

Published in final edited form as:

Sociol Res Online. 2014 May 31; 19(2): . doi:10.5153/sro.3241.

Cognitive, affective and eudemonic well-being in later life:

Measurement equivalence over gender and life stage

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Abstract

The hedonic view on well-being, consisting of both cognitive and affective aspects, assumes that through maximizing pleasurable experiences, and minimizing suffering, the highest levels of well-being can be achieved. The eudemonic approach departs from the concept of a good life that is not just about pleasure and happiness, but involves developing one-self, being autonomous and realizing one's potential. While these approaches are often positioned against each other on theoretical grounds, this paper investigates the empirical plausibility of this two dimensional view on subjective well-being. The interrelations between common measures such as the General Health Questionnaire, the CES-D inventory of depressive symptoms, the satisfaction with life scale and the eudemonic CASP scale are examined in a confirmatory factor analysis framework using the third wave of the English Longitudinal Study of Ageing (ELSA). A multidimensional structure of well-being, distinguishing cognitive, affective and eudemonic well-being, is shown to be the best fitting empirical solution. This three dimensional second order structure is neutral to gender in its measurement. A lower influence of feeling energetic on self-actualisation, and of somatic symptoms of depression on affective well-being was noted for respondents in the fourth age in comparison to respondents in the third age. These small measurement artefacts underline that somatic symptoms of later life depression should be distinguished from mood symptoms. Two main social facts are confirmed when we compare the different forms of well-being over gender and life stage: men tend to have a higher level of well-being than women, and well-being is lower in the fourth age than in the third age. Although the three measures are very closely related, with high correlations between .74 and .88, they each have their specific meaning. While affective and cognitive well-being emphasize the use of an internal yardstick to measure well-being, the eudemonic perspective adds an external dimension. As each measure has an own story to tell, we advocate the use of these multiple assessments of well-being.

1 Introduction

Subjective well-being, or the ability to live a "good life", has been a contested concept since the classical period, when ancient Greeks philosophised about the nature of a good life itself. The hedonic school of thought argued that pleasure should be maximised and suffering minimised, an argument regurgitated by utilitarians such as Bentham and Mill. Stating that in this way a slave or an animal can be happy too, Aristotle emphasised in his Nichomachean Ethics that human flourishing, or eudemonic well-being, flows from the development of one's capabilities, rather than from the simple fulfilment of basic needs. This idea of well-being comes very close to Maslow's hierarchy of needs. To some extent, these arguments are reflected in current scientific debates on what subjective well-being

consists of, and how it should be measured. In this paper we want to investigate to what extent this conceptual, two dimensional view of subjective well-being can be applied to empirical reality of later life.

Any investigation of measurement instruments would be incomplete without looking at possible sources of bias. By investigating to what extent our measures of subjective well-being are neutral to differences in gender, and between the third and fourth age, we contribute to the research literature of these background aspects of well-being in later life. Although attention for gender issues is very present in our society, it tends to focus on issues of young people or the workplace, and less on older women. Inequalities between the sexes accumulate throughout the life course, so that later life has a large potential for gender differences in well-being. Next to gender, there is the possibility that age, and it's associated inevitable physical decline, contribute to disparities in old age. This comparison of well-being between third and fourth age, and between men and women in these phases of life, rests on the often untested assumption that subjective well-being can be measured in the same way, and without bias, across different life stages and genders. The second aim of this paper is to investigate to what extent our multidimensional measure of well-being is neutral towards both genders, and towards different life stages. If our measure allows us to, we will compare the well-being of these groups.

First, an overview of the existing approaches to examine subjective well-being in later life is given, based on available measures. We focus on the subjective measures of well-being, but acknowledge that different approaches, such as objective lists of conditions from which well-being emerges (Nussbaum and Sen 1993), or preference satisfaction (Dolan and Peasgood 2008), also have their merits. A short description is sketched of the influences of gender and age on subjective well-being. Our analysis consists of three parts. First we conduct a second order confirmatory factor analysis (CFA), that examines to what extent empirical measures confirm to the theoretical divide between hedonic and eudemonic aspects of subjective well-being. The second part of the analysis investigates if the second order model of subjective well-being can be used to compare well-being among gender and life stage groups, by looking at the measurement equivalence using a multigroup CFA framework. A last part of the analysis is comparing the different dimensions of well-being between gender and age groups. These analyses will be conducted using the third wave of the English Longitudinal Study of Ageing (ELSA), as it contains multiple instruments to measure well-being, and also presents the opportunity to examine well-being in a specific context, namely later life.

1.1 Subjective well-being as a multidimensional construct

The nature of well-being is a meeting ground between philosophy and empirical measurement (Sumner 1999). Two different ethical frameworks on what a good life entails, hedonic and eudemonic well-being, have dominated most research on subjective well-being.

The hedonic view on well-being assumes that through maximizing pleasurable experiences, and minimizing suffering, the highest levels of well-being can be achieved. Both cognitive and affective aspects of well-being can be identified within this approach (Diener 1984).

