

Cognitive and Affective Measures of Wellbeing in the SOEP

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Abstract

I define wellbeing as preference realization. Wellbeing can be measured with affective (the amount of pleasant versus unpleasant experiences) and cognitive (satisfaction with life in general and life domains) measures. Since its inception 25 years ago, the SOEP has included cognitive measures of wellbeing. In the past years, studies of the SOEP data have produced a paradigm shift in wellbeing research. Previously influential set-point theories assumed that wellbeing is largely determined by heritable personality traits, and that effects of life events are short-lived due to adaptation (hedonic treadmill, aspiration treadmill). The SOEP data have uncovered strong environmental influences that parallel or even exceed the effects of personality traits. So far, these conclusions were limited to life-satisfaction judgments. This paper extends these findings to (weighted) averages of domain satisfaction as an alternative cognitive measure and an affective measure of wellbeing. In 2006, the SOEP included four affective indicators of wellbeing (happy, sad, angry, afraid). This presentation examines similarities and differences between these subjective measures of wellbeing as well as household income as an objective indicator of wellbeing. The four wellbeing measures are related to objective predictor variables (age, employment, single, divorce, widowhood, commuting distance) and a measure of the Big Five personality traits. The main finding is that wellbeing measure show similar relations to predictor variables, which makes it possible to use them as multiple indicators of unobserved variance in wellbeing. In addition, results show that different weights for domain satisfaction have relatively little effects on substantive conclusions. Consistent with previous findings, wellbeing is strongly related to unemployment, divorce, widowhood, and neuroticism.

The concept of wellbeing has deep roots in philosophy. Modern definitions of wellbeing emerged in the 19th century (Mill, 1863). The main contribution of the utilitarian movement was to define wellbeing subjectively and to proclaim individuals' wellbeing as an important, if not the only goal of individuals' behavior and public policy. The utilitarian movement had profound effects on the way most people live today, at least in Western democratic countries. Equal opportunity, freedom of choice, and human rights are valued primarily because they are assumed to enable individuals to maximize their own wellbeing.

During the 20th century social scientists started to study wellbeing, but a unified concept of wellbeing was lacking. Economists developed elaborate quantitative theories of utility. These economic models had a profound impact on policies and government. Economic growth, low unemployment, and free trade have been promoted and implemented based on the implicit assumption that these factors will increase wellbeing. In the second half of the 20th century, the World Health Organization defined health as more than just the absence of sickness and added wellbeing as a goal. At the same time, social scientists started to develop subjective measures of wellbeing, and started to examine how these measures relate to demographic variables or other characteristics of individuals (Cantril, 1965; Andrews & Whithey, 1975). In the 1980s, an influential article by Diener (1984) kindled psychologists' interest in wellbeing, and the volume of psychological studies on wellbeing started to increase exponentially in the 1990s. In sociology, Veenhoven's (1984) book and his World Database of Happiness (Veenhoven, 1995) made important contributions. The driving force behind these developments is captured in Andrews and Whithey's (1973) article in the first issue of *Social Indicators Research*.

We are embarked on a major effort to develop measures of perceived life quality. The effort is part of the larger movement within the United States and a number of other countries to develop an expanded set of social indicators which can be monitored over time. It is hoped that through the generation and analysis of data from such indicators improvements can result in our understanding of the causes and directions of social changes, and in policymaking oriented toward efforts to improve the quality of life. (p. 1)

These early efforts are responsible for the inclusion of wellbeing measures in large survey studies with national representative samples, such as the World Value Survey, or the General Social Survey in the United States. Most importantly, the movement had gained sufficient force to convince economists in 1984 at the German Institute of Economic Research (Deutsches Institute für Wirtschaftsforschung, DIW) to include wellbeing measures in the Socio-Economic Panel (SOEP) (Wagner, 2007). However, the SOEP data are only now starting to inform and revolutionize wellbeing science.

The first decade of the twenty-first century has seen an explosion of interest and research on wellbeing. One might speculate whether this interest repeats the surge of interest in wellbeing in the 1970s, when the world faced weak economic growth due to high oil prices after a period of economic prosperity in the 1960s. The new threat of global warming and ecological problems may also play a role. Maybe wellbeing science can show how human's wellbeing can be raised in the face of economic downturns and in a sustainable manner that does not undermine the wellbeing of future generations.

Whatever the reasons for the current surge in interest in wellbeing science may be, many wellbeing scientists are trying to translate the empirical findings from the past decades into normative recommendations that could increase individuals or societies wellbeing. A flood of articles in the media is disseminating these recommendations to the general public ("Money does not buy happiness" "Money buys happiness, if you spend it on other people" or "If you were richer, you would not be happier" "Keep a gratitude diary" "Don't have children" "Commute less, work less, and have more sex"). There are several problems with these recommendations. The main problem is that wellbeing researchers have failed to define wellbeing or happiness. Without a clear definition of wellbeing, the validity of existing measures as wellbeing measures remains unclear because validation research requires a clear definition of a construct. For example, a scale is a valid measure of weight, but not a valid measure of intelligence. Thus, it is important to specify the construct of weight to examine the validity of a scale as a measure of weight. Similarly, it is impossible to determine whether a measure (e.g., the

11-point scale of global life-satisfaction in the SOEP) is a valid measure of wellbeing without defining wellbeing. Thus, I start this paper by defining wellbeing.

