.51 | | 0.39 | |
| 53 | Personal Growth | | | 0.48 | | | |
| 10 | Positive Relationships | | | | -0.76 | | |
| 27 | Positive Relationships | | | | -0.76 | | |
| 46 | Positive Relationships | | | | -0.74 | | |
| 37 | Positive Relationships | | | | -0.70 | | |
| 56 | Positive Relationships | | | | -0.70 | | |
| 12 | Environmental Mastery | | | | -0.63 | | |
| 40 | Positive Relationships | | | | -0.57 | | |
| 1 | Positive Relationships | | | 0.35 | -0.44 | | |
| 6 | Positive Relationships | | | | -0.38 | | |

(continued on next page)

| Eigen values | 12.794 | 3.487 | 2.488 | 2.214 | 1.989 | 1.810 |
|---|---|---|---|---|---|---|

*Note*. Item numbers refer to the numbering of the entire PGGS (consisting of 66 items). The table only includes factor loadings of at least 0.35.

Table 4 (continued)

*Exploratory principal component analysis of PWB restricted to six factors*

| Item | Subscale | Factor | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| 34 | Purpose in Life | | | | | 0.54 | |
| 54 | Purpose in Life | | | | | 0.53 | |
| 60 | Personal Growth | | | | | 0.51 | |
| 13 | Purpose in Life | | | | | 0.47 | |
| 3 | Personal Growth | | | | | 0.44 | |
| 7 | Purpose in Life | | | | | 0.41 | |
| 48 | Personal Growth | | | | | 0.35 | |
| 44 | Purpose in Life | | | | | | 0.77 |
| 42 | Environmental Mastery | | | | | | 0.74 |
| 33 | Environmental Mastery | | | | | | 0.67 |
| 18 | Environmental Mastery | | | | | | 0.66 |
| 49 | Purpose in Life | | | | | | 0.45 |
| 22 | Environmental Mastery | | | -0.38 | | | 0.39 |
| Eigen values | | 12.794 | 3.487 | 2.488 | 2.214 | 1.989 | 1.810 |

*Note*. Item numbers refer to the numbering of the entire PGGS (consisting of 66 items). The table only includes factor loadings of at least 0.35.

*Internal consistency*

Similar Cronbach's alpha coefficients were found for the total sample and the four diagnostic groups. Within the total sample, Autonomy, Self-Acceptance and Positive Relationships with Others showed good internal consistenties (respectively $\alpha$=0.85, $\alpha$=0.86, and $\alpha$=0.82). Internal consistencies of Personal Growth and Environmental Mastery were fair (respectively $\alpha$=0.74 and $\alpha$=0.78). The Cronbach's alpha coefficient of Purpose in Life was also fair ($\alpha$=0.77), but could be slightly improved into 0.79 by deleting item 54. Table 5 shows descriptive statistics (means, standard deviations, skewness and kurtosis) as well as Cronbach's alpha coefficients per diagnostic group.

*Convergent validity*

Bivariate correlation analyses of the PWB scales with another measure of well-being and measures assessing psychopathological symptoms and eating pathology are presented in Table 6 (results per diagnostic group are shown in Appendix B, Tables 4-7). In general, correlations largely corresponded to expectations. As hypothesized, the relation between the total scale of PWB and the total scale of the MHC-SF was positive and strong. Also in accordance with the a-priori hypothesis, a strong positive relation was found between Self-Acceptance and the emotional well-being scale of the MHC-SF. Contrary to expections, only moderate positive

relations were found with Purpose in Life and Environmental Mastery. As expected regarding the emotional well-being scale of the MHC-SF, moderate positive relations were found with Personal Growth and Positive Relationships with Others and a weak positive relation with Autonomy. Most correlations between PWB subscales and the social well-being subscale of the MHC-SF were positive and moderate which was somewhat stronger than expected. Only Autonomy showed the expected weak correlation. With regard to the psychological well-being scale of the MHC-SF, correlations with PWB subscales were positive and strong as expected. Unlike the a-priori hypothesis, the strength of the correlation with Autonomy was moderate.

The negative relation between the total scale of PWB and the total scale of the OQ-45 was stronger than expected. In accordance with the a-priori hypotheses, strong negative relations were also found between Purpose in Life, Self-Acceptance, and Environmental Mastery and the subscale Symptom Distress of the OQ-45. The other three subscales correlated negatively and moderately with Symptom Distress, as expected. A strong negative relation was also found between Positive Relationships with Others and Interpersonal Relationships which was in accordance with expectations.

A moderate negative relation was found between the total scale of PWB and the global score of the EDE-Q, as expected. In accordance with the a-priori hypotheses, Autonomy and Self-Acceptance correlated respectively weakly and moderately. The other PWB subscales showed somewhat weaker correlations than expected.

Table 5

*Descriptive statistics and internal consistencies*

| Variable | | | | | | AN | BN | BED | OSFED |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | Skew | Kurt | $\alpha$ | $\alpha$ | $\alpha$ | $\alpha$ | $\alpha$ |
| Purpose In Life | 3.93 | 0.79 | -0.17 | -0.23 | 0.77 | 0.76 | 0.74 | 0.79 | 0.79 |
| Personal Growth | 4.06 | 0.69 | -0.20 | -0.01 | 0.74 | 0.70 | 0.70 | 0.77 | 0.80 |
| Autonomy | 3.06 | 0.91 | 0.19 | -0.46 | 0.85 | 0.86 | 0.81 | 0.80 | 0.88 |
| Environmental Mastery | 3.42 | 0.81 | -0.21 | -0.44 | 0.78 | 0.77 | 0.79 | 0.80 | 0.78 |
| Self-Acceptance | 2.64 | 0.86 | 0.35 | -0.28 | 0.86 | 0.87 | 0.84 | 0.83 | 0.88 |
| Positive Relationships | 3.89 | 0.85 | -0.20 | -0.27 | 0.82 | 0.84 | 0.80 | 0.82 | 0.82 |

*Note.* AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation; Skew=Skewness; Kurt=Kurtosis; $\alpha$=Cronbach's alpha.

Table 6

*Bivariate intercorrelations of PWB subscales and correlations with other measures*

| Measures | Total PWB | PL | PG | AUT | EM | SA | PRO |
|---|---|---|---|---|---|---|---|
| *PWB* | | | | | | | |
| PL | 0.79* | - | | | | | |
| PG | 0.76* | 0.61* | - | | | | |
| AUT | 0.63* | 0.29* | 0.39* | - | | | |
| EM | 0.77* | 0.64* | 0.42* | 0.35* | - | | |
| SA | 0.84* | 0.55* | 0.57* | 0.53* | 0.59* | - | |
| PRO | 0.74* | 0.49* | 0.49* | 0.29* | 0.51* | 0.51* | - |
| *MHC-SF* | | | | | | | |
| Emotional well-being | 0.57* | 0.47* | 0.48* | 0.25* | 0.41* | 0.56* | 0.38* |
| Social well-being | 0.52* | 0.43* | 0.37* | 0.25* | 0.45* | 0.44* | 0.43* |
| Psychological well-being | 0.67* | 0.51* | 0.50* | 0.37* | 0.53* | 0.60* | 0.50* |
| Total | 0.67* | 0.53* | 0.51* | 0.34* | 0.54* | 0.61* | 0.50* |
| *OQ-45* | | | | | | | |
| Symptom Distress | -0.66* | -0.52* | -0.44* | -0.36* | -0.56* | -0.64* | -0.45* |
| Interpersonal Relations | -0.61* | -0.43* | -0.37* | -0.30* | -0.52* | -0.52* | -0.61* |
| Social Role | -0.50* | -0.39* | -0.31* | -0.25* | -0.54* | -0.41* | -0.37* |
| Total | -0.69* | -0.53* | -0.45* | -0.36* | -0.61* | -0.64* | -0.53* |
| *EDE-Q* | | | | | | | |
| Global score | -0.33* | -0.25* | -0.21* | -0.27* | -0.22* | -0.38* | -0.16* |

*Note.* PL=Purpose in Life, PG=Personal Growth, AUT=Autonomy, EM=Environmental Mastery, SA=Self-Acceptance, PRO=Positive Relationships with Others; MHC-SF=Mental Health Continuum-Short Form; OQ-45=Outcome Questionnaire 45; EDE-Q=Eating Disorder Examination Questionnaire; * = $p<0.001$.