The affective aspect of hedonic well-being consists of moods and emotions, both positive and negative. This approach to well-being can be traced back to the first enquiries on psychological well-being and quality of life (Bradburn 1969). The affective aspect of well-being brings measurement very close to assessing mental health. Therefore it is not surprising that depressive symptoms are sometimes used as a measure of negative affect (NA) (Demakakos, McMunn, and Steptoe 2010). Depression is traditionally assessed by the Centre for Epidemiological Studies Depression (CES-D) scale (Radloff 1977), which has been shown to be accurate and valid among the older population as well as at younger ages (Lewinsohn et al. 1997). A second measure for mental health, the 12 item version of the General Health Questionnaire (GHQ) (Goldberg 1988) can be seen in the light of affective measures of Subjective Well-being (SWB) as well. The GHQ-12 is a widely used screening tool for psychiatric disturbance, and has shown to have good psychometric properties and reliability for older people (Cheung 2002).

In relation to later life, affective aspects of well-being have been studied quite intensively. On the level of measurement, it has been illustrated that the PANAS scale (Watson et al., 1988) has good psychometric and scale properties among the old, and yields information that is comparable to other age groups (Kercher 1992; Kunzmann, Little, and Smith 2000; Crawford and Henry 2004). In regard to differences in mean levels of affect, it has been established that negative affect decreases over the lifespan, albeit the rate of decline is slower in old age, and may reverse in old-old age, while results for positive affect are not unequivocal (Charles, Reynolds, and Gatz 2001; Crawford and Henry 2004; Kunzmann, Little, and Smith 2000; Kunzmann 2008; Ready et al. 2011). There is some evidence that although positive and negative affect are valid and separate factors, the structure of the interrelations among emotions in older adults differs from younger adults (Ready et al. 2011). Specifically sadness and depressive feelings seem to be more interrelated with anxiety. In connection to that, some studies report more somatic symptoms than emotional moods of depression by older adults (King and Markus 2000), leading to the challenged idea that depression manifests itself in a different way for older adults, a phenomenon called later life depression (Alexopoulos 2005; Lebowitz et al. 1997). As depression is not a monolithic disease, but an emotional disorder accompanied by physiological symptoms, it is difficult to distinguish it from conditions in later life that trigger similar symptoms, such as chronic illness or cognitive impairment as the result of dementia or Alzheimer's disease (Lebowitz et al. 1997). The cognitive component of hedonic well-being, often referred to as life satisfaction, is a judgemental process in which individuals assess the quality of their life based on their own set of criteria (Pavot and Diener 1993). As such, it differs from domain specific evaluations of satisfaction (Campbell, Converse, & Rodgers, 1976) in that an idiosyncratic set of standards is taken into account, which allows comparing satisfaction with life across groups of people with different aspirations in life. The Satisfaction With Life Scale (SWLS) (Diener et al. 1985; Pavot and Diener 1993) consists of 5 items to be rated on a response scale ranging from 1 (strongly disagree) to 7 (strongly agree), inviting respondents to make a global evaluation of their life. It was also explicitly tested on older respondents (Diener et al. 1985).

The second approach to well-being, Eudemonic well-being, reflects positive functioning and personal expressiveness (Ryff and Keyes 1995). Positive functioning, or psychological well-

being, reflects the need for self-actualisation in Maslow's (1968) need hierarchy. Similarly, positive functioning can be seen from the perspective of developmental psychology, as personality changes articulate well-being as trajectories of continued growth across the life cycle (Erikson 1959). As the concept of positive functioning is rooted in different approaches, several different measurement instruments can be found. Ryan and Deci (2000) conceptualize it in their self-determination theory and see autonomy, competence and relatedness as three basic necessities for personal growth, integrity and well-being. By looking at six distinct aspects of actualisation (autonomy, personal growth, self-acceptance, life purpose, mastery and positive relatedness), Ryff & Keyes (1995) measure psychological well-being, which they see separate from subjective well-being.

In the framework of studies on later life, a measure specifically targeted at older populations has been developed (Hyde et al. 2003). Four constructs, namely Control, Autonomy, Self-realization and Pleasure (CASP) together can be seen as an accurate measure of positive functioning, and subjective quality of life in later life. An explicit aim of this measure is to distinguish quality of life from its drivers, such as health (Hyde et al. 2003). The scale shows better properties in a reduced form with 12 or 15 items, when the items referring to health, age, family circumstances and financial situation are removed (Vanhoutte 2012). A second point of importance concerns the domain of Pleasure, which could be seen more as a hedonic than a eudemonic form of well-being. When looking at the specific items, it nevertheless becomes clear that it is not pleasure in the sense of happiness, but rather in the sense of fulfilment (see appendix for item wording).