### *What is Wellbeing?*

It is impossible to review the major theories of wellbeing here. Sumner (1996) provides a good overview and classification of various theories. His first distinction is between objective definitions and subjective definitions of wellbeing. The distinction is based on the selection process of the criteria that are used to judge individuals' wellbeing. Objective definitions assume that the criteria can be defined without reference to the individual's own preferences, interests, values, and attitudes. Subjective definitions require that individuals' preferences, interests, values, and attitudes matter. Without going into details here, I agree with various other wellbeing scientists as well as philosophers that wellbeing has to be defined subjectively because objective definitions encounter insurmountable problems (Diener, 1984; Sumner, 1996; Veenhoven, 1991).

The next important distinction among subjective theories is whether they focus exclusively on mental states or also incorporate actual states of the world in the concept of wellbeing. This criterion separates traditional definitions of utility in terms of pleasure and pain (Bentham; Kahneman, 1999) from desire-fulfillment or preference-satisfaction accounts of wellbeing. What is at stake here is how wellbeing science should deal with feelings that are based on illusory perceptions of reality. Some psychologists have argued that illusions are common, normal, and healthy (Taylor & Brown, 1988). If good feelings are the only criterion for high wellbeing, then promoting good feelings via illusory beliefs could be one strategy to promote wellbeing.

Other theorists have argued that mental states in general or hedonic feelings specifically are sufficient for happiness, but may be insufficient to define wellbeing (Sumner, 1996). To use Sumner's (1996) example, a man may feel quite happy because he assumes that his wife loves him and is faithful to him, when this is actually not the case. If he misses or even avoids signs of her infidelity, he would still be happy, but his feelings may provide inaccurate information about his wellbeing, if wellbeing implies that good feelings only contribute to wellbeing if they

provide accurate information about the conditions of one's lives. To distinguish wellbeing as a life that actually matches one's preferences from happiness, I have defined wellbeing as preference realization (Schimmack, 2008). Preference realization can include mental states and feelings because people can have preferences for some feelings over others. Most people prefer pleasure to pain most of the time. It can also allow for illusions to have positive effects on wellbeing if people have a preference to be ignorant and happy rather than informed and unhappy about things that are objectively not going well in their lives.

One advantage of the definition of wellbeing as preference realization is that it overlaps considerably or may even be identical to economists' definition of utility. The main difference between economists and psychologists would concern the measurement of wellbeing. Whereas economists favor indirect measures like income or behavioral indicators of revealed preferences, psychologists assume that it is possible to measure wellbeing by asking people to report the degree to which their preferences are realized.

### *Measuring Wellbeing*

In the previous section, I argued that wellbeing cannot be reduced to the amount of pleasant and unpleasant feelings that people actually experience. There are two reasons why hedonic measures of wellbeing are still useful, even if wellbeing is defined as preference-realization (Schimmack, 2008). One reason is that many people have a strong preference to feel good. Empirical studies suggest that this preference has also gained in importance over time and with increasing wealth (Inglehart, 2000; Suh, Diener, Oishi, & Triandis, 1998). However, this argument does not give hedonic feelings a special status. It could be equally important to measure other aspects of human's life that could reflect preference-realization. The more powerful argument to assess hedonic feelings is that people's feelings respond to their life-circumstances (Lazarus, 1991). Moreover, the affective response depends on people's preferences. A car driving by blasting hip-hop music could produce feelings of displeasure and irritation for one person, and feelings of pleasure and enjoyment for another person. Thus, people's feelings are one indicator of preference-realization.

Hedonic measures are not the only way to measure wellbeing. A more direct way to assess preference-realization is to directly ask people how satisfied they are with their lives (Cantril, 1965), or to ask for satisfaction with various life domains that are important to most people (Andrews & Whithey, 1976). Finally, it is possible to assess wellbeing by assessing people's opportunities to realize their preferences either in terms of their monetary resources or more broadly by also taking education, health, and freedom into account.

Diener, Lucas, Schimmack, and Helliwell (2008) point out the various strengths and weaknesses of different measures. Most importantly, none of these measures can claim a priori to be the ultimate or even the best measure of wellbeing. Thus, an important question is how well various measures of wellbeing actually measure wellbeing. Ample evidence shows that wellbeing measures are all positively related to each other. Psychologists call this convergent validity. Convergent validity is reassuring, especially if two different methods are used. However, convergent validity is not always high, and when self-ratings are used, estimates of convergent validity can be biased by shared method variance. Many wellbeing measures also show convergent validity with ratings by informants, but these correlations can be quite modest, often not exceeding .5 (Lucas, Diener, & Suh, 1996; Schneider & Schimmack, 2008; Walker & Schimmack, 2008). Thus, the empirical evidence shows that wellbeing measures have more validity than behaviorists and other skeptics considered possible, but the evidence also leaves ample room for the influence of distortions and biases.