*Incremental validity*

Results of the multivariate regression analyses showed that three out of six PWB dimensions were independently associated with eating pathology: Purpose in Life ($\beta$=-0.13, $t$=-2.01, $p$=0.045), Autonomy ($\beta$=-0.11, $t$=-2.33, $p$=0.020), and Self-Acceptance ($\beta$=-0.35, $t$=-5.63, $p<0.001$). Altogether, PWB dimensions predicted 16.2% of the total variation in eating pathology (F=15.99, $p<0.001$).

The stepwise linear regression analysis supported incremental validity as PWB dimensions explained 3.1% additional variance in eating pathology above and beyond psychopathological symptoms ($\Delta$F=3.425, $p$=0.003, adjusted $R^2$ step 2 = 0.25). In the second step, Autonomy ($p$=0.017) and Self-Acceptance ($p$=0.007) remained independently associated with eating pathology, as shown in Table 7.

Table 7

*Stepwise regression analysis explaining variance in eating pathology (EDE-Q) by psychopathological symptoms (OQ-45) and dimensions of PWB*

| | Eating pathology (EDE-Q) | | | | | |
|---|---|---|---|---|---|---|
| | Model 1 | | | Model 2 | | |
| Measures | Beta | *t* | sign | Beta | *t* | sign |
| *Step 1: OQ-45* | | | | | | |
| Symptom Distress | 0.61 | 10.23 | 0.00 | 0.51 | 7.79 | <0.01 |
| Interpersonal Relationships | -0.12 | -2.16 | 0.03 | -0.11 | -1.83 | 0.07 |
| Social Role | -0.09 | -1.81 | 0.07 | -0.06 | -1.21 | 0.23 |
| $\Delta R^2$ (%) | 23.4 ($p$<0.001) | | | 23.4 ($p$<0.001) | | |
| *Step 2: PWB* | | | | | | |
| Purpose in Life | | | | -0.06 | -0.95 | 0.35 |
| Personal Growth | | | | 0.06 | 1.08 | 0.28 |
| Autonomy | | | | -0.11 | -2.40 | 0.02 |
| Environmental Mastery | | | | 0.11 | 1.80 | 0.07 |
| Self-Acceptance | | | | -0.17 | -2.73 | 0.01 |
| Positive Relationships | | | | 0.05 | 0.82 | 0.41 |
| $\Delta R^2$ (%) | | | | 3.1 ($p$=0.003) | | |

*Note*. $\Delta R^2$=R square change in explained variance.

*Correlations between PWB and maladaptive personality functioning*

Bivariate analyses showed that maladaptive personality functioning correlated considerably with PWB, as shown in Table 8. Within the total sample, all correlations were negative and significant at the 0.01 level. The SIPP-domains Social Control and Social Concordance correlated weakly to moderately with PWB subscales which was somewhat weaker than the correlations found between the other domains and PWB. Identity Integration, Responsibility, and Relational Capacities correlated mostly moderately with PWB, but strong correlations were found between the SIPP-domains Identity Integration and Relational Capacities and Self-Acceptance, between Responsibility and Environmental Mastery, and between Relational Capacities and Positive Relationships with Others.

In general, correlation patterns within the four diagnostic groups resembled correlations in the total sample. Nevertheless, not all correlations approached statistical significance (e.g. within BED-patients). Similar patterns were found within all groups as PWB correlated weakly to moderately with the SIPP-domains Social Control and Social Concordance and the other SIPP-domains correlated somewhat stronger with PWB. In addition, Responsibility and Relational Capacities were strongly associated with respectively Environmental Mastery and Positive Relationships with Others. Small differences were found between groups. Within AN-patients and BN-patients, respectively Identity Integration and Relational Capacities correlated

less strong (moderately) with Self-Acceptance than within the other two groups (strongly). On the other hand, Responsibility was strongly associated with Purpose in Life within BED- and OSFED-patients, but not within the other two groups.

Table 8

*Correlations between PWB and maladaptive personality functioning*

| PWB dimensions | Domains of maladaptive personality functioning | | | | |
|---|---|---|---|---|---|
| | SC | II | RE | RC | SCC |
| *All groups* (*N*=502) | | | | | |
| Purpose in Life | -0.26** | -0.39** | -0.47** | -0.40** | -0.20** |
| Personal Growth | -0.24** | -0.34** | -0.29** | -0.35** | -0.20** |
| Autonomy | -0.18** | -0.36** | -0.20** | -0.32** | -0.08** |
| Environmental Mastery | -0.34** | -0.45** | **-0.55**** | -0.40** | -0.27** |
| Self-Acceptance | -0.27** | **-0.55**** | -0.31** | **-0.50**** | -0.21** |
| Positive Relationships with Others | -0.31** | -0.39** | -0.32** | **-0.60**** | -0.35** |
| *AN* (*n*=177) | | | | | |
| Purpose in Life | -0.25** | -0.47** | -0.48** | -0.44** | -0.18* |
| Personal Growth | -0.26** | -0.33** | -0.30** | -0.38** | -0.21** |
| Autonomy | -0.15 | -0.28** | -0.16* | -0.21** | -0.09 |
| Environmental Mastery | -0.30** | -0.47** | **-0.53**** | -0.41** | -0.32** |
| Self-Acceptance | -0.19* | -0.48** | -0.28** | **-0.50**** | -0.15* |
| Positive Relationships with Others | -0.25** | -0.33** | -0.33** | **-0.62**** | -0.39** |
| *BN* (*n*=114) | | | | | |
| Purpose in Life | -0.28** | -0.38** | -0.46** | -0.43** | -0.22* |
| Personal Growth | -0.36** | -0.29** | -0.38** | -0.24** | -0.32** |
| Autonomy | -0.20* | -0.40** | -0.30** | -0.29** | -0.06 |
| Environmental Mastery | -0.39** | -0.49** | **-0.56**** | -0.42** | -0.25** |
| Self-Acceptance | -0.36** | **-0.58**** | -0.38** | -0.43** | -0.24** |
| Positive Relationships with Others | -0.34** | -0.42** | -0.37** | **-0.54**** | -0.27** |
| *BED* (*n*=65) | | | | | |
| Purpose in Life | -0.21 | -0.39** | **-0.53**** | -0.43** | -0.17 |
| Personal Growth | -0.14 | -0.33** | -0.36** | -0.34** | -0.04 |
| Autonomy | -0.37** | -0.48** | -0.14 | -0.14 | -0.04 |
| Environmental Mastery | -0.38** | -0.45** | **-0.52**** | -0.33** | -0.24 |
| Self-Acceptance | -0.28* | **-0.53**** | -0.36** | **-0.50**** | -0.23 |
| Positive Relationships with Others | -0.32** | -0.30* | -0.36** | **-0.56**** | -0.33** |
| *OSFED* (*n*=146) | | | | | |
| Purpose in Life | -0.28** | -0.32** | **-0.51**** | -0.34** | -0.22** |
| Personal Growth | -0.20* | -0.35** | -0.30** | -0.37** | -0.18* |
| Autonomy | -0.17* | -0.35** | -0.26** | -0.48** | -0.07 |
| Environmental Mastery | -0.32** | -0.44** | **-0.57**** | -0.45** | -0.23** |
| Self-Acceptance | -0.31** | **-0.59**** | -0.37** | **-0.54**** | -0.26** |
| Positive Relationships with Others | -0.37** | -0.46** | -0.32** | **-0.64**** | -0.38** |

*Note*. SC=Self-Control, II=Identity Integration, RE=Responsibility, RC=Relational Capacities, SCC=Social Concordance; AN=Anorexia Nervosa, BN=Bulimia Nervosa, BED=Binge Eating Disorder, OSFED=Other Specified Feeding or Eating Disorder; **bold**=strong correlation; * = $p<0.05$; ** = $p<0.01$.

