The relationship between early personality and midlife psychological well-being: evidence from a UK birth cohort study

Rosemary A Abbott[1],[§], **Tim J Croudace**[1], **George B Ploubidis**[1], **Diana Kuh**[2], **Michael E.J. Wadsworth**[2], **Marcus Richards**[2], and **Felicia A Huppert**[1]

[1]Department of Psychiatry, University of Cambridge, Box 189, Addenbrooke's Hospital, Hills Road, Cambridge, CB2 2QQ, UK

[2]MRC Unit for Lifelong Health and Ageing, Department of Epidemiology and Public Health, Royal Free & University College Medical School, 1-19 Torrington Place, London, WC1E 6BT, UK

Abstract

Background—Individual differences in personality influence the occurrence, reporting and outcome of mental health problems across the life course, but little is known about the effects on adult psychological well-being. The aim of this study was to examine long range associations between Eysenck's personality dimensions and psychological well-being in midlife.

Methods—The study sample comprised 1,134 women from the 1946 British birth cohort. Extraversion and neuroticism were assessed using the Maudsley Personality Inventory in adolescence (age 16 years) and early adulthood (age 26). Psychological well-being was assessed at age 52 with a 42-item version of Ryff's psychological well-being scale. Analyses were undertaken within a structural equation modelling framework that allowed for an ordinal treatment of well-being and personality items, and latent variable modelling of longitudinal data on emotional adjustment. The contribution of mental health problems in linking personality variations to later well-being was assessed using a summary measure of mental health (emotional adjustment) created from multiple time-point assessments.

Results—Women who were more socially outgoing (extravert) reported higher well-being on all dimensions. Neuroticism was associated with lower well-being on all dimensions. The effect of early neuroticism on midlife well-being was almost entirely mediated through emotional adjustment defined in terms of continuities in psychological/ psychiatric distress. The effect of extraversion was not mediated by emotional adjustment, nor attenuated after adjustment for neuroticism.

Conclusions—Individual differences in extraversion and neuroticism in early adult life influence levels of well-being reported in midlife.

Keywords

Personality; psychological well-being; emotional adjustment; mental health; birth cohort; structural equation modelling

Introduction

There is an extensive literature on the relationship between mental ill-health and personality that shows that personality dimensions are vulnerability factors for psychiatric disorders.

[§]Corresponding author: raa25@medschl.cam.ac.uk. Fax: 01223 336968 .

While cross-sectional studies abound, several prospective cohort studies have established robust longitudinal associations between childhood temperament and adolescent or early adult personality characteristics and psychosocial outcomes [5, 21, 32, 40]. These studies consistently find that high levels of neuroticism (negative affectivity) are linked to the development and reporting of mental health problems such as anxiety and depression. Evidence for a link between extraversion and mental health problems is less robust. In many studies this is either absent or correlations much weaker [6, 30, 40]. Interest in well-being or positive mental health is becoming prominent in psychology and has led to the recognition that well-being needs to be studied in its own right if we are to advance our knowledge of its causes and consequences [13, 20, 36].

Although the term "mental health" has been widely used to mean mental ill-health, or psychiatric disorder, there has been wide recognition that the notion of mental well-being can be described and defined more positively than simply as the absence of diagnosable disorder. The general view of health as more than the absence of disorder was enshrined in the World Health Organisation (WHO) Constitution, but has recently been re-articulated by the WHO specifically in relation to new aspirations to define and measure positive mental health. In the WHO guidance documents on health promotion positive mental health has been described as "a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" [46] .

In view of the importance of personality in the aetiology of mental disorder, a fundamental question concerns the role of personality in determining variations in well-being. For example, if the causes of mental well-being are the same, but in the reverse direction to, the causes of disorder, then we would expect that high levels of well-being would be strongly related to low levels of neuroticism (emotional stability).

In contrast to the extensive literature on personality, psychological distress and psychiatric disorders, fewer studies have examined relationships between personality and well-being. Researchers have found that personality influences subjective well-being (SWB) where SWB is defined in terms of questions about life satisfaction, happiness or other positively experienced emotions [7, 9, 10, 12, 17, 18, 24]. Extraversion and neuroticism appear to be the two personality traits most strongly associated with individual differences in well-being, but there has been considerable debate over the relative importance of these two traits [41, 42].

In general, extraversion has been regarded as more important than neuroticism in explaining variations in positive affect and life satisfaction, whereas neuroticism is strongly linked to negative affect [4, 7, 11]. However, in a meta-analysis, DeNeve and Cooper [9] found that when personality traits from the Five Factor Personality Inventory [8] were correlated with components of subjective well-being, neuroticism was the strongest predictor of life satisfaction (−0.24) and negative affect (0.23). Extraversion was the strongest predictor of positive affect (0.20), but both extraversion (0.27) and neuroticism (−0.25) predicted happiness. A combined measure of SWB correlated −0.22 with neuroticism and 0.17 with extraversion [9]. Most studies examining the association between subjective well-being and personality have been cross-sectional or conducted over relatively short time frames.