#### *Confusion of Measures and Constructs*

Unfortunately, wellbeing scientists who use subjective measures have often ignored the fact that their measures are only imperfect indicators of wellbeing. Often the measure is equated with the construct, which is a common fallacy in the social sciences (Borsboom, 2006). The infamous Easterlin paradox provides a simple example. Easterlin (1974) compared GDP with happiness ratings over time. He found that GDP quadrupled, whereas happiness ratings remained stable. He concluded from these findings that absolute wealth does not produce more wellbeing. However, a graph that plots the two trend lines against each other is grossly misleading (Diener

et al., 1999). Evidently, a happiness rating of 2 on a 3-point scale cannot increase four-fold because a 3-point scale cannot resume a value of 8. To perform Easterlin's comparison, measurement on ratio scales is required. However, neither GDP nor happiness was measured on ratio scales because neither scale has a meaningful zero point. This has not stopped wellbeing scientists to make questionable claims about the relation between economic growth and wellbeing that continue to be quoted in the media.

Recent articles challenge Easterlin's claims (Heagerty & Veenhoven, 2004), but even these articles find seemingly low correlations between GDP growth and increases in wellbeing. However, it is misleading to rely on observed effect sizes to make claims about the true effect of GDP growth on wellbeing. This interpretation assumes that happiness ratings have perfect validity. Once, we distinguish clearly between measures and constructs, it is clear that observed correlations can be attenuated or inflated to an unknown degree by measurement error that produces an imperfect link between a measure of wellbeing and the construct of wellbeing.

Divergent findings for different measures of wellbeing show that it is unreasonable to expect high validity of wellbeing measures. For example, rankings of nations in the world value survey vary quite dramatically depending on the choice of the wellbeing measure. Whereas wealthy Western democracies show the highest wellbeing on a 10-point life-satisfaction scale, the four-point happiness scale produces more surprising findings (Schimmack, 2008). Thus, it becomes important to determine the factors that produce discrepancies between these two measures and which measure produces a more valid ranking of nations, but wellbeing scientists have failed to examine the factors that produce these discrepancies.

#### *A Comparison of Multiple Measures of Wellbeing*

This paper examines the validity of wellbeing measures by examining convergence and discrepancies of several well-being measures. If a diverse set of measures produce similar findings, it is more likely that the results would also generalize to the unobserved variation in wellbeing. However, if different measures produce different results, a careful examination of the discrepancies is required.

*Global life-satisfaction.* The first measure is the global 11-point rating of life-satisfaction (Wagner, 2007). This item is nearly exclusively used as a measure of wellbeing in the SOEP. The reasons for its popularity are its high face validity and the widespread use of life-satisfaction ratings in the wellbeing literature. Moreover, life-satisfaction ratings have shown impressive validity, and many potential biases have been shown to have relatively little effect on these ratings (Diener et al., 2008; Eid and Diener, 2004; Schimmack & Oishi, 2005). However, this evidence does not suggest that life-satisfaction judgments are perfect measures of wellbeing, nor does it imply that life-satisfaction measures are the best measures of wellbeing. A recent multi-method study with various wellbeing measures indicated that global life-satisfaction judgments were not more valid than other measures such as affect balance or average domain satisfaction, and some studies have revealed systematic biases in life-satisfaction judgments (Schimmack et al., in press).

*Affect balance.* The second measure is an affective measure of wellbeing. One important question is which affective experiences should be included in a measure of affective wellbeing. Modern languages have hundreds, if not thousands of words to describe people's experiences. It is also possible that some experiences are difficult to describe with words. In the 1980s, the taxonomy of affects and affect words received a lot of attention by psychologists and linguists (Russell, 1980; Shaver et al., 1987; Watson, Clark, & Tellegen, 1988; Oatley & Johnson-Laird, 1987; Ortony, Clore, & Collins, 1988; Wierzbicka, 1992). This research failed to produce a unified taxonomy of affect (see Schimmack & Crites, 2006, for a review). However, the distinction between pleasant (positive) and unpleasant (negative) affects is ubiquitous to all of them. The valence of affective experiences is also most important for the assessment of wellbeing because the valence of affective experiences varies with the appraisal of events on the basis of one's own preferences.

The previous review suggests that the most valid measure would simply ask people to rate how pleasant/good/positive or how bad/unpleasant/negative they feel (Schimmack et al., 2002; Schimmack & Grob, 2002; Schimmack & Reizenzein, 2002). However, it is possible that this

approach creates problems when people are asked to report their affective experiences in the past. In this case, people cannot simply introspect on their momentary feelings, but have to retrieve relevant information from episodic memory. The validity of these reports depends on the quality of the retrieval cues (Schimmack, 1997, 2002). Another feature of good items is that they should be relatively broad and cover a wide range of experiences, rather than very rare and unique experiences. For example, Bradburn's (1969) affect balance scales asked respondents whether they felt "on top of the world." These peak experiences are rare and the item fails to cover many other positive experiences. Thus, Bradburn (1969) had to include several positive items to cover a broad range of positive experiences. Alternatively, it is possible to use affect words that are at a higher level of a hierarchical taxonomy of affective experiences (Shaver et al., 1987). For example, happy would include experiences of being on top of the world and it would include many other positive experiences.

