How Does Subjective Well-Being Evolve with Age?
A Literature Review

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Abstract This literature review provides an overview of the theoretical and empirical research in several disciplines on the relation between ageing and subjective well-being, i.e., how subjective well-being evolves across the lifespan. Because of the different methodologies, data sets and samples used, comparison among disciplines and studies is difficult. However, extant studies do show either a U-shaped, inverted U-shaped or linear relation between ageing and subjective well-being.

Keywords Wellbeing · Ageing · U-shape

Well-being is supposed to be both the ultimate goal of public policy and what individuals strive for. In the current context of rapidly aging societies, however, the development of well-being as age increases suggests a particularly interesting research agenda relevant not only to policymakers but to all sectors of society. Even though much has been written about the relation between ageing and well-being, this issue continues to be a source of debate among scholars, politicians and the media (see, for example, *The Economist* 2010). Although researchers have tried to identify patterns of well-being across the lifecycle, they have reached different, and sometimes even contradictory, conclusions.

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The purpose of our paper is to describe the mainstream theories on the relation between ageing and well-being from the perspectives of economics, psychology and gerontology and to provide a discussion of the empirical studies on this topic. The primary focus of the paper is the effect that age (or ageing) has on *subjective* well-being (SWB), a factor whose measurement and definition is an extensive research topic in itself and the subject of a wealth of literature that ranges across disciplines and decades. One of the most general interpretations of SWB is that of Diener et al. (1985) who define it as "all of the various types of evaluations, both positive and negative, that people make of their lives" (p. 51), encompassing "cognitive evaluations of one's life, happiness, satisfaction, positive emotions such as joy and pride, and negative emotions such as pain and worry" (Stiglitz et al. 2009, p.15). It therefore includes not only rational valuations of a person's life circumstances (e.g. satisfaction) but also emotions, which are more difficult to assess and compare. In this paper, we use the term SWB rather eclectically and refrain from providing or adhering to a precise definition. In this review we also cover a few more recent studies that use "less-subjective" well-being measures to corroborate the more traditional well-being measures used to determine SWB.

The first section of this paper presents a conceptual background that includes economic, psychological and gerontological theories about the relation between well-being and age. Section two then gives an overview of some of the most relevant empirical findings on this issue, and section three discusses the main conclusions that can be drawn from this review.

Conceptual Frameworks

Experts in the social sciences have developed various theories that attempt to determine a life-time pattern of well-being. Because of well-being's multidimensional nature, however, the approach to understanding its relation with age varies among disciplines. Nonetheless, there does seem to be some theoretical convergence, at least in terms of findings, across such fields as economics, psychology and gerontology. In these areas, different approaches have produced theories that have more in common than is apparent at first glance.

Insights from Economics

The social science of economics, which, at its most general analyses how economies work, is often seen as having a focus on growth. In reality, however, rather than focusing on growth per se, it views growth as a means of increasing social welfare. In the words of Oswald (1997, p. 2): "Economic performance is not intrinsically interesting. No-one is concerned in a genuine sense about the level of gross national product last year or about next year's exchange rate. [...] The relevance of economic performance is that it may be a means to an end. That end is not the consumption of beefburgers, nor the accumulation of television sets, nor the vanquishing of some high level of interest rates, but rather the enrichment of mankind's feeling of well-being". (p. 2)

By definition, economics deals with that part of individual and social action that is most closely connected with the attainment and use of material requisites of well-

being Marshall (1997). Therefore, to produce measurable results, economics has traditionally focused on pecuniary resources, their deployment, and their distribution and contribution to well-being.

Above all, economics deals with *utility*. It thus assumes that an increase in consumption, income or GDP inherently increases welfare. Thus, the maxim "more is better" is common in the field. Utility, however, cannot be directly observed, so economists focus on analysing individual behaviors, such as consumption patterns, to infer welfare increases or decreases. Rational individuals, they believe, will try to maximise their consumption of goods and services subject to wealth constraints. Theoretically, therefore, under some key assumptions, economists should be able to predict the lifecycle pattern of well-being by solving the typical utility maximisation problem using lifetime constraints. This standard approach is known as *lifecycle theory*.

Lifecycle theory has received much attention from economists since Fisher (1930) first suggested a linkage between consumption plans and income expectations. Later, this linkage was enhanced by the concept of "hump saving," the idea that individuals would give up consumption in the present to save for future consumption, most particularly for retirement. The model was then more generally adapted for the prediction of savings, consumption and labor supply across the lifespan (Modigliani and Brumberg 1954).

The lifecycle model argues that, in making their consumption decisions, individuals consider not only their current income, but also their income expectations over their entire lifecycle, from childhood to retirement. Lifetime utility is thus an aggregation of instantaneous utilities, which depend on consumption at that instant (i.e. at a specific age). In its most strict application, the theory assumes that planned consumption is a function of lifetime wealth plus some parameters for age and tastes. According to this theory, maximisation of lifetime utility requires that the well-being gain associated with the consumption of an additional unit (the so-called marginal utility of consumption) should be the same in all periods. How consumption, and thus well-being, changes over the lifespan depends on the nature of the utility functions. If as is often done in standard microeconomic models one assumes that the utility function is additively separable in terms of consumption and age (i.e. it has the form utility = v(age) + u(consumption)), then it can be easily shown that individuals would choose constant consumption throughout their lives, a process known as *consumption smoothing*. Lifetime utility or well-being would then be independent of age and therefore flat across the lifespan. Note that this form of utility function assumes that the utility of consumption is independent of age (i.e. the function u does not depend on age).