## Discussion

This is the first study that evaluated the Dutch PWB scales within the clinical population of eating disorder patients. Psychometric properties were examined, including factorial validity, internal consistency, convergent validity, and incremental validity. The findings suggest that the construct of PWB can be measured in a fairly reliable and valid way. Support was also found for incremental validity. In addition, a significant relationship between PWB and maladaptive personality functioning was revealed suggesting additional value of measuring both constructs and possible leads for the treatment of patients with comorbid personality disorders.

The exploratory factor analysis provided for a fair support of Ryff's 6-factor structure of PWB as two-third of the items loaded on expected dimensions. In the literature, the factorial validity of the PWB scales is controversial. A Spanish study which conducted an exploratory principal component analysis with a similar 9-items per scale version, found less consistency with Ryff's structure (Triadó et al., 2007). Some studies supported the 6-factor structure using confirmatory factor analysis, but only tested the shorter 3-items per scale version (Clarke et al., 2001; Ryff & Keyes, 1995). Other studies failed to confirm the 6-factor structure for the longer 9- and 14-items per scale versions (Kafka & Kozma, 2002; Springer & Hauser, 2006; Van Dierendonck, 2004). In this study, some factors contained the expected items whereas other factors contained items from several dimensions. For example, items from Purpose in Life and Personal Growth alternately loaded on factor 5. This was in line with the strong correlations found between these dimensions. Similarly, factor 6 contained items from Purpose in Life and Environmental Mastery, again showing strong intercorrelations. Besides, Self-Acceptance and Environmental Mastery correlated quite strongly. Springer & Hauser (2006) reported even stronger correlations suggesting complete conceptual overlap. The current study, however, supported the findings by Ryff & Keyes (1995). This means that, although some correlations were rather strong, the six dimensions appeared to be distinct. As Ryff's 6-factor structure was not entirely supported, improvements on the current scales may be needed. However, it should be taken into account that an exploratory factor analysis is not entirely suitable to either confirm or refute the factor structure. A confirmative factor analysis would be an appropriate technique to verify the structure first. For example, a 6-, 4-, and 2-factor structure of PWB could be tested for the total group and the four diagnostic groups.

The internal consistencies of the six subscales were relatively high showing that items within dimensions measured the same construct. The coefficients of the current 8/9-items per

scale version ranged from fair to good which is far better than those typically obtained for a 3-items per scale version (Clarke et al., 2001; Ryff & Keyes, 1995; Van Dierendonck, 2004). Coefficients were also slightly better than those obtained for similar 9-items per scale versions (Triadó et al., 2007; Van Dierendonck, 2004). In fact, internal consistencies in this study resembled those found for the longer 14-items per scale version (Van Dierendonck, 2004). Similar Cronbach's alpha coefficients were found within the four diagnostic groups.

Although the findings did not fully support a 6-factor structure, internal consistencies of the subscales were sufficient. Therefore, it is assumed that the impact on subsequent analyses performed at a subscale level remained limited. Nevertheless, confirmative factor analysis is recommended to determine whether the 6-factor structure is plausible.

Support was found for convergent validity as the PWB scales related with other measures. All correlations were in the expected direction and significant, but some correlation strengths differed slightly from expectations. With regard to another measure of well-being, for example, relations between Purpose in Life and Environmental Mastery and the emotional well-being scale of the MHC-SF were found to be moderate instead of strong. Ryff & Keyes (1995) reported similar strengths though, stating that correlates were much weaker when happiness and satisfaction with life was measured by a single item. As the emotional well-being scale of the MHC-SF only consists of three items, this could explain the current findings. On the other hand, correlations between PWB subscales and the social well-being scale of the MHC-SF were somewhat stronger than expected. Possibly, this is due to the fact that Lamers et al. (2011) used different type of measures for social well-being. As for the psychological well-being scale of the MHC-SF, Autonomy showed a somewhat weaker relation than expected. This is remarkable as both the current PWB scales and the psychological well-being scale of the MHC-SF were derived from the same original PWB scales. However, somewhat weaker correlations were also found by Ryff (1989).

Relation strengths with a measure for psychopathological symptoms mostly met expectations. Only the relation between PWB and the total scale of the OQ-45 was stronger than the moderate correlations reported previously. Possibly, this was due to the use of a different type of instrument (Lamers et al., 2011). It must also be noted that, so far, the majority of studies addressed PWB in the general population. For this reason, it cannot be concluded that PWB is experienced in the same way within clinical populations. Future studies should examine this into more depth. Alongside the expected moderate to strong relations between PWB and the OQ-45 subscale Symptom Distress, a strong relation was found between Self Acceptance and Interpersonal Relations (i.e. interpersonal difficulties resulting from psychopathological

problems). In other words, having a negative attitude towards oneself is very much related to loneliness or conflicts with other people. Previous findings supported this, showing that self-acceptance is a prerequisite to have a succesful relationship (Broder, 2013; Ellis, 1986). Also, Environmental Mastery strongly related to Interpersonal Relations, suggesting that having a sense of mastery and competence in managing environmental demands plays an important role in relationships. Strong correlations obtained between Environmental Mastery and Positive Relationships with Others support this finding. Although both constructs are considered as essential aspects of mental health (Ryff, 1989), to the knowledge of the author, the relation between these concepts has not been examined as yet.

Furthermore, relations with a measure assessing eating pathology were significant, but rather weak. This contradicts previous findings by Tomba et al. (2014) who found mostly moderate correlations. These differences in strengths may have been caused by the use of different types of measures. As research on the relation between PWB and eating pathology is still in a preliminary state, further research is needed to determine the strength of the relation.

Support was found for incremental validity as PWB dimensions explained eating pathology above and beyond psychopathological symptoms. First, PWB dimensions accounted for 16.2% of the total variation in eating pathology where Purpose in Life, Autonomy, and Self-Acceptance were independently associated with eating pathology. Second, PWB dimensions explained 3.1% additional variance above and beyond psychopathological symptoms where Autonomy and Self-Acceptance remained independently associated with eating pathology. The preliminary results of this study are particularly relevant for clinical settings. De Vos et al. (2017) already found that former patients rated PWB as a key criterion for recovery in addition to reducing symptoms. The current findings emphasize the value of measuring PWB in addition to psychopathological symptoms. Also, the findings indicate that patients may benefit from treatments like *Well-Being-Therapy*, a recently developed therapy aimed at improving PWB including self-determinancy/independency and a positive attitude towards oneself (Christenhusz & Meulenbeek, 2015).

Nevertheless, considering the cross-sectional data of this study, the current findings should be treated with caution. Data only concern one moment in time (at intake) which restricts the predictive ability of the scores. Also, PWB scores are likely to become more relevant during the course of treatment as the absence of mental illness does not imply mental health (Keyes, 2005). Towards the end of the treatment, the incremental validity of the PWB scales may even increase as pathological symptoms become less. Although this study provides a reason to measure PWB in addition to psychopathological symptoms, the incremental validity of PWB

during the course of treatment should be examined into more depth by means of a longitudinal study.