Numerous taxonomies of affects and affect words recognize a list of basic affects (Shaver et al., 1987; Oatley & Johnson-Laird, 1987). The lists vary slightly in some affects, but most lists recognize happy, sad, anger, and fear as basic emotions. Moreover, Shaver et al. (1987) presented evidence that these affect words are basic categories. That is, they are learned early (4-year olds understand happy and sad), and they cover a wide range of more specific affects. For example, other positive emotions like pride and gratitude are subtypes of happy feelings (Reisenzein, 1995). A pilot study of the SOEP with a national representative sample of 500 respondents included both simple ratings of pleasure and displeasure as well as the four basic emotions. A comparison of the simple hedonic items (pleasure / displeasure) and the four basic affects (happy, sad, anger, and fear) should show similar convergent validity with a global rating of life-satisfaction and personality traits, especially extraversion and neuroticism. On the positive side, pleasure and happiness were highly correlated and had similar correlations with other variables. On the negative side, displeasure was related to all three negative affects, and the composite measure of the three negative items showed similar relations with other variables as

the displeasure item. Based on these preliminary results and theoretical considerations, the four-item basic affect measure was included in the longitudinal SOEP wave of 2007.

*Average domain satisfaction.* The third measure is an average of various domain satisfactions that are routinely assessed in the SOEP. Previous studies have shown high correlations between global life-satisfaction judgments and judgments of average domain satisfaction (Andrews & Whitey, 1976; Schimmack, Diener, & Oishi, 2002; Schimmack & Oishi, 2005). This measure has two drawbacks. First, it does not weigh domains by the subjective importance of domains. Second, the measure fails to capture aspects of wellbeing that are not covered by the domains included in the survey. A main advantage of this measure is that it relies less on respondents' ability to summarize and weigh all relevant aspects of their lives in response to a single question about satisfaction with life in general. It is implausible to assume that people are able to do so perfectly, even if they are able to do so much better than critics have assumed (Schwarz & Strack, 1999; Schimmack & Oishi, 2005). Moreover, unweighted averages can be surprisingly robust estimates of weighted averages (Andrews & Whitey, 1976; Schimmack et al., 2002). As a result, it is possible that the validity of average domain satisfaction is as high as the validity of global life-satisfaction (Schimmack, Pinkus, & Lockwood, 2008). However, this paper also examines how weighing of domains influences the results. One weighted average was created by regressing global life-satisfaction judgments onto domain satisfactions. A second weighted average was created by regressing affect balance onto domain satisfactions.

*Income.* The fourth measure is income. Although psychologists do not regard income as a measure of wellbeing, income is still the preferred measure of wellbeing in economics. In short, income is an indicator of wellbeing because it enhances people's opportunity to realize their preferences. However, standard economists are aware that income is an imperfect indicator of wellbeing for a number of reasons. One important reason is that not all preferences can be realized with money for ethical (e.g., it is illegal to pay a contract killer) or logical (it is impossible to buy a loyal friend or unconditional love) reasons. The second reason is that salaries

could be negatively related to other aspects of a job that influence preference realization. In general, there is a positive relation between other good job characteristics (autonomy) and income. However, after controlling for education and other qualifications for a job, less desirable jobs may have to be compensated with higher salaries to attract workers. Finally, income is an imperfect measure of spending and consumption, which are the more proximal predictors of wellbeing.

Although the relation between income and wellbeing is not perfect, a wide variety of preferences can be realized better with more money (a better house, a shorter commute, fancier vacations, better schools for one's children, more leisure by paying for help with chores, etc). Not surprisingly, household income is consistently positively related with global happiness and life-satisfaction ratings (Easterlin, 1974; Diener et al., 1999). Across nations, income measured in GDP is a very strong predictor of average life-satisfaction ratings (Deaton, 2008).

#### Method

I am not going to give a detailed description of the variables that are used in this paper. It is sufficient to say that all analyses are based on the SOEP data. Detailed documentation of the variables can be found on the DIW website (SEOP Info). I will mention relevant details about measures in the results section when this information is needed to interpret results.

#### Results

##### *Simple Correlations of Wellbeing Measures*

A first step of any study with multiple measures of the same construct is to examine the convergent validity of the measures. These correlations should be positive (after reversing negative indicators like negative affect). Moreover, higher correlations suggest more convergent validity, whereas low correlations suggest various measurement problems. For the measure of affect balance, the three negative items were averaged and reversed and then averaged with the positive item to avoid overweighing negative affect in the scale score. For domain satisfaction, satisfaction ratings of the following domains were averaged: health, work, housework, household income, leisure time, dwelling, and family life. Table 1 presents the simple correlations for

wellbeing measures obtained in the 2007 wave. Because information on household income in 2007 was not yet available, household income was based on the previous year (wh5101).