Very little empirical evidence supports the lifecycle theory that, in its simplest form, posits consumption smoothing, which has led some authors to argue that there is no reason to assume that utility of consumption must be independent of age. An alternative, therefore, is to relax this assumption that the marginal utility of consumption is independent of age. As pointed out by Blanchflower and Oswald (2008, p. 1735), "There seems no reason why the marginal utility of consumption would be independent of a person's age. One might believe that young people wish to signal their status to obtain mates, and, therefore, might have a greater return from units of consumption than the old […] Alternatively, older people may have more need of

health and medical spending, so the marginal utility of consumption is greatest in old age." If one relaxed this assumption, then consumers would adapt their consumption to periods in which the utility they receive from consuming is higher. Consumption and thus well-being would then vary across the lifespan.

One leading economist in the area of life satisfaction and ageing is Richard Easterlin, whose findings initially supported the idea that happiness is essentially flat throughout the lifecycle. The socio-economic principle he proposed at that time (now known as the *Easterlin paradox*) maintains that economic growth, measured in per capita income, does not ultimately translate into increased well-being because people adapt to better life situations relatively quickly. Besides claiming that his results prove "the adaptability of mankind," Easterlin (1974) also quoted George Homans' dictum that "any satisfied desire creates an unsatisfied one" (p. 119).

Well-being, Easterlin therefore posited, is only slightly increased if an individual's income is raised *relatively* to the incomes of others. This point was further explained by economists Frey and Stutzer's (2002) *aspiration level theory*, which argues for a strong correlation between increases in income and rises in aspiration levels. Human beings, the authors contend, are constantly comparing their current situation to past situations and their expectations of the future. In improved circumstances, they rapidly adapt their expectations and are therefore less happy in the long run. In Frey and Stutzer's own words, "[a] rise in our income initially provides a surge of satisfaction, but after some time we get accustomed to it and are not happier than before" (*ibid*., p. 78). As a result, higher levels of well-being are often transitory across the lifespan.

The idea that well-being is relatively smooth along the lifespan has also found detractors in the realm of economics. Indeed, it seems tenuous to believe that individuals are equally happy regardless of the conditions in which they live. Easterlin (2005) himself reassessed his earlier findings and proposed that happiness depends on two types of factors: pecuniary and non-pecuniary. Pecuniary factors are those to which people can completely adapt, like income; non-pecuniary factors are those that, like marriage, disability, and long-term unemployment, can cause long-term changes in the individual's well-being. The effects of such changes are examined in Clark et al.'s (2004) study of the effects of long-term unemployment on life satisfaction, which indeed found that individuals did not return to their original level of well-being after this type of change.

The fact that economic models can be manipulated to include extra assumptions, which can in turn change the observed shape of a lifetime satisfaction curve, allows for contrasting conclusions. Indeed, it seems that "economic theory leaves open room for every structure of well-being over age" (van Landeghem 2008, p. 4), and that "textbook economic analysis is not capable […] of producing unambiguous predictions about the pattern of well-being through life" (Blanchflower and Oswald 2008, p. 6).

Insights from Psychology

In recent years, one branch of psychology, which focuses on analysing life satisfaction and well-being across the lifespan, has contributed important insights to this discussion. Much attention has been given in psychology to the *set point theory*,

which argues that individuals are born with a predisposition to a certain level of happiness, based on genetics and personality. Even life-changing events, such as marriage or the death of a loved one, only have temporary effects on the individual's life satisfaction, which after a while will return to the original, biologically-determined level. This process, called *hedonic adaptation*, is defined as "the process by which individuals return to baseline levels of happiness following a change in life circumstances" (Lucas 2007, p. 75). Even as early as 1999, Diener and Lucas (1999, p. 227) argued that "the influence of genetics and personality suggests a limit on the degree to which policy can increase subjective well-being […] Changes in the environment, although important for short-term well-being, lose salience over time through processes of adaptation, and have small effects on long-term subjective well-being". Therefore, all individuals in society have different but stable levels of well-being, which are not supposed to change across the lifespan.

Many psychological studies seem to support this theory, which was initially set out by psychologists Brickman and Campbell in the 1970s (see Campbell et al. 1976). Originally, these scholars' research aimed at understanding why groups of people with very different access to resources (i.e. very rich people and very poor people) seemed to have similar levels of happiness. To explain this phenomenon, they developed the *adaptation-level theory* of well-being and proposed what is now known as the *hedonic treadmill* or *hedonic adaptation* theory (Kahneman 1999). According to this perspective, even after major life events like winning the lottery or becoming paraplegic, individuals return to a 'baseline' level of well-being (Brickman et al. 1978; Kahneman 1999). This theoretical framework was then complemented by Costa and McCrae's (1980) *personality theory of well-being*, which specified that individuals are born with certain personality traits that do not change significantly across the lifespan. Supporting research by Myers and Diener (1996, p. 54) found, for instance, that "the even distribution of happiness cuts across almost all demographic classifications of age, economic class, race, and educational level" and that "happiness does not appear to depend significantly on external circumstances".

To further explore the hereditary aspect of happiness, Lykken and Tellegen (1996) analysed the lives, personality traits and reported well-being of twins. Their findings seemed to confirm that hereditary characteristics are very strong determinants of life satisfaction, accounting for 50 % of the variance in well-being. In further studies, Lykken (2000) even concluded that close to 100 % of the variance in well-being can be accounted for by hereditary traits.