This is the first study that explored the relation between PWB and maladaptive personality functioning. Multiple significant negative relations were found between the constructs with minor differences between the four diagnostic groups. As pathology tends to negatively correlate with PWB, negative correlations are plausible (Keyes, 2005). Three dimensions of maladaptive personality functioning (i.e. Identity Integration, Responsibility, and Relational Capacities) correlated considerably with PWB. As Identity Integration includes aspects like self-reflective functioning and purposefulness (Verheul et al., 2008), it is likely to measure the same construct as PWB, or at least partially. This seems especially true for Self-Acceptance showing a strong relation with Identity Integration. It must be noted though that the internal consistency of Identity Integration was found to be inadequate. This may have influenced the findings. Responsibility may also have some theoretical overlap with PWB, as reflected by a strong relation with Environmental Mastery. This is plausible as one can only take responsibility and be trustworthy when a sense of mastery in managing the demands of the environment is present. Also, Relational Capacities related considerably with PWB. This dimension of maladaptive personality functioning includes intimacy, enduring relationships, and feeling recognized. The found strong correlation with Self-Acceptance is supported by other findings in this study, showing that the type of attitude towards oneself determines the quality of relationships. The obtained strong relation with Positive Relationships with Others can be reasoned as both constructs encompass capabilities like empathy, affection, and intimacy. Given the fact that these three domains of maladaptive personality functioning showed (partial) theoretical overlap with PWB, the necessity of measuring them in addition to PWB is questionable. Relations between PWB and Social Control and Social Concordance were mostly significant but less strong. The relational strengths obtained for Social Control, encompassing emotion regulation and effortful control, are supported by Gross & John (2003) who found similar strengths for emotion regulation. Given the theoretical background of the construct Social Concordance, encompassing agression regulation, frustration tolerance, cooperation, and respect, correlations with PWB are also likely to be less strong (Verheul et al., 2008).

These findings suggest that it may be useful to measure PWB and (domains of) maladaptive personality functioning in addition to pathological symptoms, in particular with regard to patients whose long-term treatment outcome is worsened by a comorbid personality disorder (Martinussen et al., 2017). Although the direction of the relation between PWB and

maladaptive personality functioning is yet unclear, this study also suggests that PWB may contribute to the alteration of the changeable components of personality functioning (Verheul et al., 2008). For example, patients with comorbid personality disorders, who score low on PWB as well as on Social Control and/or Social Concordance, may be offered *Well-Being-Therapy* to improve PWB (Christenhusz & Meulenbeek, 2015). Given the found relationship, this may simultaneously help their personality functioning to become more adaptive. In this way, positive contributions can be made to the long-term treatment outcome of these patients. The preliminary findings in this study legitimize further research on the direction and strength of the relationship between PWB and maladaptive personality functioning.

The current sample contained clearly defined groups and was sufficiently large to perform analyses for the total group. Significant differences in PWB were found between AN- and BN-patients, but it should be noted that these sample sizes were rather small. Also, a comparison between groups would only be valid if the PWB scales measure identical constructs with the same structure across all groups. Whether patients from all four diagnostic groups interpret the individual items and underlying contructs in the same way needs further research though. Such measurement invariance can be examined within the framework of a confirmative factor analysis by running a set of structural equation models and testing for significant differences between these models (Van de Schoot, Lugtig, & Hox, 2012).

Altogether, the construct of PWB can be measured in a fairly reliable and valid way by means of the Dutch PWB scales. However, deployment within the context of routine outcome monitoring requires further research. First, test-retest reliability needs to be examined to determine whether the scales measure consistently over time. Second, it is required that the instrument can measure changes in PWB over time. Although the use of a Likert scale facilitates the detection of change, it is yet unknown whether effect sizes of differences in scores will be sufficiently large enough. Finally, it is useful to distinguish between clinical and non-clinical scores. The development of clinical cut-off scores would enhance the use of the measure within the context of routinely monitoring treatment outcome.

Some limitations concerning the sample need to be considered. The 1% males in this study is much lower than the generally assumed prevalence rate of 10% since the 80s. It is also much lower than recent studies suggested (25-50%) (Cohn, Murray, Walen, & Woolridge, 2016; Vo, Accurso, Goldschmidt, & Le Grange, 2017). Therefore, the current findings cannot be generalized without reserve to the clinical population of eating disorder patients. Also, the present sample included patients with comorbid disorders. Comorbidity is common within eating disorder patients as 56-95% has at least one other diagnosis (Hudson et al., 2007).

However, whilst suffering from other psychopathological symptoms, it cannot be ruled out that participants' answers were influenced by such symptoms. This may have had an impact on the current findings. In addition, as the sample only contained patients with eating disorders as a first diagnosis whilst leaving out those with a prominent second diagnosis, generalization of the results to other samples of eating disorder patients with comorbidities is questionable.

There are also some limitations regarding the measures used in this study. First, there may have been a greater chance of social desirable answers than usual with self-report questionnaires. Patients with eating disorders and personality disorders were found to be often displaying deceptive behaviour (Cunnien, 1997) and fast at making judgements on editing answers (Holtgraves, 2004). Second, besides the PWB scales, the PGGS contained a spiritual well-being subscale with religious items. Although this subscale was disregarded in the analyses, the religious items may have influenced the answers on PWB items with regard to religious participants. It was found that religious priming effects on a number of psychological outcomes (e.g. prosocial behaviour) generalized to individuals who reported religiosity (Shariff, Willard, Andersen, & Norenzayan, 2016). Third, the items of the PWB scales were translated from English into Dutch by means of the forward backward translation procedure. In general, translation problems were not immediately apparent. However, the backward translation was not carried out by an independent translator. Besides, this type of procedure may lead to literal translations, encompassing unnatural wording in the target language, paying less attention to connotations, naturalness, and comprehensibility. Thus it cannot be ruled out that construct and item bias may have influenced the psychometric properties (Rode, 2005; Van de Vijver & Hambleton, 1996; Van der Vijver & Leung, 1997).

The findings of this study showed a reasonable support for the reliability and validity of the Dutch PWB scales. Nevertheless, further research on the factorial validity is recommended. Within the framework of a confirmative factor analysis, both the factor structure and invariance of the measurement between diagnostic groups can be examined. Deployment of the PWB scales within the context of routine outcome monitoring also requires research on test-retest reliability and the scales' capabilities to measure changes over time. Measuring PWB in addition to psychopathological symptoms appeared to be useful, but incremental validity during the course of treatment needs to be examined into more depth using longitudinal data. In addition, further research is recommended on the relationship between PWB and maladaptive personality functioning considering the possible implications for future treatment of patients with comorbid personality disorders.

In summary, the Dutch PWB scales provided for a fairly reliable and valid way to measure the construct of PWB within the clinical population of eating disorder patients. It is not yet known whether the scales can be used to routinely monitor the patient's progress during the course of treatment.