While early work on well-being was content to define it in terms of good feelings such as happiness and life satisfaction, more recent research has recognised that well-being is not characterised by positive feelings alone, which may be fleeting, or relatively temporary (state-like), but also encompasses more long-lasting or stable aspects of positive functioning. A widely used measure specifically designed to evaluate the more functional aspects of

well-being has been developed by Ryff and her colleagues [34] [35]. Ryff's scale of Psychological Well-Being (PWB) was designed to measure six theoretically distinct dimensions of well-being: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. Thus far, very few studies have examined the relationship between personality and PWB. In a small, cross-sectional study, Schmutte and Ryff [37] correlated PWB dimensions and personality for men and women (N=215) aged 44-65 years using the NEO Five Factor Inventory [8] and an 84-item version of the Ryff scale. All six PWB dimensions were positively associated with extraversion and negatively associated with neuroticism. After controlling for current affect the magnitude of the correlations for both extraversion and neuroticism were markedly reduced.

Nevertheless, research to date on the relationship between personality and well-being has been limited in a number of ways. First, compared to studies that have explored the premorbid personality of adults who develop psychological disorders, there are few studies of the long-range associations between dimensions of personality and later well-being. Second, most existing studies suffer from methodological limitations. Many studies for example, rely on univariate analyses, whereby different personality traits are considered separately, one at a time, rather than being modelled simultaneously in a multivariate analysis that allows for any correlation between personality scores on different traits. Further limitations include the failure to take account of the possible complicating and complex effects of life course variations in emotional adjustment captured by traditional mental health outcome measures in understanding the relationship between personality and well-being.

The aim of this study is to examine long-range associations between dimensions of psychological well-being in midlife and personality traits (extraversion and neuroticism) measured in adolescence and early adulthood using data from a large population-based sample, the MRC national Survey of Health and Development (the 1946 British birth cohort study). We extend the methodological sophistication of prior work in this area by applying a full psychometric measurement model within the structural equation modelling framework, needed for simultaneously analysis of key variables, and take account of the possible mediating role of emotional adjustment across the life course.

METHODS

Sample

The sample comprised participants from the Medical Research Council's National Survey of Health and Development (NSHD), also known as the 1946 British birth cohort study. The NSHD is a stratified sample of singleton births occurring to married parents in England, Scotland and Wales during the week of 3-9 March 1946 [43, 45]. The sampling design was based on father's socio-economic status; all births from non-manual and agricultural backgrounds were included, and one in four births from manual social class backgrounds. The sample originally included 5,362 individuals (2,547 women) and data have been collected at regular intervals since childhood. The representativeness of the sample has been well documented; comparisons of the samples retained at age 43 and 53 with population census data has shown that the NSHD survey members are generally representative of the national population of a similar age after weighting to compensate for initial survey design [43-45].

As part of the NSHD, an annual sub-study of women's health in midlife was undertaken by postal questionnaire between the ages of 47-54 [22]. This study included 1,778 (70%) of the original cohort of women; the others had died (6%), previously refused to take part (12%) or lived abroad and were not in contact with the study or could not be traced (13%). Ryff's

psychological well-being scale (see details below), was included in the Women's Health Survey (WHS) at age 52, and was sent to 1,421 women who had completed at least one WHS questionnaire in the previous two years; 1,214 women returned well-being questionnaires. No psychological well-being data are available for men in the cohort.

Personality assessment

Survey members completed six extraversion (E) and six neuroticism (N) items from the short Maudlsey Personality Inventory (MPI) of Eysenck [15] at age 16 and again at age 26, providing a longitudinal assessment of these two personality traits. The extraversion-introversion dimension comprises items which cover sociability, energy and activity orientation. The neuroticism dimension assesses emotional stability-instability and includes items that cover mood and distractibility.

Psychological well-being

Psychological well-being was assessed using a 42-item version of Ryff's psychological well-being scale the PWB [34]. This self-report questionnaire includes seven questions for each of six dimensions (autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance). Responses are made on a six-point Likert scale labelled from 'disagree strongly' to 'agree strongly'. Twenty items are positively worded and 22 negatively worded. Prior to analysis, negatively worded items were reverse scored so that high values indicated high well-being. Full wording for the 42 questions has been provided elsewhere [2].

Psychological/emotional adjustment

Measures of psychological distress were available at several stages to characterise emotional adjustment during adulthood. Symptoms of depression and anxiety at age 36 were recorded with a short version of the Present State Examination [47], a clinically validated interview administered by trained research nurses assessing the frequency and severity of neurotic and affective symptoms in the preceding month. The Psychiatric Symptom Frequency scale, a self-administered 20-item scale that rates the frequency and intensity of common symptoms of anxiety and depression in the preceding year was administered to survey members at age 43 [23]. Between ages 47-54 symptoms of psychological distress (PD) were assessed annually in the WHS through six self-report questions covering trouble sleeping, irritability, anxiety and depression, tearfulness, feelings of panic, and forgetfulness (hereafter WHS-PD). Responses were made on a four-point Likert scale evaluating the extent to which the six items had bothered the respondent in the last twelve months. The four response categories included: 0) 'have not had this symptom'; 1) 'have had this symptom and it did not bother me'; 2) have had this symptom and it bothered me a little', and 3) 'have had this symptom and it bothered me a lot'. Confirmatory factor analysis of these items provided strong support for a single dimension.