The field of genoeconomics, a new field of study based on this research, has recently emerged to combine genetics and economics to explore and better understand decision-making processes and their inheritability, especially economics-related decisions and traits. One underlying motivation for this research is that behavioural geneticists have produced a "compelling array of evidence that there is genetic variance in economic behaviors, outcomes, and preferences" (Beauchamp et al. 2011, p. 59). Most of these studies are based on twins and siblings because researchers are better able to control for genetic and environmental conditions.

Important evidence for set-point theory was delivered by De Neve et al. (2010), who showed that individuals do indeed "exhibit a baseline level of happiness". Specifically, these researchers illustrated that individuals with a longer version of the serotonin transporter gene (SLC6A4) tended to report higher levels of happiness

(*ibid*.). In fact, their study, which used twins and genetic associations, showed that around 33 % of the variation in self-reported well-being is genetically explicable. Conversely, even though demographic variables like socio-economic status, income, marriage, education and religiosity are significantly associated with individual happiness, no demographic variable typically accounts for more than 3 % of the variation in self-reported well-being (Frey 2008).

According to psychologist Richard Lucas, there are three main arguments in favour of the set-point theory of life satisfaction. First, evidence usually shows long periods of constant levels of life satisfaction, even under changing circumstances. In fact, up to 40 % of the variance in life satisfaction measures is stable in periods of up to 20 years (Lucas 2007, p. 76). Second, over 80 % of the variables that determine well-being are inheritable, which leaves only 20 % of the variance accounted for by demographic factors (*ibid*.). Third, personality variables, such as "extroversion and neuroticism, are relatively strong predictors of happiness" (*ibid*.).

Nevertheless, while exploring individual adaptation to major life events, Lucas also found some contradictory evidence; namely, that well-being levels do in fact change over time and these changes appear to be permanent. The major events that precipitate such changes include marriage, unemployment and disability (Lucas 2007, pp. 76–77), similar to the findings of Easterlin. Lucas thus concluded that long-term levels of happiness do change but still appear "moderately stable over time" (*ibid*., p. 77). Nonetheless, he emphasised that these results "do not refute the set point model of happiness" (*ibid*., p. 78). He therefore does not reject the theory but argues in favour of developing it further to allow for certain adaptations to life circumstances.

Some scientists have, however, found evidence of particular circumstances that can have a serious effect on the path of well-being across the lifespan (Headey and Wearing 1989; Headey 2008). Among these, Winter et al. (1999) maintained that individuals still suffer from the consequences of divorce or marriage long after the event and do not return to their original level of happiness. Easterlin (2006a) also reported that "adverse health changes have a negative and lasting effect on subjective well-being" (p. 39). Likewise, Huppert (2005, p. 318), in proposing that individuals have emotional reactions of different magnitude that can alter well-being, argued for the existence of evidence "that our set point for happiness is less set than some have supposed". She also showed that individuals with the same genes manifest different levels of life satisfaction, which argues against the hypothesis of a hereditary baseline level of life well-being.

Insights from Gerontology

Gerontology, the study of ageing, has made important contributions that have enriched the study of well-being across the lifespan, especially with regards to the levels of well-being among older individuals. On an intuitive level, common sense dictates that well-being should decrease among older individuals, not least because health diminishes substantially. That is, advancing age compromises not only physical but also mental capabilities. On the whole, individuals are not as self-sufficient as in their younger years. They exit the labour market and depend on fixed pensions that limit the amount of financial resources at their disposal, and as they frequently

experience the death of friends and loved ones, they become more socially isolated (Williams 1977). Yet, according to much gerontological research, "well-being seems to be unaffected by the adverse contexts brought on by the ageing process" (Mroczek and Kolarz 1998, p. 1333).

This phenomenon, known as the *satisfaction paradox* or "stability despite loss" paradox, tries to explain the disconnect inherent in the relatively high levels of subjective life satisfaction reported by elderly living in objectively relatively bad conditions. The gerontological literature notes that this so-called paradox might be caused by age-cohort effects—that is, older people may report higher levels of life satisfaction because of the lower expectations of a particular generation (Walker 2005, p. 4).

An alternative explanation is Charles and Carstensen's (2009) *socio-emotional selectivity theory*, which argues that individuals experience more life satisfaction as age increases because, with passing time and shrinking time horizons, they spend more time in activities that contribute to their well-being instead of pursuing goals that are expected to pay off in the future. Put simply, because older people are more aware of mortality, they try to focus on things that contribute to their current happiness. As a result, older individuals have a "selective attention to the positive [which] might explain why [they] report the less amount of distress in day-to-day lives, are less likely to be depressed, and experience lower rates of phobia than younger people do" (Munsey 2007). Additionally, older people tend to have fewer but more rewarding social contacts, which allows them to better control their emotional health (Berg et al. 2006).

Other researchers of the elderly have reached similar conclusions. For instance, Argyle (2001) found evidence that happiness increases slightly with age, mainly due to a declining goal-achievement gap. In other words, as time goes by, individuals realise that their expectations were probably set too high in their younger years and learn to accept the reality of their lives. Likewise, Diener et al. (1999, p. 291) concluded that "life satisfaction often increases, or at least does not drop, with age".

In a related train of thought, the *selection*, *optimisation and compensation* (SOC) model attempts to highlight the factors that contribute to successful ageing and high levels of well-being among the elderly (Baltes and Baltes 1990). According to the SOC model, "successful aging encompasses *selection* of functional domains on which to focus one's resources, *optimizing* developmental potential (maximization of gains) and *compensating* for losses—thus ensuring the maintenance of functioning and a minimization of losses" (Freund 2002). One underlying assumption of this model is that internal and external resources are depleted as people age, often making it more difficult for individuals to shape their environment according to their goals. Selecting realistic goals becomes important, and empirical evidence shows that focusing on a selected few life domains "is particularly adaptive for those older people whose resources are highly constrained" (Freund 2002).