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## Appendix A

PWB-items of the PGGS

| Item | Statement |
|---|---|
| 1 | De meeste mensen zien mij als liefdevol en hartelijk. |
| 2 | Over het algemeen heb ik het gevoel dat ik grip heb op de situatie waarin ik leef. |
| 3 | Ik ben niet geïnteresseerd in activiteiten die mijn horizon zouden kunnen verbreden. |
| 4 | Als ik terug kijk op mijn leven dan ben ik tevreden met hoe dingen zijn gelopen. |
| 6 | Het handhaven van intieme relaties is moeilijk en frustrerend voor me. |
| 7 | Ik leef mijn leven van dag tot dag en ik denk niet echt na over de toekomst. |
| 8 | Over het algemeen ben ik positief over mezelf en voel ik me zeker van mezelf. |
| 10 | Ik voel me vaak eenzaam omdat ik maar weinig goede vrienden heb waarmee ik mijn zorgen deel. |
| 11 | Mijn beslissingen worden gewoonlijk niet beïnvloed door wat anderen doen. |
| 12 | Ik pas niet zo goed bij de mensen en de gemeenschap om mij heen. |
| 13 | Ik heb de neiging om me op het heden te richten omdat de toekomst me bijna altijd in de problemen brengt. |
| 14 | Ik heb het gevoel dat veel mensen die ik ken meer uit het leven hebben gehaald dan ik. |
| 16 | Ik geniet van persoonlijke gesprekken met familieleden of vrienden. |
| 17 | Ik heb de neiging om me zorgen te maken over wat anderen van me denken. |
| 18 | Ik ben vrij goed in het hanteren van de vele verantwoordelijkheden in mijn dagelijks leven. |
| 19 | Ik heb geen behoefte nieuwe dingen uit te proberen. Mijn leven is prima zoals het is. |
| 21 | Gelukkig zijn met mezelf is belangrijker voor me dan de goedkeuring van anderen. |
| 22 | Ik voel me vaak overweldigd door mijn verantwoordelijkheden. |
| 23 | Ik denk dat het belangrijk is om nieuwe ervaringen te hebben die je uitdagen om over jezelf en de wereld na te denken. |
| 24 | Mijn dagelijkse activiteiten lijken me vaak triviaal en onbelangrijk. |
| 25 | Ik houd van de meeste aspecten van mijn persoonlijkheid. |
| 27 | Ik heb niet veel mensen om me heen die naar me willen luisteren wanneer ik behoefte heb om te praten. |
| 28 | Ik heb de neiging me te laten beïnvloeden door mensen met een uitgesproken mening. |
| 29 | Als ik er over nadenk, dan heb ik mezelf niet echt verbeterd in de loop van de tijd. |
| 30 | Ik heb geen duidelijk beeld van wat ik probeer te bereiken in mijn leven. |
| 31 | Ik heb fouten gemaakt in het verleden, maar ik heb het gevoel dat alles bij elkaar genomen het uiteindelijk op zijn pootjes terecht is gekomen. |
| 33 | Over het algemeen regel ik mijn persoonlijke financiën en zaken goed. |
| 34 | Ik was gewend om doelen te stellen voor mezelf, maar nu lijkt dat alleen maar zonde van de tijd. |
| 35 | Op verschillende vlakken voel ik me teleurgesteld over mijn prestaties in het leven |
| 37 | Ik heb het idee dat veel andere mensen meer vrienden hebben dan ik. |
| 38 | Ik geniet van het maken van plannen voor de toekomst en het werken eraan om ze werkelijkheid te laten worden. |
| 40 | Mensen zullen me omschrijven als een vrijgevig persoon, bereid om mijn tijd door te brengen met anderen. |
| 41 | Ik heb vertrouwen in mijn opvattingen, zelfs als ze in strijd zijn met de algemene consensus. |
| 42 | Ik ben goed in het goochelen met mijn tijd zodat ik alles kan doen wat gedaan moet worden. |

(continued on next page)

(continued)

43 Ik heb het gevoel dat ik me als mens, in de loop van de tijd, goed heb ontwikkeld.
44 Ik ben een actief persoon als het erom gaat de plannen die ik mezelf heb opgelegd uit te voeren.
46 Ik heb niet veel warme en vertrouwens-waardige relaties met anderen ervaren.
47 Het is moeilijk voor me om mijn opvattingen uit te spreken over tegenstrijdige zaken.
48 Ik vind het niet prettig om in nieuwe situaties te zijn die van me vragen dat ik mijn oude, vertrouwde manier van dingen doen moet veranderen.
49 Sommige mensen dwalen doelloos door het leven, maar ik ben daar niet een van.
50 Mijn houding over mezelf is waarschijnlijk niet zo positief als hoe de meeste mensen over zichzelf denken
52 Ik verander vaak van gedachte over beslissingen wanneer mijn vrienden of familie het niet met me eens zijn.
53 Het leven is voor mij een continu proces van leren, veranderen en groeien.
54 Ik heb soms het gevoel dat ik alles gedaan heb wat er te doen valt in het leven.
56 Ik weet dat ik mijn vrienden kan vertrouwen en zij weten dat ze mij kunnen vertrouwen.
57 Het verleden had zijn pieken en dalen maar over het algemeen zou ik het niet willen veranderen.
59 Ik heb er moeite mee om mijn leven zo in te richten dat het me voldoening geeft.
60 Ik heb het lang geleden opgegeven om te proberen grote verbeteringen en veranderingen in mijn leven aan te brengen.
61 Wanneer ik mijzelf vergelijk met vrienden en kennissen dan geeft het me een goed gevoel over mezelf.
63 Ik beoordeel mezelf op wat ik belangrijk vind, niet op de waarden die anderen belangrijk vinden.
64 Ik ben erin geslaagd om een thuis en een levensstijl op te bouwen waarbij ik me prettig voel.
65 Er zit een waarheid in het gezegde dat je een oude hond geen nieuwe trucjes kunt leren.

## Appendix B

Supplementary results

Table 1

*Variation within items (per scale): mean, variance, and item-total correlation*

| Item | M | SD | $r_{it}$ |
|---|---|---|---|
| *Purpose in Life* | | | |
| 7 | 4.42 | 1.38 | 0.36 |
| 13 | 4.37 | 1.20 | 0.48 |
| 24 | 3.51 | 1.36 | 0.48 |
| 30 | 3.25 | 1.54 | 0.63 |
| 34 | 3.76 | 1.28 | 0.38 |
| 38 | 3.61 | 1.41 | 0.58 |
| 44 | 4.01 | 1.38 | 0.35 |
| 49 | 3.59 | 1.40 | 0.63 |
| 54 | 4.81 | 1.15 | 0.11 |
| *Personal Growth* | | | |
| 3 | 4.58 | 1.31 | 0.44 |
| 19 | 4.69 | 1.03 | 0.29 |
| 23 | 4.84 | 0.94 | 0.33 |
| 29 | 3.34 | 1.47 | 0.45 |
| 43 | 3.37 | 1.28 | 0.52 |
| 48 | 2.69 | 1.28 | 0.34 |
| 53 | 4.45 | 1.09 | 0.48 |
| 60 | 4.14 | 1.31 | 0.57 |
| 65 | 4.44 | 1.05 | 0.37 |
| *Autonomy* | | | |
| 11 | 3.07 | 1.32 | 0.65 |
| 17 | 1.80 | 0.97 | 0.50 |
| 21 | 3.61 | 1.53 | 0.51 |
| 28 | 3.03 | 1.35 | 0.71 |
| 41 | 3.50 | 1.27 | 0.65 |
| 47 | 3.20 | 1.28 | 0.49 |
| 52 | 3.23 | 1.28 | 0.65 |
| 63 | 3.03 | 1.29 | 0.61 |
| *Environmental Mastery* | | | |
| 2 | 3.02 | 1.29 | 0.51 |
| 12 | 3.87 | 1.39 | 0.39 |
| 18 | 3.90 | 1.37 | 0.63 |
| 22 | 2.90 | 1.28 | 0.43 |
| 33 | 4.39 | 1.25 | 0.36 |
| 42 | 3.56 | 1.33 | 0.52 |
| 59 | 2.44 | 1.07 | 0.55 |
| 64 | 3.28 | 1.31 | 0.48 |

(continued on next page)

*Note.* M=Mean; SD=Standard Deviation; $r_{it}$=item-total correlation.