Table 1

Correlations among four measures of wellbeing (N = 9,892)

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Global Life-Satisfaction (2007)	-			
Average domain satisfaction (2007)	.67	-		
Affective Balance (2007)	.55	.51	-	
<u>Household Income (2006)</u>	<u>.25</u>	<u>.23</u>	<u>.14</u>	<u>-</u>

Note. Household income is a household variable that is constant for members of the same household.

As expected, all four variables were positively correlated. However, correlations vary widely from  $r = .67$  for life-satisfaction and domain satisfaction to  $r = .14$  for affective balance and income. This variation provides the basis for the subsequent analyses. The factors that produce the variation in these correlations are essential for the creation of a valid indicator of wellbeing. The reason is that wellbeing measures that are only moderately correlated will lead to different conclusions about wellbeing. Economists who focus on income will arrive at different answers than psychologists who study subjective measures, and psychologists who prefer affect measures (Kahneman, 1999) will arrive at different conclusions than those who prefer life-satisfaction measures (Schimmack et al., 2002).

A common practice in social indicator research with objective indicators is to simply average various indicators into a global measure (e.g., the Human Development Index). However, this procedure is often merely a political compromise rather than a scientifically

validated approach. To go beyond arbitrary integration rules, it is important to examine the validity of the various measures as indicators of wellbeing.

### *Controlling for Reliability*

One limitation of the correlations in Table 1 is that observed correlations are attenuated by random measurement error. Random measurement error can account for up to 50% of the variance in single ratings of global life satisfaction or domain satisfaction (Saris, 1998; Schimmack & Lucas, 2007; Schimmack & Oishi, 2005; Schimmack, Wagner, Krause, & Schupp, 2008). The longitudinal nature of the SOEP provides an excellent opportunity to examine the influence of random measurement error on the correlations in Table 1. Although it can be informative to use all waves (Schimmack & Lucas, 2008), I use the data from 2006 and 2007 to illustrate the effect of random measurement error.

I estimated the retest reliability of household income using the correlation between the measures of household income in 2005 and 2006 ( $r = .88$ ). Additional analyses suggest that random error rather than true variation in household income is mostly responsible for this correlation. The reason is that household income in 2005 and 2006 revealed similar correlations with life satisfaction in 2005 and 2006 (same-time  $r = .26, .26$ , cross-year  $.24, .26$ ).

Retest reliability information for the affect measure is not available from the SOEP. However, other studies suggest that reliability is in the typical range from .5 to .8 (Schimmack et al., 2002). Moreover, the affect measure asked respondents to report their affect in the past month. Thus, valid effects of recent events will lower the validity of this measure as a measure of wellbeing over more extended periods. In one study, the retest correlation for monthly ratings for two consecutive months was  $r = .50$  (Schimmack et al., 2002). Table 2 shows that the affect measure was time-sensitive, in that it correlated more highly with other subjective wellbeing measures in the same year (2007) than in the previous year. This finding does not necessarily reflect valid variance. It is also possible that occasion-specific biases (e.g., current mood) produce a spurious correlation between subjective measures obtained during the same interview. However, irrespective of the nature of the time-specific variance, the results show that

correlations of the affect balance measure with other variables are attenuated by occasion-specific variance.

Table 2

Correlations measures of wellbeing in 2006 and 2007 (N = 9,892)

Global Life-Satisfaction (2006)	-				
Global Life-Satisfaction (2007)	.61				
Average domain satisfaction (2006)	.65	.55			
Average domain satisfaction (2007)	.56	.67	.71		
Affective Balance (2007)	.43	.55	.42	.51	
Household Income (2006)	.26	.25	.23	.23	.14

Note. Household income is a household variable that is constant for members of the same household.

Table 2 also provides important information about the reliability and convergent validity of the two satisfaction measures of wellbeing. Most relevant is the comparison of the retest correlations of global life-satisfaction and average domain satisfaction for the same measure (.61 and .71) to those across measures (.55 to .56). The comparison reveals that 85% of the stable variance in each measure covaries with the other measure. In other words, the measures appear to be much more similar measures of wellbeing than the simple correlations on a single occasion suggest. Both satisfaction measures also show similar correlations with the other two indicators of wellbeing, affect balance and income. This finding suggests that both measures are equally valid measures of wellbeing. As a result, the cross-measure, cross-occasion correlations of  $r =$

.55 and  $r = .56$  provide an upper limit for the validity of the two satisfaction measures. These estimates may still be inflated by shared method variance common to satisfaction judgments. The correlations with income (.23 to .26) provide an estimate of the lower limit because income and satisfaction judgments are unlikely to share common method variance. A range from .2 to .5 is consistent with the typical amount of convergent validity in studies that compare self-ratings with informant ratings of wellbeing (Walker & Schimmack, 2008).