Broadly speaking, the gerontology literature on well-being in old age stresses the ability of older people to adapt to their circumstances. This adaptive capacity often declines among the very old, i.e. among the "oldest old" or those in the "fourth age" (Baltes and Smith 2003), and accordingly, empirical evidence also suggests that there is a significant decline in well-being among the oldest old (Gwozdz and Sousa-Poza 2010). As technology today allows severe disability to be delayed to older ages, one can assume that this decline will, in subsequent generations, arise at an even higher age.

Empirical Evidence

Authors in different fields have empirically analysed the relation between age and well-being and three main trends have been identified: a U-shape (convex), an inverted U-shape (concave) and linearity. In this section, we outline some of the most relevant literature supporting each of these positions. It should be stressed that the empirical studies that we are aware of do not, in essence, try to test the theories discussed above and it is most probably no trivial task trying to discriminate among the various theories.

U-Shaped Relation

In recent years, a number of authors, especially economists, have identified a U-shaped relation between age and reported life satisfaction. In these analyses, well-being is believed to reach its minimum between a person's mid-30s and early 50s (e.g. van Landeghem 2012; Blanchflower and Oswald 2008). A number of reasons have been given for this observation, including: (i) the possibility that younger individuals have higher expectations than their elders that are not met; (ii) older individuals learn to adapt to their strengths and weaknesses and thus have more realistic aspirations; (iii) and happy people live longer. These reasons could all contribute to a reduction of well-being in younger years and an eventual increase as individuals age.

One of the first attempts to examine this relation was Clark and Oswald's (1994) study of a 1991 cross-section of the British Household Panel Survey and the General Health Questionnaire. The evidence indicates a U-shaped relation between both variables for both data sets, with a minimum life satisfaction reached around a person's mid-30s. In a later study using the U.S. General Social Surveys, Oswald (1997) again found evidence of a U-shape with a minimum reached in the 30s.

Frey and Stutzer (2002), in their meta-analysis of the economic quality-of-life literature, also concluded that a convex relation exists between life satisfaction and age, claiming that "the young and the old are happier than the middle-aged" (p. 54). In their study, after regressing happiness on age and controlling for other demographic factors like income, marital status, employment and health, they found that the minimum level of life satisfaction is reached between an individual's 30th and 35th year.

Deaton (2007, 2008) explored cross-sectional data from the 2006 Gallup World Poll and showed that the age profiles of self-reported life satisfaction differ from country to country. Although his analysis is descriptive and does not control for covariates, the use of the World Gallup Poll data allowed for cross-country comparisons and encompassed nationally representative samples of individuals from over 130 countries. By observing general life satisfaction among individuals from different age groups, Deaton (2008) concluded that the U-shaped relation is present solely in rich, English-speaking countries in which the elderly are relatively satisfied with their lives. In his words, "for most of the world, life satisfaction declines with age; the exceptions being among the very highest-income countries—including the United States, Canada, United Kingdom, Australia, and New Zealand—where life satisfaction is U-shaped with age, falling at first and rising after middle age" (*ibid*., p. 8).

Although a broad body of literature supports the existence of a U-shaped relation, most such analyses are based exclusively on cross-sectional data. For example, Di

Tella et al. (2001) used multiple regressions and cross-sections to confirm the U-shaped relation between age and reported well-being in developed countries. However, the problem with cross-sectional analyses is that the convex relationship might be due to omitted cohort effects in the variable that measures age. That is, a generation born in particularly difficult or prosperous times might report levels of life satisfaction that are lower or higher than the levels reported by other generations.

To counteract this criticism, researchers have tried to analyse the robustness of the U-shape in a longitudinal design using such longitudinal data sets as the German Socio-Economic Panel (since 1984) and the British Household Panel Survey (since 1991). In their 2006 study, Clark and Oswald tested the validity of the U-shaped relation using longitudinal data from the British Household Panel Survey and the British General Health Questionnaire. Their data sets ranged from 1991 to 2004 and covered over 100,000 individuals. After using fixed effects to control for individual heterogeneity, the authors confirmed the U-shaped relation between reported well-being and age with one difference from their previous findings in that minimum life satisfaction occurred in the mid-40s, not the mid-30s. Even after controlling for myriad variables they found consistent evidence for the U-shape, with a minimum reached between 40 and 49 years of age.

To determine whether this U-shaped relation reflects individuals' reactions to typical events in the lifecycle or is due to unobserved cohort effects, Clark (2007) controlled for cohort effects using fixed-effects estimations in panel regressions on 14 waves of the British Household Panel Survey. Estimation with fixed effects still gave rise to a U-shape, although the curviture was not as pronounced.

Using panel data from 1996–2000 and 2002–2004 from the British Household Panel, a more recent study by McAdams et al. (2012) used an innovative approach that analyses eight individual domains of life satisfaction: health, income, housing, partnership, job, social life, amount of leisure time, and use of leisure time. Age trajectories diverged considerably across these domains, but in general, satisfaction with social life, housing, amount of leisure time and use of leisure time showed a U-shape pattern with age. When aggregating all eight domains, a pattern resembling the U-shape of overall life satisfaction also emerged. The authors concluded that "this pattern is consistent with the idea that people are constructing overall evaluative judgements in a more bottom-up fashion" (McAdams et al. 2012, p. 301).