Social Class

Previous work has shown that a positive association, albeit modest, between several indicators of adult socio-economic status and psychological well-being (e.g. [1] [14]). Accordingly, adult social class (non-manual versus manual) was used as a single proxy for these adult socio-economic indicators, to address the likely impact of social factors on well-being outcomes.

Statistical Modelling

Our statistical modelling incorporated recommendations from prior psychometric investigations of the factorial structure of the PWB e.g. [2, 39]. Specifically, Abbott et al [2]

using data from the 1946 Birth Cohort, demonstrated that construct variance could be separated from methodological artefacts using factors loaded by positive and negative item content (orthogonal to the primary/construct factors). Their work also showed that four of the six dimensions of well-being (environmental mastery, personal growth, purpose in life and self-acceptance) were sufficiently highly correlated in this sample to load strongly on a more general, higher order construct: a second-order well-being factor measuring general well-being. Other minor model modifications include the exclusion of two poorly fitting items from personal growth, modelling one item from environmental mastery on positive relationships and allowing correlated residuals between two items (see [2] for details).

For the personality variables, we introduced a common-factor model to summarize the association between the repeated personality measures. The two latent variables capturing extraversion at ages 16 and 26 (each comprising six items) loaded onto a single extraversion (E) factor and the two neuroticism latent variables at age 16 and 26 onto a neuroticism (N) factor (see Figure 1a).

Women's reports of psychological distress were summarised by a single latent variable loaded by the six items administered repeatedly during the Women's Health Survey (WHS-PD ages 47-52).

A single latent variable spanning ages 36-52, was loaded by the PSE (age 36), the PSF (age 43), and the WHS-PD factors to summarise continuities in emotional adjustment across the life course.

Our first stage of modelling regressed the six-psychological well-being dimensions of the PWB scale on each personality latent variable simultaneously (Figure 1a). A similar regression model was applied to the second-order general well-being model (Figure 1b). We then specified a comprehensive structural equation model [38] to estimate the long range associations (predictive relationships) between personality dimensions and well-being, taking into account the potential influence of intermediate mental health outcomes, that might differentially link variations in early personality to the different well-being dimensions (Figure 2). We used the technical approach of Muthén for structural equation modelling (SEM) with an appropriate measurement model for binary and ordinal data [27]. All models were estimated using M*plus* (version 5) with the robust, weighted least squares (WLSMV Mean and Variance Adjusted Weighted Least Square) estimation method [28] [26].

Analysis Sample

The analysis sample included survey members with fewer than six missing values on the PWB scale and a personality assessment at one or both time-points (N=1,134). This included participants who had completed the PWB, but had incomplete personality data (N=204); either missing one full assessment (N=183) or incomplete item level data (N=21). Survey members with PWB data but missing both personality assessments (N=45) were excluded.

To assess the potential effect of differential attrition by personality type, women included in the longitudinal analysis (N=1,134) were compared to women who had undertaken personality assessments at age 16 and 26 but were not interviewed at age 52 (N=979). A comparison of the latent trait scores between the two groups suggested that women who remained in the study had slightly lower extraversion scores (mean=−.05, SD=.70) than those who were not included at the age 52 assessment (mean=.01, SD=.65) although the effects size was small (d=−.09). There were no apparent differences in neuroticism scores between the included (mean= −.01, sd= .71) and excluded groups (mean =−.02, sd=.72); d=.01.

RESULTS

Model 1: Regression - distal effects of early personality on midlife well-being

The long-range/distal effects of personality on the adult well-being dimensions (Figure 1a) showed that individual differences in personality, captured by a short scale of extraversion items, administered in adolescence and early adulthood, were strongly predictive of all six dimensions of psychological well-being (PWB) three decades later at age 52. More extraverted survey members reported higher psychological well-being (Figure 1a). Extraversion explained between 7% (purpose in life (r=.27) and 13% (positive relations (r=.36) of the variance in well-being outcomes, defined as latent variables using normal ogive item response models.

The percentage of well-being variance explained by neuroticism was less than for extraversion. Survey members with higher neuroticism scores reported lower well-being on all dimensions. Higher neuroticism scores were strongly and negatively associated with environmental mastery (r=−.24), purpose in life (r=−.21) and self-acceptance (r=−.20). Autonomy (r=−.10), positive relations (r=−.11) and personal growth (r=−.12), were more weakly associated with neuroticism, and accounted for around 1% of the variance on each dimension. The model-based correlation between the two extraversion measures (ages 16 and 26) was .69, and between the two neuroticism measures was .56. Extraversion and neuroticism were not independent (r =−.32) (Figure 1a).