Table 1 (continued)

*Variation within items (per scale): mean, variance, and item-total correlation*

| Item | M | SD | $r_{it}$ |
|---|---|---|---|
| *Self-Acceptance* | | | |
| 4 | 2.66 | 1.28 | 0.63 |
| 8 | 2.24 | 1.23 | 0.65 |
| 14 | 2.48 | 1.38 | 0.63 |
| 25 | 3.21 | 1.29 | 0.63 |
| 31 | 3.23 | 1.28 | 0.53 |
| 35 | 2.45 | 1.20 | 0.63 |
| 50 | 2.21 | 1.00 | 0.45 |
| 57 | 2.91 | 1.36 | 0.55 |
| 61 | 2.37 | 1.08 | 0.67 |
| *Positive Relationships with Others* | | | |
| 1 | 4.53 | 1.01 | 0.36 |
| 6 | 3.19 | 1.51 | 0.41 |
| 10 | 3.28 | 1.53 | 0.64 |
| 16 | 4.48 | 1.27 | 0.44 |
| 27 | 4.16 | 1.35 | 0.61 |
| 37 | 2.80 | 1.48 | 0.59 |
| 40 | 4.15 | 1.07 | 0.47 |
| 46 | 3.98 | 1.43 | 0.63 |
| 56 | 4.41 | 1.17 | 0.57 |

*Note.* M=Mean; SD=Standard Deviation; $r_{it}$=item-total correlation.

Table 2

*Means, standard deviations, and percentile ranks for PWB subscale scores for a sample of Dutch patients with an eating disorder*

| | Eating disorder population | | | | |
|---|---|---|---|---|---|
| PWB subscale | Total ED (*N*=502) | AN (*N*=177) | BN (*N*=114) | BED (*N*=65) | OSFED (*N*=146) |
| *Purpose in Life* | | | | | |
| M (SD) | 3.93 (0.79) | 3.91 (0.79) | 3.95 (0.76) | 3.92 (0.80) | 3.94 (0.83) |
| 5 | 2.67 | 2.44 | 2.75 | 2.59 | 2.56 |
| 10 | 2.78 | 2.87 | 2.89 | 2.73 | 2.74 |
| 15 | 3.11 | 3.22 | 3.11 | 2.98 | 3.01 |
| 20 | 3.22 | 3.33 | 3.22 | 3.33 | 3.22 |
| 30 | 3.56 | 3.56 | 3.44 | 3.56 | 3.56 |
| 40 | 3.78 | 3.78 | 3.67 | 3.67 | 3.78 |
| 50 | 3.89 | 3.89 | 3.94 | 3.89 | 3.94 |
| 60 | 4.11 | 4.11 | 4.22 | 4.22 | 4.22 |
| 70 | 4.33 | 4.22 | 4.44 | 4.33 | 4.44 |
| 80 | 4.56 | 4.56 | 4.56 | 4.64 | 4.67 |
| 85 | 4.78 | 4.78 | 4.86 | 4.78 | 4.78 |
| 90 | 5.00 | 5.00 | 5.00 | 4.89 | 5.00 |
| 95 | 5.22 | 5.11 | 5.22 | 5.34 | 5.33 |
| 100 | 5.67 | 5.67 | 5.44 | 5.67 | 5.67 |
| *Personal Growth* | | | | | |
| M (SD) | 4.06 (0.69) | 3.93 (0.65) | 4.15 (0.64) | 4.17 (0.74) | 4.11 (0.73) |
| 5 | 2.89 | 2.77 | 3.00 | 3.00 | 2.78 |
| 10 | 3.11 | 3.11 | 3.22 | 3.11 | 3.00 |
| 15 | 3.33 | 3.22 | 3.44 | 3.32 | 3.33 |
| 20 | 3.44 | 3.33 | 3.56 | 3.47 | 3.49 |
| 30 | 3.67 | 3.67 | 3.78 | 3.67 | 3.89 |
| 40 | 4.00 | 3.78 | 4.00 | 3.98 | 4.00 |
| 50 | 4.11 | 4.00 | 4.22 | 4.22 | 4.22 |
| 60 | 4.22 | 4.11 | 4.33 | 4.33 | 4.24 |
| 70 | 4.44 | 4.33 | 4.56 | 4.56 | 4.44 |
| 80 | 4.67 | 4.44 | 4.67 | 4.89 | 4.67 |
| 85 | 4.78 | 4.59 | 4.78 | 5.01 | 4.78 |
| 90 | 4.89 | 4.78 | 5.00 | 5.22 | 5.00 |
| 95 | 5.21 | 4.89 | 5.22 | 5.33 | 5.29 |
| 100 | 6.00 | 5.33 | 5.44 | 5.67 | 6.00 |

(continued on next page)

*Note.* ED=eating disorder; AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation.

Table 2 (continued)

*Means, standard deviations, and percentile ranks for PWB subscale scores for a sample of Dutch patients with an eating disorder*

| | Eating disorder population | | | | |
|---|---|---|---|---|---|
| PWB subscale | Total ED (*N*=502) | AN (*N*=177) | BN (*N*=114) | BED (*N*=65) | OSFED (*N*=146) |
| *Autonomy* | | | | | |
| M (SD) | 3.06 (0.91) | 3.92 (0.91) | 3.08 (0.84) | 3.20 (0.79) | 3.15 (0.99) |
| 5 | 1.63 | 1.50 | 1.75 | 1.83 | 1.63 |
| 10 | 1.88 | 1.63 | 2.00 | 2.20 | 1.88 |
| 15 | 2.13 | 1.88 | 2.16 | 2.25 | 2.01 |
| 20 | 2.25 | 2.08 | 2.25 | 2.40 | 2.25 |
| 30 | 2.50 | 2.38 | 2.63 | 2.73 | 2.63 |
| 40 | 2.75 | 2.63 | 2.75 | 3.00 | 2.88 |
| 50 | 3.00 | 3.00 | 3.06 | 3.25 | 3.13 |
| 60 | 3.25 | 3.13 | 3.25 | 3.38 | 3.38 |
| 70 | 3.50 | 3.38 | 3.50 | 3.65 | 3.63 |
| 80 | 3.88 | 3.75 | 3.75 | 3.95 | 4.00 |
| 85 | 4.00 | 3.88 | 3.88 | 4.13 | 4.25 |
| 90 | 4.38 | 4.15 | 4.31 | 4.30 | 4.50 |
| 95 | 4.63 | 4.63 | 4.75 | 4.50 | 5.00 |
| 100 | 5.75 | 5.00 | 5.00 | 4.63 | 5.75 |
| *Environmental Mastery* | | | | | |
| M (SD) | 3.42 (0.81) | 3.44 (0.78) | 3.33 (0.82) | 3.33 (0.85) | 3.50 (0.81) |
| 5 | 2.00 | 1.99 | 1.97 | 1.75 | 2.00 |
| 10 | 2.29 | 2.25 | 2.25 | 2.00 | 2.38 |
| 15 | 2.63 | 2.63 | 2.50 | 2.36 | 2.63 |
| 20 | 2.75 | 2.75 | 2.63 | 2.65 | 2.75 |
| 30 | 3.00 | 3.00 | 2.88 | 2.75 | 3.13 |
| 40 | 3.25 | 3.38 | 3.13 | 3.18 | 3.35 |
| 50 | 3.50 | 3.50 | 3.38 | 3.38 | 3.50 |
| 60 | 3.63 | 3.75 | 3.63 | 3.50 | 3.78 |
| 70 | 4.00 | 4.00 | 3.94 | 3.75 | 4.00 |
| 80 | 4.13 | 4.13 | 4.13 | 4.10 | 4.13 |
| 85 | 4.25 | 4.25 | 4.25 | 4.26 | 4.38 |
| 90 | 4.38 | 4.38 | 4.25 | 4.68 | 4.50 |
| 95 | 4.75 | 4.51 | 4.66 | 4.84 | 4.83 |
| 100 | 5.38 | 5.25 | 5.00 | 4.88 | 5.38 |

(continued on next page)

*Note.* ED=eating disorder; AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation.