Blanchflower and Oswald (2008) tested the robustness of the U-shape using a set of dummy variables for each birth decade to account for cohort effects in a sample of over 500,000 individuals in America (U.S. General Social Surveys, 1972–2006) and Europe (Eurobarometer Surveys, 1976–2002; UK Labour Force Survey, 2004–2007). Although the authors controlled for such demographic and economic variables as marital status, race, children, education level and employment status, they could not control for health. They did however test whether the data had a quadratic form in age and concluded that the U-shaped relation between age and reported life satisfaction holds despite the inclusion of cohort effects. In the United States, when cohort effects were not taken into account, males reach their minimum life satisfaction at 35.7 years of age, but once cohort effects were controlled for, this minimum moved forward to 52.9. Women, on the other hand, reached a minimum at 38.6 even when cohort effects are accounted for. In Europe, well-being reached a minimum at 44.5 without cohort effects and at 46.5 with cohort effects. Blanchflower and Oswald also

examined the relation between age and well-being (proxied by mental health) using only the UK Labour Force Survey and showed that depression and anxiety reaches a maximum around age 46, which is consistent with previously reported results.

When testing the robustness of the U-shape in developing countries, Blanchflower and Oswald (2008) found evidence that the curvilinear relationship seems to partially hold there as well. Using four waves of the World Values Survey, the Latinobarometers, and the Asiabarometers, they followed a similar methodology to that used for the American and European data. In addition to controlling for employment status, marital status, years of education and income, the authors used dummies for countries and years. They found that "the U-shape seems to occur in the majority of nations," which in their analysis totalled 72, but not in 20 developing countries, an outcome whose insignificance they attributed to the small sample sizes (*ibid.*, p. 13).

Using data from the German Socio-Economic Panel (1985–2007), Van Landeghem (2008, 2012) examined the validity of the U-shaped relation from the perspective of different econometric methods with special attention to model specification problems. First, he used pooled OLS with and without controls and found that without controls, well-being reaches a minimum between 42 and 52 years of age, whereas with controls, the minimum is reached later, around the age of 60. His data also illustrated a second turning point in life, around age 70, a finding consistent with Gwodz and Sousa-Poza (2010) and in Van Landeghem (2012), in which he aimed to identify the second derivative of well-being with respect to age. This study shows positive second derivative until midlife, which implies convexity and is thus in line with a U-shaped pattern.

Three recent studies have used "non-subjective" data to assess the U-shape relation, namely Blanchflower and Oswald (2011), Lang et al. (2011), and Weiss et al. (2012). The use of such data can be seen as "a powerful and independent corroboration of the claim in the well-being literature that happiness and mental health follow an approximate U-shape through life" (Blanchflower and Oswald 2011).

Blanchflower and Oswald (2011) used data from the 2010 Eurobarometer survey in order to analyse the effect of age on the probability of taking antidepressants. With a sample of over 16,000 individuals in 27 countries, the study shows that the probability of taking antidepressants follows an inverted U-shape pattern with a peak the late 40s. "People in their mid-life are approximately twice as likely to be taking antidepressants as individuals with the same characteristics who are under the age of 25 or over the age of 65" (Blanchflower and Oswald 2011, p. 15). This result is consistent with a U-shape pattern of (mental) well-being and age.

Lang et al. (2011) analysed pooled data from the Health Survey for England collected between 1997 and 2006. With a sample of approximately 100,000 individuals, they assessed the prevalence of diagnosed mental illness and receipt of prescribed psychiatric medication. Diagnoses, treatments and prevalence of psychological distress rose with age until early middle age and declined subsequently. This result is, however, specific to low-income groups.

A recent study by Weiss et al. (2012) analysed the well-being of a sample of 508 great apes housed in zoos, sanctuaries and research centers in four countries. The well-being of the apes was reported by zoo keepers, volunteers, researchers, and caretakers who had known the apes for at least 2 years. Well-being was assessed using a 4-item questionnaire on a 7-point scale. The results support a U-shape relation

with minumums at around 30 years of age, comparable to human well-being minima of approximately 45–50 years. This result is particularly interesting as it highlights the possibility that "the U-shape found in human studies of age and well-being evolved in the common ancestors of humans and nonhuman primates" (Weiss et al. 2012, p. 2).

Inverted U-Relation

Contrary to the U-shape, very limited evidence on an inverted U-shape exists. Mroczek and Spiro (2005) included only males between 40 and 85 years of age in their analysis of data from the Veterans Affairs Normative Ageing Study, one of the first panel analyses (22 waves) to explore the relation between ageing and reported well-being measured by positive affect. Their results show an inverted U-shaped relation between age and positive affect in which well-being grows throughout midlife and peaks around age 65. Thereafter, it falls steadily. They also concluded that 1 year before death, reported positive affect decreases dramatically. It must be stressed, however, that this pattern is consistent with the U-shaped relation that reaches a maximum at around 65 years.

One of the most influential studies in support of an inverted U-shape is Easterlin's (2006b) investigation of a possible lifecycle pattern of well-being in the United States and the factors responsible for it. Using data from the United States General Social Surveys (1973–1994), he applied a "domains of life approach" to analyse the variables happiness, financial satisfaction, job satisfaction, family satisfaction and health satisfaction. After regressing happiness on age while controlling for birth cohort, gender, race and education, Easterlin concluded that "happiness is greatest at midlife, but not by a great deal. On average, it rises as people progress from 18 to 51 and declines thereafter" (*ibid.*, p. 471).