Defining well-being at a more general level, as a second order construct underpinning associations among four of the six Ryff dimensions [2] further increased the impact of extraversion on the general well-being factor (r=.32), explaining 10% of variance. Under the same model the impact of neuroticism accounted for 5% of the variance (r=−.22). (Figure 1b)

Table 1 reports the proportion of variance explained by the combined personality variables (i.e. the overall model R2). Together the distal effects of the extraversion and neuroticism latent factors explained from around 13% of the variance on personal growth and autonomy to 18% on environmental mastery and self-acceptance and around 20% on the second-order well-being factor (Table 1).

Model 2: Pathways model – Early personality, emotional adjustment and midlife well-being

Structural equation models are useful, over and above regression analyses, because of their ability to specify mediation among latent variables. In our model, we examined the possibility that most of the impact of neuroticism was through the intermediate outcome summarising emotional adjustment. We also examined whether extraversion would impact on PWB through this pathway. The direct and indirect pathways between these variables were estimated simultaneously in a comprehensive model (Figure 2).

The effect of early neuroticism on well-being was indeed shown to be through the latent factor summarising emotional adjustment. However, extraversion exerted a direct effect on PWB without any substantial mediation by life course variations in emotional adjustment.

Finally we included adult social class (non-manual versus manual) to assess any additional impact on the well-being scores at age 52. Inclusion of this dummy variable changed the total variance explained in well-being outcomes by less than one percent on any dimension. The strongest associations were between adult social class and personal growth (−.13); and purpose in life (−.10); but association with all other PWB dimensions were weaker: autonomy (−.05); positive relations (.03); environmental mastery (−.01) and self acceptance (−.05).

DISCUSSION

This is the first study to investigate the effects of early personality measures on well-being in midlife, using data collected over several decades and including multiple longitudinal measures of emotional adjustment. We investigated the influence of the personality traits of extraversion and neuroticism on dimensions of psychological well-being. In our first model which looked at the direct effects of personality on well-being, the extraversion-introversion dimension measured by the Maudsley Personality Inventory was associated with all six dimensions of psychological well-being with the strongest effect on positive relations with others. Neuroticism (or emotional instability) was strongly associated with three PWB dimensions (environmental mastery, purpose in life and self-acceptance) and exhibited weaker associations with autonomy, personal growth and positive relations with others. Together these two personality dimensions accounted for between 13% (autonomy and personal growth) and 18% (self-acceptance, environmental mastery) of the variance on the six PWB dimensions. The two personality dimensions also explained 20% of the variance on the second-order general PWB factor, previously shown to capture the inter-relations among four of the first-order factors (environmental mastery, personal growth, purpose in life and self-acceptance) [2].

Numerous studies of the personality antecedents of mental health problems have highlighted the role of neuroticism [5, 16, 30, 40]. In general, psychiatric research has ignored, or failed to find a strong role for extraversion [5, 21, 30, 40]. The relative impact of these two personality traits on psychological well-being is therefore of particular interest. We tested the hypothesis that some of the association between early personality and later PWB could be explained by an association between well-being and adult emotional adjustment. We found a strong and direct association between extraversion and psychological well-being even after allowing personality traits to exert their effects through emotional adjustment. However, the effect of neuroticism on well-being was almost entirely mediated through emotional adjustment.

The importance of controlling for distress in the relationship between personality and well-being was highlighted in a cross-sectional study by Schmutte and Ryff [37]. In a series of unadjusted correlations, all PWB dimensions were positively associated with extraversion and negatively associated with neuroticism. However, after controlling for current affect (measured with the CES-D) the magnitude of the correlations for both extraversion and neuroticism were markedly reduced.

Both Fergusson et al (1989) [16] and Ormel et al (2000) [31] have argued that measures of neuroticism are simply measures of emotional adjustment and associations between neuroticism and emotional problems are therefore circular. In this study using SEM, the impact of neuroticism, which may capture early emotional maladjustment, was shown to be entirely mediated through emotional problems in adult life. Our latent variable modelling of emotional distress during adulthood linked personality-based trait neuroticism to an empirically defined notion of emotional maladjustment, defined by measures of psychological and psychiatric distress assessed at multiple time points during adulthood.

It is instructive to ask why there is a strong direct effect between extraversion and psychological well-being. The extraversion-introversion dimension is generally regarded as a measure of sociability, and it could be predicted that the strongest relationship between extraversion and of well-being would be evident on the dimension of positive relations with others. This is borne out by the data, which show that extraversion explains the highest percentage variance on positive relations. On the other hand the effect of extraversion is also very strong on the dimensions of autonomy (self-determination) and self-acceptance

(positive self-regard). The mechanisms underlying these long-term relationships require further investigation. For example, studies are needed of the relationship between early extraversion and factors known to be associated with adult well-being, such as social capital, social support or self-efficacy [3, 14, 19, 29].

Among the strengths of our study are the use of a population-based sample, the prospective collection of data and the life course approach. An additional strength was that our model included a trait measure of the two personality dimensions (assessed at ages 16 and 26) and a trait measure of emotional adjustment summarising mental health problems assessed at several stages in the life course. By combining measures made on several occasions we have increased the reliability of these variables. However, we note that around 15% of the sample only had relevant personality data from one time point or the other and so for them the latent factor does not reflect a trait component.