Comparing the dimensionality of different conceptualisations of eudemonic well-being it becomes clear that they rely on very similar concepts and sub-dimensions. All three approaches depart from the idea that human flourishing depends on the satisfaction of certain psychological needs. Autonomy is a need that is present explicitly in psychological well-being (PWB), self-determination theory (SDT) and CASP. Both control in CASP, and environmental mastery in PWB can be seen as a closely related concept, also relating to autonomy. The second key aspect of eudemonic well-being is developing one-self, and is captured as personal growth in PWB, as competence in SDT and self-realisation in CASP. The largest difference between the three approaches is that both PWB and SDT do not see pleasure, or any other aspect of Diener's hedonic concepts, as an explicit psychological need (Ryff and Singer 1998; Diener, Sapyta, and Suh 1998), while CASP does. While Ryff & Singer (1998) downplay the importance of hedonic well-being altogether, Ryan & Deci (2001) see it as a consequence of the fulfilment of needs, that goes hand in hand with eudemonic well-being. Secondly, relatedness, or having warm and positive social relations, is seen as an essential need for psychological well-being, while it is not explicitly defined in the CASP scale.

While both approaches are often positioned against each other on theoretical grounds, it is worthwhile to look at how different aspects of both eudemonic and hedonic well-being are interrelated empirically.

1.2 Gender influences on subjective well-being

What is the role of gender in these different aspects of subjective well-being in later life? It has been long established that there are strong gender disparities in emotional health, with women having worse mental health than men (Nazroo, Edwards, and Brown 1998; Van de Velde et al. 2010; Bracke 1998; Kim and Moen 2002). In terms of the more evaluative satisfaction with life approach to subjective well-being, the differences noticed are more subtle, but nevertheless persistent and significant (Pinquart and Sörensen 2000; Diener, Suh, and Lucas 1999; Haring, Stock, and Okun 1984). When it comes to positive functioning, expressed as psychological well-being in the form of autonomy, pleasure and self-actualisation, earlier studies again show small to insignificant gender differences (Netuveli et al. 2006; Ryff, Keyes, and Hughes 2003; Wiggins et al. 2004). As such, it seems gender differences are small but persistent when it comes to subjective well-being.

The reasons for these differences are prone to arise from both cultural and structural aspects of gender. From the cultural side, the question is to which extent subjective well-being means the same for both genders, not only in old age but throughout the life course. As traditional gender identities emphasize different yardsticks for men and women to evaluate their life against, it is likely that older men and woman are doing gender in later life, and as such draw on different aspects of life to evaluate their well-being. A measure that explicitly refers to a domain where gender is performed strongly, could therefore be gender biased. A classic, historical example from the fifties illustrates that meanings attributed to economic activity can differ between genders. While job satisfaction in the fifties was highly correlated with life satisfaction for male employees, this relation was non-existent for female employees (Brayfield, Wells, and Strate 1957). At that point in time and among that specific group of employees, the male breadwinner model appeared to be of importance to understand individual gendered pathways to life satisfaction. These cultural scripts, dictating that women should find satisfaction in housework and childcare rather than employment, were challenged shortly after by Betty Friedan's *Feminine mystique*, which sparked the second wave of feminism. As we investigate gender effects among people aged 50 or more, we are studying the very people who grew up during the second wave of feminism, and experienced the gradual changing of gender norms, so these cohort effects are one possible explanation for gender differences in well-being. A second cultural explanation could lie in the self-image of woman. A double standard of aging, with woman being evaluated as losing important aspects of their femininity as they grow older, could well have its impact on the subjective well-being of ageing women (Deusch, Zalenski, and Clark 1986).

As structural differences throughout the life course culminate in later life, these also are a fertile ground for gender differences. Inequalities in partnership status, socio-economic status and health have shown to be the main causes of gender inequalities in later life (Pinquart and Sörensen 2000). Although women live longer than men, they tend to have worse health (Verbrugge 1989; Nathanson 1975). Because women tend to live longer, and tend to have older partners, women have to cope by themselves more often than men later in life (Stroebe and Stroebe 1987). Socio-economic differences between genders accumulate over the life course, and as such can be expected to be quite large and influential in later life.

When examining subjective well-being, these differences in on the one hand the immaterial interpretation of 'happiness' and 'satisfaction' in later life and on the other hand the physical, social and material resources needed to produce well-being can all play a role in measurement as well as in substantive issues.

1.3 Life stage influences on subjective well-being

The improvements in life circumstances and advances in medicine in the 20th century have had a strong influence on the human life course, in the sense that due to increased longevity, a number of years in good health are added to life. This new life stage, often called the third age, follows adulthood but precedes old age, and carries the promise of realising one's individual aspirations, while the responsibilities of work and family recede to the background, given relative wealth and health (Laslett 1989). The third age is not as clearly defined in terms of its start and end as other life phases, but has retirement as its key transition. As it is a relatively recent development in the life course, it has been argued that institutionalised scripts are lacking and that the third age is lived as it happens (Moen and Spencer 2006). The connection of the third age with retirement draws the attention to the fact that there must be strongly gendered influences on this life phase, as the theoretical smooth transitions from education over work into retirement is derived from an outdated male centered perspective, to which contemporary and female life courses rarely fit (Bernard et al. 1995). One promising angle to look at the evidence for a third age of flourishing is through the lens of subjective well-being, as there are high expectations on the pay-off of the third age in terms of personal subjective well-being (Laslett 1989; Kim and Moen 2002; Bury 1995). The fourth age on the other hand, is thought to be a life phase with diminishing physical health as its main characteristic, so not too much is to be expected in terms of well-being. To be able to make this comparison, the equivalence of the available measures of well-being according to gender and life stage has to be established firmly, which is the main aim of this paper.