Table 2 (continued)

*Means, standard deviations, and percentile ranks for PWB subscale scores for a sample of Dutch patients with an eating disorder*

| | Eating disorder population | | | | |
|---|---|---|---|---|---|
| PWB subscale | Total ED (*N*=502) | AN (*N*=177) | BN (*N*=114) | BED (*N*=65) | OSFED (*N*=146) |
| *Self-Acceptance* | | | | | |
| M (SD) | 2.64 (0.86) | 2.48 (0.83) | 2.75 (0.82) | 2.76 (0.80) | 2.70 (0.92) |
| 5 | 1.33 | 1.22 | 1.53 | 1.56 | 1.22 |
| 10 | 1.56 | 1.44 | 1.78 | 1.73 | 1.52 |
| 15 | 1.67 | 1.56 | 1.92 | 1.88 | 1.78 |
| 20 | 1.89 | 1.67 | 2.00 | 2.00 | 1.89 |
| 30 | 2.11 | 1.89 | 2.22 | 2.33 | 2.12 |
| 40 | 2.33 | 2.24 | 2.44 | 2.44 | 2.31 |
| 50 | 2.56 | 2.44 | 2.67 | 2.67 | 2.67 |
| 60 | 2.87 | 2.56 | 2.89 | 3.00 | 2.89 |
| 70 | 3.11 | 3.00 | 3.22 | 3.11 | 3.21 |
| 80 | 3.33 | 3.11 | 3.44 | 3.42 | 3.44 |
| 85 | 3.56 | 3.37 | 3.67 | 3.78 | 3.66 |
| 90 | 3.86 | 3.67 | 3.94 | 3.89 | 4.00 |
| 95 | 4.21 | 3.90 | 4.22 | 4.33 | 4.22 |
| 100 | 5.44 | 5.44 | 5.00 | 4.67 | 5.22 |
| *Positive Relationships with Others* | | | | | |
| M (SD) | 3.89 (0.85) | 3.80 (0.87) | 3.96 (0.83) | 3.96 (0.83) | 3.91 (0.86) |
| 5 | 2.44 | 2.33 | 2.42 | 2.59 | 2.26 |
| 10 | 2.78 | 2.67 | 2.89 | 2.91 | 2.89 |
| 15 | 3.00 | 2.89 | 3.03 | 3.11 | 3.11 |
| 20 | 3.11 | 3.00 | 3.11 | 3.22 | 3.22 |
| 30 | 3.44 | 3.33 | 3.44 | 3.33 | 3.46 |
| 40 | 3.67 | 3.56 | 3.78 | 3.67 | 3.78 |
| 50 | 3.89 | 3.78 | 4.00 | 3.89 | 3.89 |
| 60 | 4.11 | 4.00 | 4.22 | 4.11 | 4.13 |
| 70 | 4.44 | 4.33 | 4.56 | 4.58 | 4.43 |
| 80 | 4.67 | 4.56 | 4.67 | 4.78 | 4.67 |
| 85 | 4.78 | 4.78 | 4.78 | 4.89 | 4.78 |
| 90 | 5.00 | 4.91 | 4.94 | 5.04 | 5.00 |
| 95 | 5.22 | 5.23 | 5.22 | 5.38 | 5.22 |
| 100 | 5.89 | 5.78 | 5.78 | 5.67 | 5.89 |

*Note.* ED=eating disorder; AN=Anorexia Nervosa; BN=Bulimia Nervosa; BED=Binge Eating Disorder; OSFED=Other Specified Feeding or Eating Disorder; M=Mean; SD=Standard Deviation.

Table 3

*Principal component analysis with oblimin rotation*

| Component | Eigenvalues | Variance (%) |
|---|---|---|
| 1 | 12.74 | 24.60 |
| 2 | 3.49 | 6.71 |
| 3 | 2.49 | 4.78 |
| 4 | 2.21 | 4.26 |
| 5 | 1.99 | 3.83 |
| 6 | 1.81 | 3.48 |
| 7 | 1.35 | 2.59 |
| 8 | 1.29 | 2.49 |
| 9 | 1.11 | 2.14 |
| 10 | 1.08 | 2.08 |
| 11 | 1.04 | 2.00 |
| 12 | 0.96 | 1.85 |
| 13 | 0.93 | 1.80 |
| 14 | 0.89 | 1.71 |
| 15 | 0.81 | 1.56 |
| 16 | 0.80 | 1.54 |
| 17 | 0.80 | 1.53 |
| 18 | 0.77 | 1.49 |
| 19 | 0.74 | 1.42 |
| 20 | 0.72 | 1.39 |
| 21 | 0.71 | 1.36 |
| 22 | 0.67 | 1.30 |
| 23 | 0.65 | 1.24 |
| 24 | 0.64 | 1.23 |
| 25 | 0.60 | 1.14 |
| 26 | 0.58 | 1.12 |
| 27 | 0.58 | 1.11 |
| 28 | 0.55 | 1.05 |
| 29 | 0.52 | 0.99 |
| 30 | 0.51 | 0.98 |
| 31 | 0.49 | 0.95 |
| 32 | 0.48 | 0.92 |
| 33 | 0.47 | 0.91 |
| 34 | 0.47 | 0.90 |
| 35 | 0.45 | 0.86 |
| 36 | 0.43 | 0.83 |
| 37 | 0.41 | 0.79 |
| 38 | 0.39 | 0.75 |
| 39 | 0.39 | 0.74 |
| 40 | 0.37 | 0.72 |
| 41 | 0.36 | 0.69 |
| 42 | 0.35 | 0.67 |
| 43 | 0.33 | 0.64 |
| .. | .. | .. |

Table 4

*Bivariate intercorrelations of PWB subscales and correlations with other measures within AN-patients (N=177)*

| Measures | Total PWB | PL | PG | AUT | EM | SA | PRO |
|---|---|---|---|---|---|---|---|
| *PWB* | | | | | | | |
| PL | 0.75* | - | | | | | |
| PG | 0.71* | 0.61* | - | | | | |
| AUT | 0.59* | 0.22 | 0.27* | - | | | |
| EM | 0.77* | 0.57* | 0.39* | 0.34* | - | | |
| SA | 0.80* | 0.48* | 0.50* | 0.49* | 0.56* | - | |
| PRO | 0.71* | 0.41* | 0.40* | 0.22 | 0.53* | 0.44* | - |
| *MHC-SF* | | | | | | | |
| Emotional well-being | 0.52* | 0.51* | 0.52* | 0.14 | 0.37* | 0.48* | 0.52* |
| Social well-being | 0.51* | 0.38* | 0.41* | 0.21 | 0.42* | 0.42* | 0.51* |
| Psychological well-being | 0.64* | 0.50* | 0.48* | 0.26* | 0.51* | 0.55* | 0.64* |
| Total | 0.64* | 0.53* | 0.52* | 0.24* | 0.50* | 0.55* | 0.64* |
| *OQ-45* | | | | | | | |
| Symptom Distress | -0.65* | -0.61* | -0.44* | -0.30* | -0.57* | -0.55* | -0.36* |
| Interpersonal Relations | -0.58* | -0.39* | -0.39* | -0.23 | -0.48* | -0.44* | -0.58* |
| Social Role | -0.47* | -0.39* | -0.35* | -0.16 | -0.52* | -0.32* | -0.47* |
| Total | -0.67* | -0.58* | -0.46* | -0.29* | -0.60* | -0.54* | -0.67* |
| *EDE-Q* | | | | | | | |
| Global score | -0.37* | -0.33* | -0.29* | -0.32* | -0.18 | -0.42* | -0.07 |

*Note.* PL=Purpose in Life, PG=Personal Growth, AUT=Autonomy, EM=Environmental Mastery, SA=Self-Acceptance, PRO=Positive Relationships with Others; MHC-SF=Mental Health Continuum-Short Form; OQ-45=Outcome Questionnaire 45; EDE-Q=Eating Disorder Examination Questionnaire; * = $p<0.001$.