The use of structural equation modelling allowed us to simultaneously evaluate the effects of extraversion and neuroticism, to simultaneously model the six-well being dimensions and to establish both the direct and indirect effects of personality on psychological well-being. Our sample is homogeneous with respect to age and gender (women aged 52). This may be seen as a weakness since it rules out the possibility of our studying these factors. However, we note that in comparison to personality characteristics, socio-demographic variables (such as age, gender, martial status) have been found to have relatively little influence in explaining well-being variance [17, 33]. Nevertheless, it would be valuable to establish the relationship between personality and later psychological well-being in men and in different age groups. As socio-economic status is widely accepted to have an important influence on well-being (e.g. [1, 14], we included a subsidiary set of models which adjusted for adult social class. However, this had a negligible effect on the overall model, suggesting that social class has little effect on well-being once personality (and emotional adjustment) is taken into account.

The personality assessments used in this study were based on short form measures (each containing six-items) and were thus more limited in the coverage of domains contributing to contemporary definitions of extraversion and neuroticism (where>10 or 12 items are used) [25]. The study has also only focused on the two personality traits of neuroticism and extraversion. However, these two traits have been shown to have the strongest associations with personality and well-being; the remaining three factors from the Five Factor personality model (agreeableness, openness and conscientiousness) have been shown to be of lesser importance (e.g. [9, 17, 37]).

In conclusion, this study has shown that the personality traits extraversion and neuroticism impact upon psychological well-being three decades after personality measurement. Extraversion exerts a direct effect on well-being but the effect of neuroticism is mediated almost entirely through emotional adjustment. Our analyses provide a life course perspective on the lasting impact of personality traits on psychological well-being in an epidemiological sample of women in mid-adult life.

REFERENCES

1. Abbott RA, Ploubidis GB, Croudace TJ, Kuh D, Huppert FA. Women's psychological well-being in midlife and its relationship to socio-economic conditions. Evidence from a British birth cohort. British Journal of Health Psychology. under revision.

2. Abbott RA, Ploubidis GB, Huppert FA, Kuh DJ, Wadsworth ME, Croudace TJ. Psychometric evaluation and predictive validity of Ryff's psychological well-being items in a UK birth cohort sample of women. Health and Quality of Life Outcomes. 2006:4. [PubMed: 16423298]

3. Argyle, M. Causes and Correlates of Happiness. In: Kahneman, D.; Diener, E.; Schwarz, N., editors. Well-Being: The Foundations of Hedonic Psychology. Russell Sage Foundation; New York: 1999. p. 365-367.

4. Argyle M, Lu L. The happiness of extraverts. Personality and Individual Differences. 1990; 11:1011–1017.

5. Caspi A, Moffitt TE, Newman DL, Silva PA. Behavioral observations at age 3 predict adult psychiatric disorders: Longitudinal evidence from a birth cohort. Archives of General Psychiatry. 1996; 53:1033–1039. [PubMed: 8911226]

6. Clarke LA, Watson D, Mineka S. Temperament, personality and the mood and anxiety disorders. Journal of Abnormal Psychology. 1994; 1:103–116.

7. Costa PT, McCrae RR. Influence of extraversion and neuroticism on subjective well-being: happy and unhappy people. Journal of Personality and Social Psychology. 1980; 38:668–678. [PubMed: 7381680]

8. Costa, PT.; McCrae, RR. Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual Psychological Assessment Resources. Odessa, FL: 1992.

9. DeNeve KM, Cooper H. The happy personality: a meta-analysis of 137 personality traits and subjective well-being. Psychological Bulletin. 1998; 124:197–230. [PubMed: 9747186]

10. Diener E. Subjective well-being. Psychological Bulletin. 1984; 95:542–575. [PubMed: 6399758]

11. Diener, E.; Larsen, RJ. The experience of emotional well-being. In: Lewis, M.; Haviland, JM., editors. Handbook of emotions. Guildford; New York: 1993. p. 405-415.

12. Diener, E.; Lucas, RE. Personality and subjective well-being. In: Kahneman, D.; Diener, E.; Schwarz, N., editors. Welll-Being: The Foundations of Hedonic Psychology. Sage Found; New York: 1999.

13. Diener E, Suh EM, Lucas RE, Smith H. Three decades of progress. Psychological Bulletin. 1999:276–302.

14. Dolan P, Peasgood T, White M. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. Journal of Economic Psychology. 2008; 29:94–122.

15. Eysenck H. A short questionnaire for the measurement of two dimensions of personality. Journal of Applied Psychology. 1958; 42:14–17.

16. Fergusson DM, Horwood LJ, Lawton JM. The relationships between neuroticism and depressive symptoms. Social Psychiatry and Psychiatric Epidemiology. 1989; 24:275–281. [PubMed: 2512644]

17. Gutierrez JLG, Jimenez BM, Hernandez EG, Puente CP. Personality and subjective well-being: big five correlates and demographic variables. Personality and Individual Differences. 2005; 38:1561–1569.