Easterlin and Sawangfa (2007) developed this hypothesis further using the same panel data for the United States and regressing happiness on age while controlling for socio-demographics like year of birth, gender, race and education level. Their results confirm a slightly inverse U-shaped relation between happiness and age, with maximum happiness being reached around the 50th year of life. The variation, however, is very small: the scale of the happiness variable is 1 to 3, and the actual variation is of only one decimal point. The authors therefore concluded that "happiness is fairly constant over time" (*ibid.*, p. 1).

Linear Relation

A linear relation between reported well-being and age has also been observed, though it can be constant throughout the lifecycle or sloping upward or downward. Costa et al.'s (1987) 9-year longitudinal study based on data from the National Health and Nutrition Examination Survey is one study that confirms this viewpoint. Using diverse multivariate regressions, both cross- and time sequential, on data from individuals aged between 25 and 74, these authors found no significant age, cohort or time effects on reported well-being in any of their analyses. They concluded that "the present data provide compelling evidence for the stability of levels of well-being in adulthood" (ibid., p. 55).

In their meta-analysis of (primarily psychological) empirical studies on happiness, Myers and Diener (1995) also reached the conclusion that there is an even distribution of reported well-being over age. According to their review, life satisfaction does not seem to depend significantly on outside circumstances but rather is based on personality traits and positive and negative affects that are usually time invariant. They thus defended the claim that "no time in life is notably happiest or unhappier than others" (*ibid.*, p.11).

All these studies, by arguing in favour of relatively constant well-being throughout the lifecycle, seem to support the psychological set-point theory of life satisfaction. Nonetheless, other empirical studies have delivered contradictory results. Deaton (2008), for example, in his analysis of 2006 World Gallup Poll data, concluded that outcomes for the relation between age and life satisfaction differ across countries. His results indicate that life satisfaction declines with age in middle income and transition countries, where health satisfaction seems to be affected more negatively by age than in richer countries. He thus concluded that "for most of the world, life satisfaction declines with age" (*ibid.*, p. 8), and that this decrease is stronger in middle-income countries and the strongest in former Soviet countries, where the elderly seem to be the most dissatisfied age group of all. In low-income countries, the decline in life satisfaction with age is not as strong. He attributed these differences specifically to cohort effects.

Similar conclusions were reached by Carmel (2001, 2011) and her team, who conducted four large-scale empirical studies to test the hypothesis that the will to live is a reliable indicator for life satisfaction among the elderly. All these studies, two using cross sections and two using longitudinal data, were based on information on the elderly in Israel. The researchers assessed the will to live using both single and multiple item scales. The single-item results confirm a strong correlation between the will to live and diverse indicators of well-being such as self-esteem, happiness, life satisfaction, health and physical functioning, and this association is supported by the multiple item outcomes. The will to live was significantly but negatively correlated with age, indicating that it diminishes as age increases.

Similarly, as discussed previously, when Van Landeghem (2008) attempted to corroborate the validity of the U-shaped relation between age and life satisfaction using German Socio-Economic Panel Data, he found the results highly sensitive to model specification problems. When he used pooled OLS, the U-shape held, but when he controlled cohort effects with fixed-effects estimation, the U-shape disappeared and the curves sloped upward with age. He thus concluded that "the U-shape is less supported in a longitudinal setting, and that the shape of the effect of ageing on subjective well-being seems to be sensitive to the specification […] suggesting the importance of time-varying as well as time-invariant factors to determine life satisfaction" (*ibid.*, pp. 3, 15). Using data from longitudinal surveys (the British Household Panel, the German Socio-Economic Panel, and the "Household, Income and Labour Dynamics in Australia" Survey), two recent studies by Frijters and Beatton (2012) and Kassenboehmer and Haisken-DeNew (2012) show that the use of fixed-effects models causes the U-shape to disappear.

Gwozdz and Sousa-Poza ([2010](#)) reached very similar conclusions in their analysis of 13 waves of the German Socio-Economic Panel Data (1994–2007). In this study, using the methodology proposed by Clark ([2007](#)), they estimated a fixed-effects model to control for cohort effects while also controlling for other socio-demographic variables such as marital status, number of children, employment status and education. After first estimating two cross-sectional models, one with and one without controls, they compared these outcomes to those of a longitudinal model that accounts for individual heterogeneity using fixed effects. Their results show that when the estimation is based on pooled regressions, most age dummies are significant and produce a U-shape. Only after the age of 75 does life satisfaction seem to rapidly decrease, reaching the lowest level at the oldest ages. When the estimation uses fixed effects, however, the U-shape vanishes. Again, only among the oldest old (after 85 years), does there seem to be a pure age effect that causes life satisfaction to decrease steeply. The authors thus concluded that, at least in Germany, the U-shape is likely to be caused by cohort effects or unobserved individual characteristics that are constant over time.

Offering another angle, Stone et al. ([2010](#)) analysed hedonic well-being in the United States with more than 300,000 observations from the 2008 Gallop Poll. As opposed to global well-being, which assesses an overall judgement of one's life, hedonic well-being captures affective components of well-being such as the experience of happiness or stress. Such hedonic measures "may yield a different view of aging because it is less influenced by the cognitive reconstruction inherent in global well-being measures and because it includes both positive and negative components of well-being" (Stone et al. [2010](#), p. 9985). Their analysis shows that, although global as well as positive hedonic well-being is U-shaped, negative hedonic well-being is not. Feelings of stress and anger decline with age, feelings of worry are elevated through middle age and then decline, and feelings of sadness are in essence flat.