2 Data and methods

This analysis is based on the English Longitudinal Study of Ageing (ELSA), a panel study representative for the English population aged 50 and over. We used the self completion questionnaire (n=7398) of the third wave (2006), since a large number of well-being measures, such as the General Health Questionnaire, Centre for Epidemiological Studies Depression scale, Satisfaction With Life scale and the more eudemonic CASP measure (Hyde et al., 2003) are simultaneously present. The total sample, used for the general second order analysis and the gender equivalence analysis consists of 3312 men and 4086 women.

There is no strict definition of either the third or fourth age, but both life phases should not be seen in terms of years of age alone. We define the third age by its key transition, retirement, and being in good health. The fourth age is defined as being 70 or older, and in declining health. Health is functionally defined in terms of (instrumental) activities of daily living: if the respondent is not limited in his daily activity, he or she is in good health, while having at least 1 limitation means health is declining. Note that about 60 percent of respondents over 70 are defined as being in their third age, as they do not have any

functional health limitations. We do not use functional health alone, as the fourth age should be distinguishable from disability. In our view, in essence it is the combination of old age and physical decline that is characteristic for the fourth age.

In summary, to investigate the equivalence of well-being over life stages, and to examine the differences over gender and life stage jointly, we only include those post retirement. The fourth age is defined as having a limitation and being aged 70 plus, while all those in retirement and without a limitation are third age. Applying these demarcations, our sample shrinks significantly to 3703 respondents, of which 2721 are in the third age, and 982 are in the fourth age.

2.1 Assessing Measurement

It could well be that men and women value aspects contributing to later life well-being differently, but this does not mean that we cannot compare well-being if our measurement instrument is free of gender bias. In a similar vein, it is quite possible that well-being is a lot lower in the fourth age than it is in the third age, but we have to be sure we are using a reliable yardstick to make this comparison. The first step in making a useful comparison, is checking for possible measurement bias induced by gender in the instruments used to measure well-being. One common way of examining comparability of measures over groups is by using multiple group confirmatory factor analysis, which allows investigating to what extent the relations between a latent concept and its indicators are the same for different groups, or for the same group over time (Steenkamp and Baumgartner 1998; Brown 2006; Vandenberg and Lance 2000). Measurement invariance consists of different levels, each of which has a meaning both in terms of the comparability of the subgroups and in the type of parameters that are constrained in the model. Disturbances to the levels of measurement equivalence can be due to either substantial issues such as a different meaning of a concept, or to measurement issues such as differences response styles across groups. Inappropriate sampling procedures or coding blunders may equally be responsible for non-invariance, but are very hard to detect.

Configurational invariance can be seen as a basic model, which checks if the same items load on the same factors in subgroups. In practice most tests of invariance start by comparing groups at this step.

Metric or pattern invariance exists if the factor loadings can be set equal among subgroups. In more abstract terms, it guarantees that the measurement scale is the same for both groups, or in other words that differences are reflected in the factor score in the same way in both groups. Each item can be seen as having the same contribution to the latent concept in all subgroups. When testing metric invariance in a second order structure, it is custom to first test the equivalence of first order loadings, and subsequently test equivalence of second order loadings (Chen, Sousa, and West 2005; Byrne and Stewart 2009). One possible reason for the absence of metric invariance is the presence of extreme response styles in one of the subgroups (Cheung and Rensvold 2000; Baumgartner and Steenkamp 2001), the other possibility is that the concept has a different meaning to the group (Gregorich 2006). When metric invariance is established, factor variances and covariances can be compared between groups.

Scalar or strong invariance exists if the intercepts or thresholds of items are equal in subgroups. This reflects a similar origin of the latent scale for both groups. Again, in a second order model first the equivalence of intercepts in the first order part of the model is examined, after which the second order intercepts, (which are in fact latent means of the first order factors), can be examined (Chen, Sousa, and West 2005; Byrne and Stewart 2009). Differential additive response styles are seen as the main explanation in terms of measurement bias for the lack of this level of equivalence (Baumgartner and Steenkamp 2001; Cheung and Rensvold 2000). One example of differential additive response is that in different cultures the same item response might mean something else due to social desirability. Scalar invariance means that latent means can be compared between groups.

These levels of invariance do not have to be satisfied absolutely on all items. Partial invariance can also be assessed, by freeing the relevant parameter for a separate item (Byrne, Shavelson, and Muthén 1989; Vandenberg and Lance 2000; Steenkamp and Baumgartner 1998). When partial invariance is established, only the invariant items should be used to compare subgroups on the latent dimension.