18. Hayes N, Joseph S. Big 5 correlates of three measures of subjective well-being. Personality and Individual Differences. 2003; 34:1561–1569.

19. Helliwell, J.; Putnam, RD. The social context of well-being. In: Huppert, FA.; Keverne, B.; Bayliss, N., editors. The Science of well-being. Oxford University Press; Oxford: 2005.

20. Huppert, FA.; Keverne, B.; Bayliss, N., editors. The science of well-being. Oxford University Press; 2005.

21. Kendler KS, Gatz M, Gardner CO, Pedersen NL. Personality and major depression: a Swedish longitudinal, population-based twin study. Archives General Psychiatry. 2006; 63:1113–1120.

22. Kuh D, Hardy R, Rodgers B, Wadsworth MEJ. Lifetime risk factors for women's psychological distress in midlife. Soc Sci Med. 2002; 55:1957–1973. [PubMed: 12406464]

23. Lindelow M, Hardy R, Rodgers B. Development of a scale to measure symptoms of anxiety and depression in the general UK population: the psychiatric symptom frequency scale. J Epidemiol Community Health. 1997; 51:549–557. [PubMed: 9425466]

24. McCrae RR, Costa PT. Adding liebe und arbeit: the full five factor model of well-being. Personality and Psychology Bulletin. 1991; 17:227–232.

25. McCrae, RR.; Costa, PT. Personality in Adulthood: A five-factor theory perspective. The Guildford Press; New York: 2003.

26. McDonald, RP. Test Theory: a unified treatment. Lawrence Erlbaum Associates; Manwah NJ: 1999.

27. Muthén B. A general structural equation model with dichotomized variables. Psychometrika. 1984; 49:115–132.

28. Muthén, L.; Muthén, B. M*plus* User Guide. Muthén & Muthén; Los Angeles, CA: 1998-2004.

29. Myers DG. The Funds, Friends, and Faith of Happy People. American Psychologist. 2000:63–65.

30. Neeleman J, Ormel J, Bijl RV. The distribution of psychiatric and somatic ill health: Associations with personality and socioeconomic status. Psychosomatic Medicine. 2001; 63:239–247. [PubMed: 11292271]

31. Ormel J, Rosmalen J, Farmer A. Neuroticism: a non-informative marker of vulnerability to psychopathology. Social Psychiatry and Psychiatric Epidemiology. 2004:39. [PubMed: 15022045]

32. Rodgers B. Behaviour and personality in childhood as predictors of adult psychiatric disorder. J Child Psychol Psychiatry. 1990; 31:393–414. [PubMed: 2318921]

33. Ruini C, Ottolini F, Rafanelli C, Tossani E, Ryff CD, Fava GA. The Relationship of Psychological Well-Being to Distress and Personality. Psychother Psychosom. 2003; 72:268–275. [PubMed: 12920331]

34. Ryff CD. Happiness is everything, or is it?. Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology. 1989; 57:1069–1081.

35. Ryff CD, Keyes CL. The structure of psychological well-being revisited. J Pers Soc Psychol. 1995; 69:719–727. [PubMed: 7473027]

36. Ryff CD, Singer B. The Contours of positive human health. Psychological Inquiry. 1998; 9:1–28.

37. Schmutte PS, Ryff CD. Personality and Well-Being: Reexamining Methods and Meanings. Journal of Personality and Social Psychology. 1997; 73:549–559. [PubMed: 9294901]

38. Skrondal, A.; Rabe-Hesketh, S. Generalized latent variable modeling: multilevel, longitudinal and structural equation models. Chapman & Hall/CRC; Boca Raton, FL: 2004.

39. Springer KW, Hauser RM. An assessment of the construct validity of Ryff's scales of psychological well-being: method, mode and measurement effects. Social Science Research. 2006; 35:1079–1101.

40. van Os J, Park SBG, Jones PB. Neuroticism, life events and mental health: evidence for person-environment correlation. British Journal of Psychiatry. 2001; 178:s72–s77.

41. Vitterso J. Personality traits and subjective well-being: emotional stability, not extraversion, is probably the important predictor. Personality and Individual Differences. 2001:903–914.

42. Vitterso J, Nilsen F. The conceptual and relational structure of subjective well-being, neuroticism and extroversion: once again, neuroticism is the important predictor of happiness. Social Indicators Research. 2002; 57:89–118.

43. Wadsworth, ME. The imprint of time: childhood, history, and adult life. Clarendon Press; Oxford, United Kingdom: 1991.