Discussion and Conclusions

The aim of this paper has been to review the literature on the relation between subjective well-being and ageing; that is, how subjective well-being evolves across the lifespan. An overview of the empirical studies on this topic discussed above is also given in the Appendix. As our review has indicated, drawing general conclusions is difficult as papers use different data sets, methodologies and samples. Nevertheless, we offer several general observations.

Cohort effects—because they refer to data trends that arise because individuals were born at a particular point in time under particular circumstances that differ from those of individuals born at different times—do seem to matter. In fact, observations suggest that even though well-being could be constant over the lifecycle, "people born in different years report, on average, a different level of life satisfaction […] or two cohorts might be equally happy but still report a different value of life satisfaction" (Schilling [2005](#), p. 4). For example, an individual born in Germany during the first half of the twentieth century,

who lived through the hardships of the Great Depression and the two World Wars, could feel that the second half of the century, with its economic and social progress, was much better (*ibid.*). This individual, therefore, would report much higher life satisfaction than individuals born after the 1950s. Accounting for cohort effects, therefore, allows researchers to eliminate time or period differences and deliver a "pure" ageing effect, if one exists. Such cohort effects, however, cannot be effectively controlled in cross-sectional analyses and require longitudinal data and additional assumptions (Van Landeghem 2012). Yet several studies on this topic reviewed here are based on cross-sections.

Selection of control variables, a decision that in turn depends on the underlying research objective, is also very important. Are we, for example, interested in the general trend of life satisfaction across the lifespan or do we want to assess the "pure" age effect—one that, all other explanatory variables kept constant, would explain the U-shape as a reflection of "the passage of individuals through various stylized life events" (Clark 2007, p. 3). If this "pure" age effect is to be isolated, health or physical vitality must be controlled for. Yet, data on health or physical vitality are not always readily available, and most studies fail to adequately account for these variables. Easterlin (2006b, p. 465) deliberately avoids controlling for health on the grounds that "if one wants to know whether a person is likely to be happier in his or her golden years than when forming families, one would not want to set aside the fact that older people are likely to have lower income, and be less healthy, and are more likely to be living alone". Nonetheless, no matter how interesting it might be to examine how life satisfaction changes throughout the lifespan, doing so allows no conclusions to be drawn about the effect of age alone (see also Glenn 2009 and Blanchflower and Oswald 2009).

In general, it is difficult to say with certainty whether the relationship between age and well-being across the lifespan is linear or convex. Given that theory and empirics in all disciplines seem to argue against an inverted U-shaped relation, the concavity hypothesis can most likely be dismissed. In fact, van Landeghem (2012) specifically concluded that, at least for Germany, "one can exclude the concavely upward sloping pattern" (p. 579), and even Easterlin (2006b), who presented the strongest evidence in favour of an inverse U-relation, admitted that "happiness is greatest at midlife, but not by a great deal" (p. 471). However, in general, one must stress that the functional relationships identified in the empirical studies are *prima facie* incompatible. In a recent study, Frijters and Beatton (2012) shed some light on this issue by analysing different functional forms with data from three large panel data sets from Germany, Australia and Britain (namely with data from the GSOEP, HILDA and BHPS). The study shows that the age-happiness profile is U-shaped when including socio-economic control variables, but that this relationship disappears when using fixed-effects methods that also control for unobserved individual characteristics, a result also observed in Gwozdz and Sousa-Poza (2010) and Kassenboehmer and Haisken-DeNew (2012). The authors argue that this is due to reverse causality, i.e. "happiness-increasing variables, like getting a job, a high income, and getting married, appear to happen mostly to middle-aged individuals who were already happy. In all three

data sets, this reverse causality shows up in cross-sections as inflated coefficients for income, marriage, and getting a job. In order to fit the actual age profile of happiness, the bias in coefficients for socio-economic variables forces the predicted age profile to become U-shaped. When one controls for fixed-effects, the non-linearity all but disappears for all three data sets" (Frijters and Beatton 2012, p. 540).

But it is not only the choice of control variables and estimation techniques that matter—the different measures of subjective well-being also play a role. This is quite clearly shown in the Stone et al. (2010) study that reveals different patterns depending on whether a global measure of well-being, a positive hedonic well-being measure or a negative hedonic well-being measure (such as "worry" or "sadness") is used. Recent use of more "objective" measures of subjective well-being, such as use of antidepressants (Blanchflower and Oswald 2011) or reports of apes' well-being by their keepers (Weiss et al. 2012), tend to support the U-shape.

Besides being statistically significant, is any observed U-shape also relevant? Or in other words, how large is the age effect? Typically, the maximum variation in life satisfaction (i.e. the difference in life satisfaction between the young and the middle-aged) is about 0.5 on a 7-point scale. One could thus conclude that the age effect on subjective well-being is rather small. It should, however, be noted that the standard error of life satisfaction is also usually not large, and that the difference in well-being between the top and bottom of the curve is about one fifth to one third of the standard deviation of life satisfaction scores. The magnitude of the age effect is comparable with medium-term effects of major life events such as becoming unemployed or becoming disabled. This magnitude, as pointed out by Blanchflower and Oswald (2008, p. 1741), "is suggestive of a large effect on well-being."