Table 5

*Bivariate intercorrelations of PWB subscales and correlations with other measures within BN-patients (N=114)*

| Measures | Total PWB | PL | PG | AUT | EM | SA | PRO |
|---|---|---|---|---|---|---|---|
| *PWB* | | | | | | | |
| PL | 0.80* | - | | | | | |
| PG | 0.70* | 0.51* | - | | | | |
| AUT | 0.59* | 0.26 | 0.29 | - | | | |
| EM | 0.82* | 0.73* | 0.45* | 0.34* | - | | |
| SA | 0.82* | 0.54* | 0.48* | 0.48* | 0.67* | - | |
| PRO | 0.73* | 0.54* | 0.46* | 0.26 | 0.48* | 0.45* | - |
| *MHC-SF* | | | | | | | |
| Emotional well-being | 0.44* | 0.27 | 0.33* | 0.22 | 0.32* | 0.53* | 0.28 |
| Social well-being | 0.59* | 0.51* | 0.37* | 0.27 | 0.54* | 0.45* | 0.48* |
| Psychological well-being | 0.62* | 0.41* | 0.47* | 0.37* | 0.50* | 0.56* | 0.44* |
| Total | 0.65* | 0.48* | 0.46* | 0.34* | 0.55* | 0.59* | 0.48* |
| *OQ-45* | | | | | | | |
| Symptom Distress | -0.58* | -0.39* | -0.28 | -0.34* | -0.56* | -0.61* | -0.41* |
| Interpersonal Relations | -0.59* | -0.41* | -0.31 | -0.32 | -0.49* | -0.51* | -0.55* |
| Social Role | -0.47* | -0.29 | -0.23 | -0.30 | -0.52* | -0.44* | -0.31 |
| Total | -0.63* | -0.42* | -0.31 | -0.36* | -0.60* | -0.62* | -0.48* |
| *EDE-Q* | | | | | | | |
| Global score | -0.23 | -0.08 | -0.12 | -0.23 | -0.15 | -0.29 | -0.13 |

*Note.* PL=Purpose in Life, PG=Personal Growth, AUT=Autonomy, EM=Environmental Mastery, SA=Self-Acceptance, PRO=Positive Relationships with Others; MHC-SF=Mental Health Continuum-Short Form; OQ-45=Outcome Questionnaire 45; EDE-Q=Eating Disorder Examination Questionnaire; * = $p<0.001$.

Table 6

*Bivariate intercorrelations of PWB subscales and correlations with other measures within BED-patients (N=65)*

| Measures | Total PWB | PL | PG | AUT | EM | SA | PRO |
|---|---|---|---|---|---|---|---|
| *PWB* | | | | | | | |
| PL | 0.88* | - | | | | | |
| PG | 0.78* | 0.77* | - | | | | |
| AUT | 0.55* | 0.33 | 0.36 | - | | | |
| EM | 0.77* | 0.63* | 0.39 | 0.37 | - | | |
| SA | 0.83* | 0.64* | 0.55* | 0.42 | 0.62* | - | |
| PRO | 0.68* | 0.55* | 0.44* | 0.09 | 0.45* | 0.47* | - |
| *MHC-SF* | | | | | | | |
| Emotional well-being | 0.67* | 0.62* | 0.52* | 0.25 | 0.51* | 0.64* | 0.43* |
| Social well-being | 0.51* | 0.42* | 0.35 | 0.25 | 0.40 | 0.42* | 0.42 |
| Psychological well-being | 0.73* | 0.64* | 0.53* | 0.35 | 0.62* | 0.60* | 0.53* |
| Total | 0.71* | 0.62* | 0.52* | 0.33 | 0.58* | 0.60* | 0.52* |
| *OQ-45* | | | | | | | |
| Symptom Distress | -0.62* | -0.54* | -0.39 | -0.31 | -0.49* | -0.66* | -0.41 |
| Interpersonal Relations | -0.66* | -0.51* | -0.33 | -0.27 | -0.63* | -0.57* | -0.63* |
| Social Role | -0.60* | -0.51* | -0.32 | -0.28 | -0.66* | -0.51* | -0.39 |
| Total | -0.71* | -0.59* | -0.41 | -0.33 | -0.63* | -0.69* | -0.52* |
| *EDE-Q* | | | | | | | |
| Global score | -0.27 | -0.18 | -0.19 | -0.24 | -0.15 | -0.25 | -0.21 |

*Note.* PL=Purpose in Life, PG=Personal Growth, AUT=Autonomy, EM=Environmental Mastery, SA=Self-Acceptance, PRO=Positive Relationships with Others; MHC-SF=Mental Health Continuum-Short Form; OQ-45=Outcome Questionnaire 45; EDE-Q=Eating Disorder Examination Questionnaire; * = $p<0.001$.

Table 7

*Bivariate intercorrelations of PWB subscales and correlations with other measures within OSFED-patients (N*=146*)*

| Measures | Total PWB | PL | PG | AUT | EM | SA | PRO |
|---|---|---|---|---|---|---|---|
| *PWB* | | | | | | | |
| PL | 0.79* | - | | | | | |
| PG | 0.82* | 0.62* | - | | | | |
| AUT | 0.72* | 0.36* | 0.56* | - | | | |
| EM | 0.76* | 0.66* | 0.48* | 0.39* | - | | |
| SA | 0.88* | 0.60* | 0.68* | 0.61* | 0.61* | - | |
| PRO | 0.80* | 0.53* | 0.60* | 0.45* | 0.55* | 0.65* | - |
| *MHC-SF* | | | | | | | |
| Emotional well-being | 0.64* | 0.49* | 0.50* | 0.37* | 0.52* | 0.62* | 0.53* |
| Social well-being | 0.50* | 0.41* | 0.35* | 0.26 | 0.45* | 0.47* | 0.47* |
| Psychological well-being | 0.70* | 0.54* | 0.52* | 0.48* | 0.55* | 0.69* | 0.56* |
| Total | 0.70* | 0.55* | 0.52* | 0.43* | 0.57* | 0.68* | 0.59* |
| *OQ-45* | | | | | | | |
| Symptom Distress | -0.72* | -0.52* | -0.55* | -0.42* | -0.60* | -0.74* | -0.58* |
| Interpersonal Relations | -0.65* | -0.45* | -0.41* | -0.36* | -0.53* | -0.60* | -0.72* |
| Social Role | -0.53* | -0.41* | -0.34* | -0.33* | -0.53* | -0.48* | -0.45* |
| Total | -0.75* | -0.54* | -0.54* | -0.44* | -0.65* | -0.74* | -0.67* |
| *EDE-Q* | | | | | | | |
| Global score | -0.43* | -0.30* | -0.27 | -0.32* | -0.33* | -0.52* | -0.30* |

*Note.* PL=Purpose in Life, PG=Personal Growth, AUT=Autonomy, EM=Environmental Mastery, SA=Self-Acceptance, PRO=Positive Relationships with Others; MHC-SF=Mental Health Continuum-Short Form; OQ-45=Outcome Questionnaire 45; EDE-Q=Eating Disorder Examination Questionnaire; * = $p<0.001$.