44. Wadsworth ME, Butterworth SL, Hardy RJ, Kuh DJ, Richards M, Langenberg C, Hilder WS, Connor M. The life course prospective design: an example of the benefits and problems associated with study longevity. Social Science & Medicine. 2003; 57:2193–2205. [PubMed: 14512249]

45. Wadsworth ME, Kuh DJ, Richards M, Hardy RJ. Cohort Profile: The 1946 National Birth Cohort (MRC National Survey of Health and Development). International Journal of Epidemiology. 2006; 31:49–54. [PubMed: 16204333]

46. WHO. World Health Organisation: Mental health: strengthening mental health promotion. 2001. WHO Fact Sheet 220

47. Wing, JK.; Cooper, JE.; Sartorius, N. The measurement and classification of psychiatric symptoms. Cambridge University Press; Cambridge: 1974.
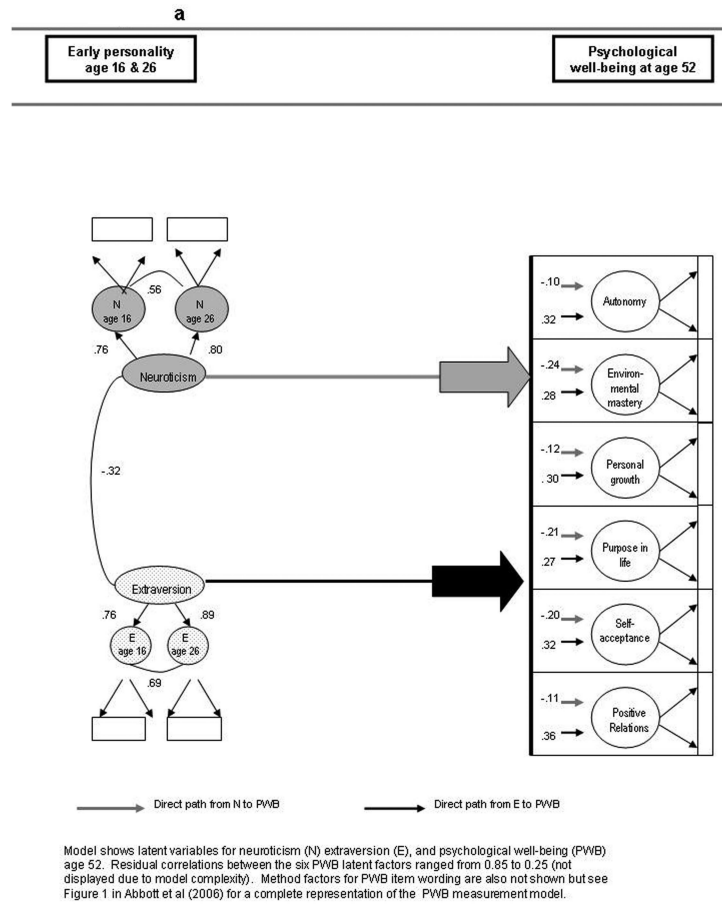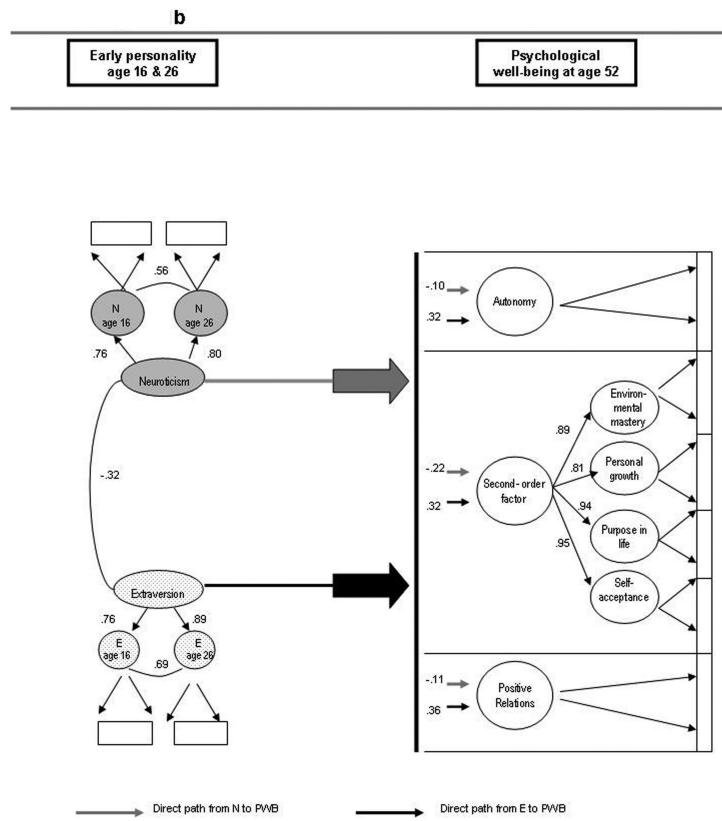
Figure 1a.
Early personality and psychological well-being in midlife (N=1,134)

Model shows latent variables for neuroticism (N), extraversion (E), and second-order psychological well-being (PWB) factor. Method factors for PWB item wording are not shown due to model complexity but see Figure 1 in Abbott et al (2006) for a complete representation of the PWB measurement model.