One important aspect to help us decide if a model is good or not, is which test statistics and thresholds to use for model fit. There is a plethora of fit indexes available, and opinions differ widely on which cut-off points to use (Hu and Bentler 1999; Ariely and Davidov 2011; Bollen 1989; Meredith 1993).. Because the chi square test will reject models because of trivial differences in large samples, two groups of alternative fit indexes, which situate the model on a continuum, have been developed over the years (Vandenberg and Lance 2000; Ariely and Davidov 2011; Hurley et al. 1997; Hu and Bentler 1999). Absolute fit indexes, such as the root means square error of approximation (RMSEA), assesses how good an a priori model reproduces the sample data, while incremental fit indexes, such as the Comparative Fit Index (CFI), compare the target model with a more restricted baseline model. Generally accepted cut-off points for RMSEA are .06 or lower for excellent fit, and .08 or lower for decent fit, and higher than .90 or higher than .95 for CFI (Hu and Bentler 1999).

When investigating measurement invariance, we are essentially comparing nested models. By comparing the test statistics of different models, taking into account the differences in complexity, a decision on which model fits best can be made. If a more complex model, reflecting a certain level of measurement invariance, fits significantly worse, the model should be rejected in favour of the simpler one. In the literature, two positions can be found on how to approach these model comparisons: a classical, statistically strict position, propagating the use of the likelihood ratio test based on the differences in chi square and degrees of freedom, and a pragmatic approach, that instigates looking at differences in incremental fit indexes, such as CFI (Meredith 1993; Steenkamp and Baumgartner 1998; Vandenberg and Lance 2000; Cheung and Rensvold 1999; G. Cheung and Rensvold 2002; Byrne and Stewart 2009; Chen, Sousa, and West 2005). We will adopt the pragmatic stance on measurement fit, which allows a maximum decrease in CFI of .01 between two models, in combination with acceptable general model fit indexes (Cheung and Rensvold 2002). All analysis has been carried out using the maximum likelihood estimation method of Mplus (Muthén and Muthén 2010), allowing a better model evaluation and comparison.

3 Analysis

3.1 Second order CFA analysis

The first step in our analysis is to determine which second order structure fits our measures best. We use all measures of well-being available in ELSA wave 3, which we shortly present below: the CES-D scale (Radloff 1977), the general health questionnaire (GHQ) (Goldberg 1988), the satisfaction with life scale (SWLS) (Diener et al. 1985), and the CASP scale (Hyde et al. 2003). A first step is to identify the first order factor structures present in these measurement instruments.

The GHQ is a 12 item scale, intended as a general screening instrument for psychiatric morbidity (Goldberg and Williams 1988). Most researchers examining the factor structure have focused on the number of sub dimensions. A large part of the scientific work has highlighted the plausibility of a two or three factor structure (anxiety, social dysfunction and loss of confidence) instead of the original one factor (Graetz 1991; Shevlin and Adamson 2005). We will adopt this three dimensional structure, which groups positive and negative items in separate dimensions (Graetz 1991)

The original CES-D scale (Radloff 1977) comprises 20 items, but shorter versions are frequently used and have been shown not to lose a lot of information (Kohout et al. 1993). In ELSA an 8 item version is used. In the 8 item version two subscales surface, one that captures mood symptoms and one that refers to somatic aspects of depression (Van de Velde et al. 2010; Wallace et al. 2000). The scale can be seen as a single scale, since internal consistency is high, and correlations between the sub dimensions are higher than .90 in the general population (Van de Velde et al. 2010). In this analysis we will look at the two factor solution, since theoretically depression in later life is explicitly linked to its somatic component. Testing the scale in a CFA framework, it has also been established that the CES-D scale represents a continuum rather than forming separate factors for positively and negatively worded items, if correlations between negatively worded items are allowed (Wood, Taylor, and Joseph 2010).

The satisfaction with life scale comprises 5 items (Diener et al. 1985) and is commonly seen as a one dimensional scale for global life satisfaction.. A two factor structure for the SWLS has been reported (Wu and Yao 2006; McDonald 1999), with the last two items of the scale, which refer more to past experiences, having a different importance for older people in comparison to younger people, and in different cultures compared to the US, where the scale has been most extensively tested (Oishi 2006; Hultell and Petter Gustavsson 2008; Pons et al. 2000). We use this two dimensional form, of which the two factors are very closely related in most studies (correlation around .90). The CASP scale, a measure of quality of life in later life, originally has 19 items, but has been shown to have a better structure in revised forms of 12 and 15 items (Vanhoutte 2012). We will use the three dimensional structure of control, self-actualisation and pleasure (Wiggins et al. 2008; Vanhoutte 2012).

Using the first order factors (Model 1) that arise from both the literature and our data, the higher order structure of subjective well-being is examined. We test increasingly complex models on these data: a one factor subjective well-being model (Model 2), two different two

dimensional models, respectively distinguishing hedonic from eudemonic aspects (Model 3), and affective from cognitive aspects of well-being (Model 4), and finally a three dimensional model (Model 5) distinguishing affective, cognitive and eudemonic aspects of subjective well-being. Error correlations are allowed between items of the same scale that are negatively worded (item d and f for the CES-D mood subscale and item b and d of the control subscale of CASP).