Our survey of the literature shows that, despite the numerous recent papers published on this topic, controversy regarding the effect that ageing has on life satisfaction still exists. We believe that a fruitful avenue for future research is to focus on less subjective measures of well-being in order to see how these measures corroborate those using more traditional well-being measures. Studies such as Weiss et al. (2012) have the potential to significantly increase our understanding of this topic. Use of longer panels may also shed additional insights, as mentioned by Frijters and Beatton (2012, p. 529), who said that ideally one would want to "follow representative individuals throughout their whole life, starting at birth." Such data is not readily available, but do exist (such as the British National Child Development Study and the British Cohort Study). We also believe that the domain approach taken by, for example, McAdams et al. (2012), can shed more light on explaining age-satisfaction trajectories, and we are not aware of many studies that take such an approach. In general, little empirical evidence exists that actually tests individual theories, implying that explanations of age-satisfaction trajectories remain somewhat speculative. Finally, a focus on countries outside of Europe and North America could also be valuable in assessing the extent to which results can be generalized. This point applies in particular to studies based on panel data, for which little evidence outside of Europe or the United States exists.

Appendix

Study	Data	Cross-sectional (CS)/longitudinal (L)	Controls	Selected highlights
Literature surveys				
Myers and Diener 1996				No time in life is notably happiest or most satisfying.
				Happiness does not appear to depend significantly on outside circumstances.
Frey and Stutzer 2002				Age affects happiness in a U-shaped way.
				Young and old people are happier than middle-aged people.
				The least happy people are between 30 and 35 years old.
Studies with evidence for U-shape				
Clark and Oswald 1994; Clark et al. 2006	British Household Panel Survey and General Health Questionnaire	L	Yes	Clear evidence of a U-shape.
				Minimum life satisfaction reached in the band between 40 to 49 years.
Clark 2007	British Household Panel Survey	L	Yes	Confirms U-shaped relation after controlling for cohort effects.
Blanchflower and Oswald 2008	US General Social Surveys, Eurobarometer, UK Labour Force Survey, World Values Survey, Latinobarometer, Asiabarometer	CS	Yes	Well defined U-shape in age.
				Well-being in the U.S. reaches its minimum for men in the early 50s, for women in the late 30s. In Europe, life satisfaction for both men and women minimises in the mid 40s.
Van Landeghem 2008, 2012	German Socio-Economic Panel 1985–2007	L	Yes	U-shape in age.
				Minimum life satisfaction between 42 and 52 years.
				U-shape vanishes after controlling for individuals fixed effects.
Blanchflower and Oswald 2011	Eurobarometer 2010	CS	Yes	Inverted U-shape relation between the probability of taking antidepressants and age.
Lang et al. 2011	Health Survey for England 1997–2006	CS	Yes	Prevalence of psychological distress, diagnoses and treatments rise with age until early middle age and then declined subsequently in low-income groups.

Study	Data	Cross-sectional (CS)/longitudinal (L)	Controls	Selected highlights
McAdams et al. 2012	British Household Panel 1996–2000 and 2002–2004	L	No	Analyses eight individual domains of life satisfaction.
				Age trajectories diverge considerably across these domains.
				When aggregating all eight domains, a pattern resembling the U-shape of overall life satisfaction emerges.
Weiss et al. 2012	Sample of caretakers' evaluation of great apes' well-being in 4 countries	CS	No	U-shape relation between well-being and age can be observed.
Studies with evidence for linear relation or inverted U-shape				
Costa et al. 1987	National Health and Nutrition Examination Survey	L	Yes	Total well-being shows no significant age, birth cohort or time effects in any of the analyses.
				Strong evidence of the stability of mean levels of psychological well-being in adulthood.
Mroczek and Spiro 2005	Veterans Affairs Normative Aging Study	L	Yes	Inverted U-shaped relation between age in life satisfaction.
				Life satisfaction peaks around 65 years.
				One year before death, life satisfaction dramatically decreases.
Easterlin 2006b	US General Social Surveys 1973–1994	L	Yes	Happiness increases in midlife, but "not by a great deal".
				Highest life satisfaction at age 51.
Easterlin and Sawangfa 2007	US General Social Surveys 1973–1994	L	Yes	Shows an inverted U-shape.
				Effect of age on individual domains of life satisfaction are analysed.
Deaton 2007	2006 World Gallup Poll (132 countries)	CS	No	Age-profile of life satisfaction differs among countries.
				There seems to be a U-shaped relation only among rich English-speaking countries.
Gwozdz and Sousa-Poza 2010	German Socio-Economic Panel 1994–2006	L	Yes	Estimating pooled regressions, most age dummies are significant and produce a U-shape.
				Using fixed effects estimation, the U-shape vanishes.
				Strong decline in satisfaction among the oldest old.

Study	Data	Cross-sectional (CS)/longitudinal (L)	Controls	Selected highlights
Stone et al. 2010	Gallup Poll 2008	CS	Yes	Although global as well as positive hedonic well-being is U-shaped, negative hedonic well-being is not.
				Feelings of stress and anger decline with age, feelings of worry are elevated through middle age and then decline, and feelings of sadness are in essence flat.
Carmel 2011	Four data sets on elderly Israelis	CS	Yes	Willingness to live can be used as a proxy for life satisfaction.
				Willingness to live declines with age.
Kassenboehmer and Haisken-DeNew 2012	German Socio-Economic Panel 1994–2006	L	Yes	The U-shape effect on life satisfaction in pooled OLS regressions is refuted when controlling for fixed effects and respondent experience in the panel.
Frijters and Beatton 2012	German Socio-Economic Panel, British Household	L	Yes	The weak U-shape in middle age becomes more pronounced when allowing for socio-economic variables.
	Panel Survey, Household Income Labour Dynamics Australia.			When selection effects via fixed-effects are accounted for, the dominant age-effect in all three panels is a strong happiness increase around the age of 60 followed by a major decline after 75, with the U-shape in middle age disappearing.

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