Figure 1b.
Early personality and psychological well-being in midlife. Second-order PWB factor model (N=1,134)
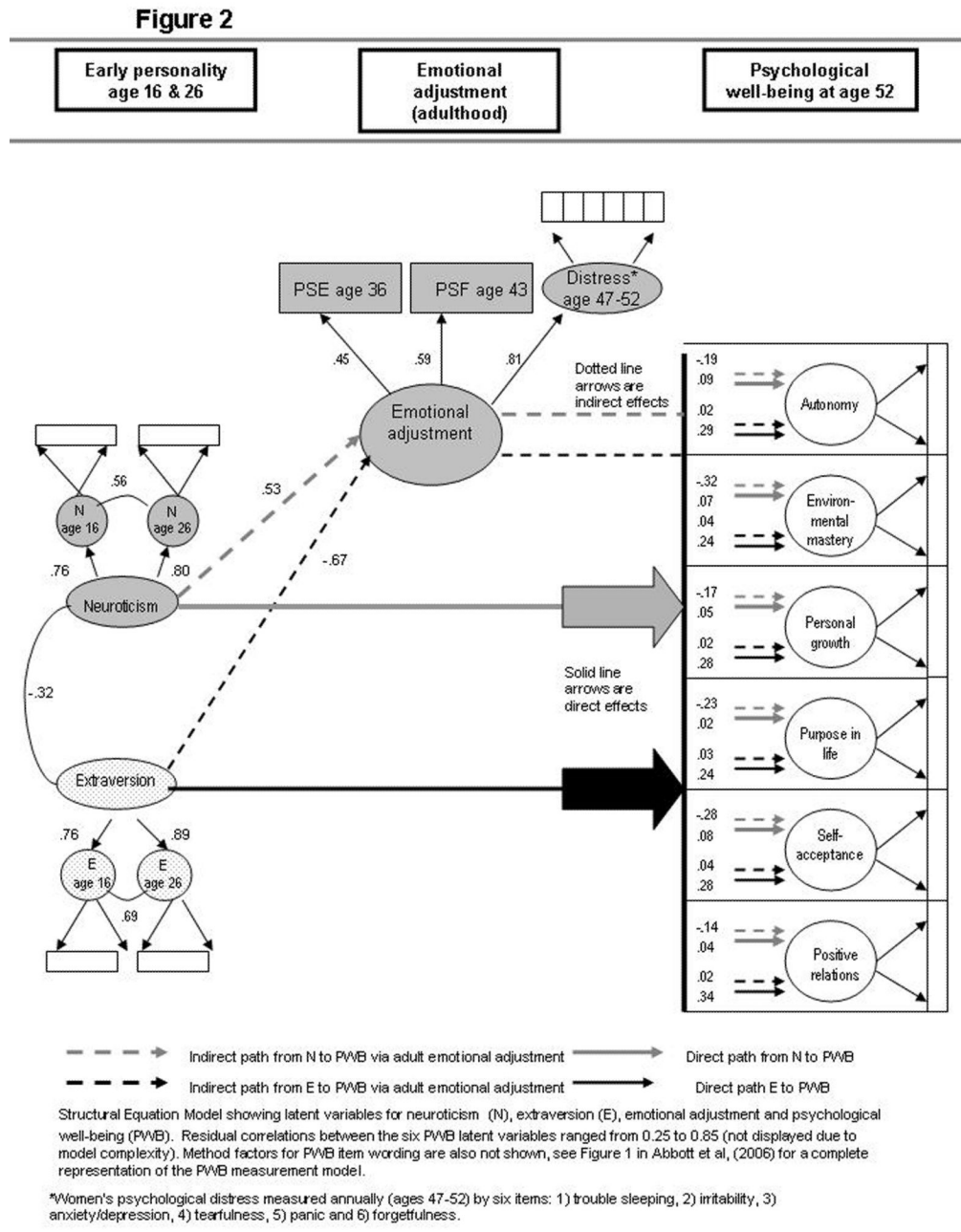
Figure 2.
Path diagram showing structural equation model of associations between early personality, adult emotional adjustment and psychological well-being in midlife (N=1.134)

Table 1

Percentage of psychological well-being variance explained by the combined personality measures and adult mental health (N=1,134)

	1. Distal effect of personality on PWB	2. Additive effects of personality and emotional adjustment
Model R^2		
Autonomy	12.9%	21.7%
Positive relations	16.5%	21.5%
Environmental mastery	18.1%	43.4%
Personal growth	12.5%	19.4%
Purpose in life	15.5%	28.6%
Self-acceptance	18.4%	38.1%
Second-order general well-being factor [*]	19.8%	40.5%

1. Distal effect of personality on PWB - Model Fit: χ^2 = 1410.9 df=431, p<0.001; CFI=92.2; TLI=96.3; RMSEA=0.05; WRMR 1.41.

2. Distal effect of personality and adult emotional adjustment on PWB – Model fit: χ^2 = 1474.9 df=453, p<0.001; CFI=91.7; TLI=96.0; RMSEA=0.05; WRMR 1.41.

The original publication is available at springerlink.com. http://www.springerlink.com/content/u46446518010u72x/

[*] Second-order general well-being factor comprising environmental mastery, personal growth, purpose in life and self-acceptance.