The results of our second order CFA analysis (Table 2) illustrate that the model 5, distinguishing three kinds of well-being, fit the data best, using RMSEA ($<.06$ for good fit) and CFI ($>.90$ for good fit) as our main fit indexes. The distinction between hedonic and eudemonic well-being (model 3) seems to be less relevant, at least in later life, than the distinction between affective and cognitive well-being (model 4). This illustrates that the empirical difference between hedonic and eudemonic well-being has been exaggerated in the literature, and is smaller than the difference between affective and cognitive aspects of well-being. If a multidimensional concept of well-being is used, a threefold structure, distinguishing cognitive, affective and eudemonic well-being is most informative. The correlations between these higher order measures of well-being give further evidence to the benefit of the three factor solution (Model 5): cognitive aspects of subjective well-being are more closely related to eudemonic ($r=.85$) than to affective aspects of well-being ($r=.69$).

3.2 Measurement invariance across age and gender

Measurement invariance can be assessed across a number of subpopulations. A first and obvious check for the validity of comparisons, is assessing equivalence across gender and age groups within a cross-sectional survey, as we will do. Are differences in well-being between groups due to measurement issues, or are they genuine and substantial differences? A second important question, when thinking about the comparability of measures, is looking at longitudinal equivalence of a scale over different waves of a panel study. This kind of analysis investigates if people get used to a questionnaire and change their answering behaviour, or if the change over time is a change in the true value of the latent concept. A third and the most well-known possibility for measurement equivalence is assessing the structure of a latent concept over several countries. Doing all of those test together would lead us to far, so we restrict ourselves to testing equivalence for gender and age in a cross-section of the English population over 50 years old.

The configural model test to what extent the items are linked to the same factors for both groups, on both levels. For metric equivalence, the factor loadings are constrained, so that it the concepts are measured in the same units. This happens in two steps: first the loadings of the items on the first order factors are constrained across the two groups, while the loadings of the first order factors on the second order factors are allowed to vary for each group. In the second step the loadings of the first order factors on the second order factors are set equal between groups as well. To ensure comparability of the factor scores across groups, the intercepts of the items on the first order factors need to be set equal across groups. Lastly, the second order intercepts, or in other words the means of the first order factors, are also set equal across groups.

The results of the investigation of measurement equivalence for gender are reported in Table 3, and for life stages in Table 4. We can conclude that there is no gender bias in our second order measure of well-being, since each model fits well and the CFI only declines marginally (with .05).

Comparing measures of subjective well-being between different life stages is not that straightforward, as we only achieve partial equivalence (Table 4). One item from the CASP scale, referring to the level of energy one has, has a different intercept in the fourth age compared to the third age. The subscale of CES-D that looks at somatic symptoms of depression equally has a different intercept in the fourth age. This difference in intercepts means that the value of zero on respectively the self-actualisation dimension of CASP, and the second order factor for affective well-being, translates to a different value of the mentioned item and subscale in both life stages. For example, to achieve the same score on the affective well-being scale, in the fourth age somatic symptoms are about .17 higher. Because we defined the fourth age as a phase of declining health, this group has a higher amount of somatic complaints. Apparently this higher average amount of physical complaints is translated in a higher ability to cope with somatic complaints of depression for a given level of affective well-being. Equally, for the same level of self-actualisation they need a slightly lower feeling of energy (.39). This partial equivalence means that the item referring to energy levels, and the somatic subscale of the CES-D should not be used when comparing subjective well-being across life stages.

3.3 Gender and age differences in affective, cognitive and eudemonic subjective well-being

We examine the differences in our three dimensions of subjective well-being between genders and age groups using our findings on measurement equivalence, and as such exclude the item and subscale that were not equivalent. The factor scores we calculate are standardised, meaning they have a mean of 0 and a variance of 1. A positive value means more of that specific kind of well-being than the average person, while a negative value means less well-being. A consistent image comes forward in terms of life stage and gender differences (Figure 1, Table 5): Both genders show a significant decline across all dimensions of well-being in the fourth age compared to the third age. A second observation from this simple comparison, is that in later life, differences in well-being between the sexes are large, and become slightly larger in the fourth age. The three different kinds of subjective well-being seem to behave in largely the same way for gender and life stage differences. One clear difference is that levels of cognitive and affective well-being seem to be slightly higher among men than among women, a finding that relates to the higher prevalence of mental illness among women. The largest differences, both between genders and life stages can be found in cognitive well-being, while the smallest difference is in eudemonic well-being.