Finally, Table 2 provides some evidence on the convergent validity of affective and cognitive measures of wellbeing. The cross-time-cross-measure correlations ( $r = .42, .43$ ) for affect with the two cognitive measures are weaker than the cross-time-cross-measure correlations for the two cognitive measures ( $r = .55, .56$ ). In addition, cognitive measures are more strongly correlated with income than the affective measure even when these measures are obtained on the same occasion (.13 vs. .23-.26). These finding shows that the affective measure behaves differently than the two cognitive measures. The implications of this discrepancy are unclear. It could be argued that affect balance is a less valid measure because affect is a less direct indicator of wellbeing. Alternatively, it could be argued that cognitive measures are biased because domains are weighted incorrectly and could be biased towards income (Kahneman et al., 2006). Thus, it is important to examine the nature of these discrepancies to create better measures of wellbeing. However, it is important to keep in mind that the discrepancies are not large. Thus, without further evidence it is reasonable to treat both measures as equally valid and to average satisfaction measures and affect balance measures. This simple measure of subjective wellbeing correlated  $r = .24$  with income as an objective measure of wellbeing.

#### *Computation of Affective Balance*

Some researchers have proposed that evolution created a negativity bias in the way people process information. Negativity bias may occur at various states of information processing. It may influence how strong people respond emotionally to their lives. It could also influence life-satisfaction judgments, if memories of negative emotions were either to retrieve. These theories predict that convergent validity would increase, if negative affect were weighted more heavily in

the affect measure. This prediction was tested with regression analysis and different weighing schemes, but alternative weighing-schemes produced at best equal and often slightly worse fit. Thus, the evidence supports the traditional assumption that wellbeing is best reflected in the balance of positive versus negative affect.

#### *Comparison of Specific Domains*

The availability of a relatively large number of domains provides the opportunity to create wellbeing measures that weigh some domains more than others. Moreover, domain satisfactions can be used to examine the discrepancies between global life-satisfaction and affect balance measures. To explore the effects of different weights on correlations of domain satisfactions with other wellbeing measures, I computed the partial correlations for each domain while controlling for the average domain satisfaction measure. This analysis was conducted once with the 2006 data and once with the 2007 data to examine the robustness of the results. This analysis controls for any common method variance in self-ratings of wellbeing. The results are shown in Table 3.

Table 3

Partial correlations of satisfaction with life domains controlling for average domain satisfaction ((N = 5,581 - 9,887))

	AWB	LS06	LS07	H-Inc
Health	.14/.16	.18/.14	.18/.13	.04/.04
Work	.01/.03	.10/-.01	.05/-.01	.01/-.01
Housework	-.07/-.10	-.14/-.12	-.12/-.12	-.16/-.14
Household Income	-.03/-.06	.17/.14	.13/.14	.34/.31
Dwelling	-.11/-.13	-.11/-.05	-.09/-.05	.01/.02
Leisure	-.08/-.11	-.21/-.16	-.14/-.15	-.24/-.22
Family	.09/.18	..00/.01	-.04/.01	-.04/-.05

Note. Household income is a household variable that is constant for members of the same household.

Health satisfaction shows a clear pattern that distinguishes all subjective measures from income. One interpretation of this finding is that a simple average of domain satisfaction underestimates the weight of health in wellbeing. The low correlation for income may reveal the fact that income is an input indicator. It only reflects wellbeing to the extent that people can use money to buy wellbeing. However, in Germany having more money may not buy more health-related wellbeing. Thus, the results suggest that health should be weighted more heavily to obtain an optimal measure of wellbeing. However, it is noteworthy that a heavier weight of health would increase correlations with global life-satisfaction judgments and affective measures. Thus, health satisfaction does not explain the discrepancy between these measures.

Satisfaction with work shows only weak partial correlations, suggesting that the average weight is a good approximate of the optimal weight in the index. In addition, the partial correlation has some other interesting implication. It has been suggested that some people spend too much time working and neglect their family. These "workaholics" are supposed to fail to realize that work actually doesn't make them happier, and that they should spend more time with family or friends to be happier. If this were the case, work satisfaction should show a negative partial (or even simple) correlation with affective balance, but the data provide no support for this hypothesis.

Satisfaction with housework shows negative partial correlations for all other indicators. This finding suggests that housework is weighted too heavily in the overall index. One reason could be that housework nowadays takes up a relatively small amount of people's time. However, a reduced weight does not imply that this domain is totally irrelevant.

The results for household income provide some support for Kahneman et al.'s (2006) focusing hypothesis in that income satisfaction is positively related to life-satisfaction judgments and slightly negatively related to affect balance. Without further information it is impossible to

decide whether the weight for household income in the unweighted average is too high or too low.

Dwelling satisfaction revealed negative partial correlations with all three subjective measures of wellbeing, indicating that the simple average weights this domain too highly. This pattern of results suggests that the weight of housing satisfaction may have to be reduced. Income does not show this bias. Again, this finding suggests that income buys more dwelling satisfaction but the contribution to overall wellbeing is relatively small due to the low weight of dwelling satisfaction in an optimally weighted average of domain satisfaction.

Satisfaction with leisure time shows negative partial correlations with all wellbeing measures, including income. The finding is most surprising for the affect measure. Leisure is a time when people freely pursue pleasurable activities. Thus the leisure domain could be more strongly related to affective balance than to other measures of wellbeing. However, the data provide no support for this conclusion. Thus, different weights for leisure do not explain the discrepancy between affective balance and life-satisfaction.