4 Conclusion

This paper investigates the empirical measurement of subjective well-being in later life, by examining the interrelations between a number of commonly used scales. This examination

is framed in the discussion on the difference between hedonic and eudemonic well-being. The dominant approach, hedonic well-being, assumes that well-being emanates from pleasure and the avoidance of painful experiences, however these are defined by the individual. Measuring well-being in this framework tries to capture moods and emotions on one hand, in the form of positive and negative affect, and cognitive evaluations of one's life on the other hand (Diener 1984). Eudemonic well-being is not approached in such a unified way, with several multidimensional approaches (Ryff and Keyes 1995; Ryan and Deci 2000; Hyde et al. 2003). What they have in common is that they assume well-being emerges from the satisfaction of universal human psychological needs, such as self-actualisation, autonomy, control over our own lives and enjoyment. Our analysis makes clear that, at least for people aged 50 and older in England, this difference between hedonic and eudemonic well-being had been exaggerated in the literature. If a multidimensional concept of well-being is used, it seems clear that a threefold structure, distinguishing cognitive, affective and eudemonic well-being is more informative. This three dimensional view on subjective well-being can be measured using common survey instruments. Affective well-being is measured by instruments such as the General Health Questionnaire (Goldberg 1988) and the CES-D inventory of depressive symptoms (Radloff 1977), cognitive well-being is measured mainly by the satisfaction with life scale (Diener et al. 1985) and eudemonic well-being can be measured using an instrument that emphasises control, self-actualisation and meaning in life as its conceptual base for human flourishing, such as the CASP scale (Hyde et al. 2003). Although the three measures are very closely related, with high correlations between .74 and .88, they each have their specific meaning and measure a specific aspect of the contested concept that subjective well-being is.

The three dimensional second order factor structure documented in this paper is neutral to gender, but seems to pick up some aspects of ageing in its measurement. This gender neutrality of the entire factor structure is important, as it emphasises that the gender inequalities found are not measurement artefacts, as is sometimes said in reference to the higher prevalence of depressive symptoms among women. Moving to a next stage in the life course on the other hand does have effects on measurement. A slightly lower mean intercept of somatic symptoms of depression on affective well-being and of feeling energetic on self-actualisation was noted for respondents over 70 with at least one functional limitation. In practice this means that for the same score on affective well-being, respondents in the fourth age can cope with a slightly higher amount of somatic symptoms (.17), and for the same level of self-actualisation they need a slightly lower feeling of energy (.39). Although these differences have a small influence on the large and complex factor structure of this paper, it can be of more importance for research questions working with the specific scales or items. As such, we advise to carefully examine somatic and mood symptoms of depression separately. In a similar sense it is advised to use the separate subscales of CASP, and to keep in mind that self-actualisation is for a small part determined by health status. A stricter solution would be to exclude that item from the scale. From our analysis it is clear that somatic depression symptoms are not neutral to differences in health status, and as such do not refer to affective well-being alone. On a theoretical level, this is related with earlier findings on a specific form of mild depression among older people, later life depression. Later life depression is mainly somatic in nature, and is possibly unrelated to clinical

depression, but a direct consequence of either the general stresses of the fourth age, or somatic symptoms of illness.

The simple comparison of means between gender and age groups illustrates two basic social facts that merit further investigation: well-being declines in the fourth age compared to the third age, and women tend to have significantly lower well-being than men. While differences are relatively small when it comes to eudemonic well-being, they are significantly larger when it comes to affective and cognitive well-being. One important aspect of our study to keep in mind in this regard is that we are not talking about chronological age, but about life phases. As such, when we look at those aged 70 or more, about 60 percent is in the third age, and still enjoys reasonably good quality of life. A second important footnote to our findings is that they are based on a self completion survey of the community dwelling part of the older population. This means that there is a double selection mechanism at work, selecting the most healthy (and happy) older people: firstly, those who are hospitalised or in a care home are not part of the survey population, and secondly the healthiest and most willing participants will take part in the self-completion part of the survey.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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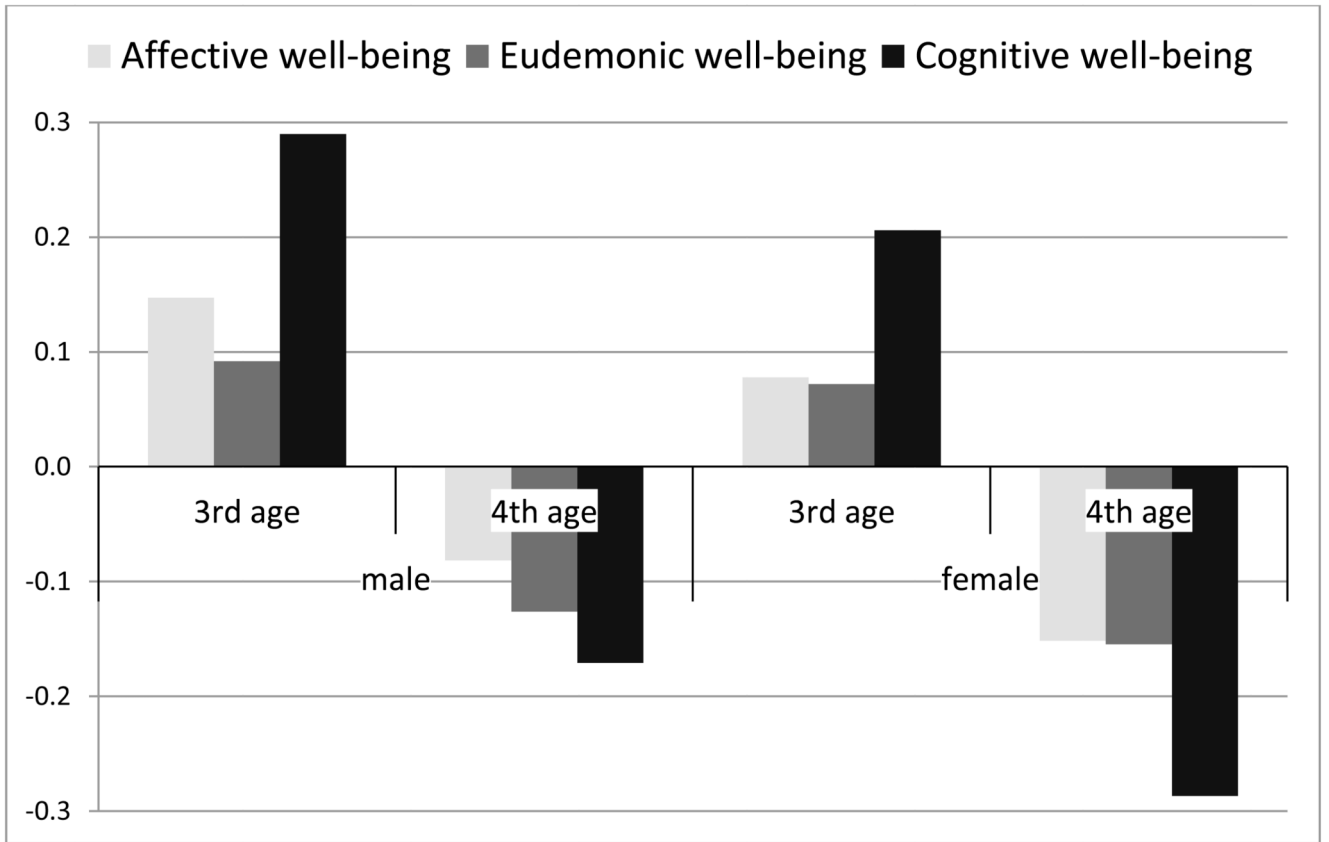


Figure 1. Mean levels of affective, eudemonic and cognitive well-being for men and women in the third and fourth age (N=3703)

Table 1

Overview of the second order structure of subjective well-being

Model 1	Model 2	Model 3	Model 4	Model 5	
GHQ Anxiety	Subjective Well-being	Hedonic Well-being	Affective Well-being	Hedonic Affective Well-being	
GHQ Social dysfunction					
GHQ Loss of confidence					
CES-D Somatic					
CES-D Mood					
SWLS Present					
SWLS Past		Cognitive Well-being	Hedonic Cognitive Well-being		
CASP Control&Autonomy				Eudemonic Well-being	Eudemonic Well-being
CASP Self-Realisation					
CASP Pleasure					

Table 2

Fit statistics for second order models (N=7398)

	Chi square	Df	RMSEA	CFI
Model 1	12483.60	693	0.048	0.914
Model 2	19681.66	728	0.059	0.862
Model 3	18466.86	727	0.057	0.871
Model 4	15832.49	727	0.053	0.890
Model 5	14137.15	725	0.050	0.903

Table 3

Results of testing for measurement invariance across gender in ELSA wave 3 (N=7398)

	Chi sq	Df	RMSEA	CFI
configural model	15190.02	1451	0.051	0.900
1 st order metric equivalence	15355.86	1481	0.050	0.899
2 nd order metric equivalence	15429.63	1491	0.050	0.899
1 st order scalar equivalence	15828.77	1511	0.051	0.896
2 nd order scalar equivalence	15899.74	1518	0.051	0.895

Table 4

Results of testing for measurement invariance across life stages in ELSA wave 3 (N=3703)

	Chi sq	Df	RMSEA	CFI
configural model	7937.28	1452	0.049	0.885
1 st order metric equivalence	8114.63	1482	0.049	0.882
2 nd order metric equivalence	8380.25	1492	0.050	0.877
1 st order scalar equivalence	8682.50	1512	0.051	0.872
Partial equivalence: 1 item intercept (scqolo) free	8495.06	1511	0.050	0.876
2 nd order equivalence	8729.04	1518	0.051	0.872
Partial equivalence: 1 first order intercept (somatic symptoms of depression) free	8605.22	1517	0.050	0.874

Table 5

Mean levels of affective, eudemonic and cognitive well-being for men and women in the third and fourth age (N=3703)

		Affective well-being		Eudemonic well-being		Cognitive well-being	
		Mean	SE	Mean	SE	Mean	SE
Male	3rd age	0.1471	0.0079	0.0918	0.0077	0.2898	0.0225
	4th age	-0.0816	0.0216	-0.1262	0.0177	-0.1708	0.0527
Female	3rd age	0.0778	0.0094	0.0721	0.0078	0.2060	0.0231
	4th age	-0.1516	0.0184	-0.1545	0.0146	-0.2868	0.0415