Finally, satisfaction with family life shows slightly different relations for affective balance and life-satisfaction. As one would expect, family life needs to be weighted more than the average weight for the prediction of affective balance, whereas the weight for life-satisfaction and income are close to optimal.

Table 4

Correlations of domain satisfaction averages with other wellbeing measures (N = 9,892)

	AWB	LS06	LS07	H-Inc
Equal 06	.42	.65	.55	.23
Affective Weight 06	.45	.64	.55	.24
Cognitive Weight 06	.44	.69	.58	.31
Equal 07	.51	.56	.67	.23
Affective Weight 07	.56	.55	.68	.23

Cognitive Weight 07	.53	.59	.71	-.30
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Note. Household income is a household variable that is constant for members of the same household.

Based on regression analyses, I created two weighted additional measures of wellbeing that used different weights for different domains. One measure used weights for optimal prediction of affect balance. The weights were .35 for health, .15 for work, .00 for housework, .10 for household income, .00 for dwelling, .05 for leisure, and .35 for family life. The new weighing scheme had the following effects. First, unweighted and unweighted averages were highly correlated,  $r = .89$  in 2006 and 2007. Second, cross-time-same-measure correlations (both  $r = .71, .69$ ) were slightly higher than cross-time-cross-measure correlations (both  $r = .64$ ), indicating that the weighing scheme made a small, but reliable difference. This is important because regression weights in small samples often do not generalize across samples. Third, the new weighing scheme slightly increased the correlation with affective balance from  $r = .42$  to  $r = .45$  for domain satisfaction in 2006 and from  $r = .51$  to  $r = .56$  for domain satisfaction in 2007 (Table 4). Fourth, the new weighing scheme produced a slight decrease in the correlations with global life-satisfaction judgments (from  $r = .648$  to  $.644$  in 2006 and  $r = .559$  to  $.554$  in 2007) (Table 4). Finally, the correlations with household income increased slightly from  $r = .232$  to  $r = .244$  in 2006 and  $r = .225$  to  $r = .233$  in 2007.

I also created a measure with optimal weights for the prediction of global life-satisfaction. The weights were .30 for health, .15 for work, .00 for housework, .25 for household income, .05 for dwelling, .05 for leisure, and .20 for family life. Once more, the unweighted measure correlated strongly with the weighted measures,  $r = .93$ . The weights also produced reliable changes, as revealed by higher same-measure correlations ( $r = .71, .72$ ) than cross-measure correlations ( $r = .67, .68$ ). The weighted measure also produced slightly stronger correlations

with the global life-satisfaction measures and income (Table 4). The weighed measure also increased the correlation with affect balance (Table 4).

The cognitively weighted measure and the affectively weighted measure were highly correlated ( $r = .95$  in 2006 and  $r = .96$  in 2007), but were reliably different from each other, in that cross-time-same-measure correlations,  $r = .69, .72$ , were higher than cross-time-cross-measure correlations,  $r = .68, .68$ . However, these differences do not explain the discrepancy between affective balance and global satisfaction judgments. Even the affectively weighted domain satisfaction measure correlated more highly with the global life-satisfaction judgments than with the affect balance measure (Table 4). This finding could indicate problems of the validity of the affect balance measure, but it could also reflect shared method variance among satisfaction judgments.

The main implications of these results are that (a) weighing domains had only relatively minor effects on the results, (b) cognitive and affective weighted measures produce similar results, and (c) the discrepancies between satisfaction measures and affect balance were not explained by different weights of domains. The last finding undermines Kahneman et al.'s (2006) hypothesis that the correlation between income and life-satisfaction is a mere focusing illusion.

#### Objective Correlates of Wellbeing

The next set of analyses examines the correlations of objective measures with the wellbeing measures. Objective measures have two advantages. First, they have high construct validity. For example, there is very little uncertainty about the meaning of birth year. Second, objective measures are unlikely to share measurement error with subjective measures of wellbeing, even when these variables are assessed with self-report. Although people do sometimes lie about their age, it is safe to assume that self-reports of birth year reflect people's objective birth year.

A potential limitation of objective variables is that objective measures do not take people's preferences into account. Nevertheless, some objective measures can be related to wellbeing if people have similar preferences. For example, most people want to work, if only to receive a

paycheck. Thus, unemployment is likely to be a predictor of lower wellbeing, even if we do not have a measure of individuals' preferences to work.

### *Age and Wellbeing*

Dozens, if not hundreds, of articles have examined the relation between age and wellbeing. A review by Wilson (1967) suggested that wellbeing declines with age. Diener et al. (1999) concluded that "Wilson's pessimistic suggestion that there is a decline in SWB as people age can be revised" (p. 291). Others have argued that wellbeing even increases with age, or shows a curvilinear relation. Some studies suggested that the relation varies as a function of the measures used (Diener et al., 1999). Negative affect or neuroticism tends to decrease with age, but so does positive affect. Life-satisfaction often shows no linear age trend. The only consistent conclusion that can be drawn from the previous literature is that age is a relatively unimportant variable because all correlations with age are quite small.

Table 5 shows the correlation between birth year and the various wellbeing measures. I only use the unweighted and affectively weighted measure of domain satisfaction because the satisfaction weighted measure produces very similar results to the affectively weighted measure. Birth year is used because it is a fixed variable, whereas age changes over time. These cross-sectional correlations confound effects of aging (the same individual getting older) and cohorts. The correlations should be interpreted as the net effect (causality can only go one way) of birth year on wellbeing measures.

Table 5

*Correlations between birth-year and wellbeing measures (N = 9,892)*

<u>Measure</u>	<u>Pearson <i>r</i></u>
Unweighted Domain satisfaction 2006	-.02
Affect Weighted Domain satisfaction 2006	.16
Satisfaction Weighted Domain satisfaction 2006	.11
Unweighted Domain satisfaction 2007	-.01
Affect Weighted Domain satisfaction 2007	.16

Satisfaction Weighted Domain satisfaction 2007	.12
Life-satisfaction 2006	.06
Life satisfaction 2007	.10
Affect balance	.10
Positive Affect (happy)	.21
Negative Affect (sad, angry, afraid)	.06
<u>Income 2006</u>	<u>.10</u>

All correlations with birth-year with the exception of the unweighted domain satisfaction scores are positive, supporting Wilson's (1967) earlier conclusion that younger people have higher wellbeing. There is no evidence to suggest that aging produces higher wellbeing. Separate analyses for positive and negative affect show positive correlations for both indicators of the same magnitude. Nevertheless, affect balance remains related to age because positive affect is more strongly correlated with age than negative affect.

To further examine the factors that produce the correlation between age and wellbeing, I examined the partial correlations of age with each domain satisfaction measure controlling for the unweighted average domain satisfaction. These correlations reveal how different weights of domains influence correlations with age.

Table 6

Partial correlations between birth year and domain satisfactions controlling for average domain satisfaction (N = 5,581 to 9,887)

	2006	2007
Health	.45	.44
Work	.12	.12
Housework	.03	.05
Household Income	-.09	-.07
Dwelling	-.17	-.17
Leisure	-.28	-.29
<u>Family</u>	<u>-.02</u>	<u>-.04</u>

The results are readily interpretable. Birth year has a strong positive relation with health satisfaction. In contrast, birth year is negatively related to dwelling satisfaction and leisure. Because the affectively and satisfaction weighted measure weighs health more and dwelling and leisure less, the weighted measures are positively correlated with birth year.

The pattern of correlations with domain satisfaction also helps to distinguish cohort effects and aging effects. A decrease in health satisfaction and an increase in leisure satisfaction with age suggest aging effects rather than cohort effects. Longitudinal analyses could be used to strengthen this conclusion.

Partial correlations controlling for health satisfaction reversed the sign for all subjective wellbeing measures (affect balance and satisfaction), indicating that health satisfaction is solely responsible for the negative relation between age and wellbeing.

In sum, the results show fairly similar relations between birth year and different wellbeing measures. In general, the results suggest a small negative relation between age and wellbeing that is explained entirely by health satisfaction. Other aspects show positive relations with age. Thus, it is relatively easy to create wellbeing measures that produce different correlations with age. For affect, the weights of positive and negative affect are crucial, and for satisfaction measures the weight of health satisfaction is important. Inconsistent findings in the literature could be due to slight differences in the measures being used. However, the consistent negative relation between age and all wellbeing measures suggests that health has to be weighted sufficiently to produce a net negative relation with age.

### *Gender*

Reviews of the literature typically find no systematic gender differences for cognitive measures of wellbeing. For affect, women tend to score higher on measures of negative affective dispositions (neuroticism, anxiety, depression) as well as measures of negative affect. To account for the discrepancy between cognitive measures and negative affect, it is commonly assumed that women also score higher on measures of positive affect. As a result, men and women would

not differ in affective balance (e.g., Schimmack, Oishi, Furr, & Funder, 2004). Another reason for lower wellbeing of women could be that women earn lower wages. This would no influence household income of married women, but it could disadvantage single women and widows. This hypothesis was explored by examining the relation between gender and wellbeing for different age groups (under 30, 30-60, over 60).

Table 7

Correlations between gender (men = 0, women = 1) and wellbeing measures (N = 9,892)

Measure	Pearson <i>r</i>	<i>Under 30</i>	<i>30-60</i>	<i>Over 60</i>
Unweighted Domain satisfaction 2006	-.02	-.02	.00	-.06
Affect Weighted 2006	-.03	-.02	.01	-.10
Satisfaction Weighted 2006	-.02	-.02	.00	-.07
Unweighted Domain Satisfaction 2007	-.01	-.02	.01	-.04
Affect Weighted 2007	-.02	-.02	.01	-.06
Satisfaction Weighted 2007	-.01	-.03	-.01	-.05
Life-satisfaction 2006	-.01	.02	.00	-.06
Life satisfaction 2007	.00	.04	.01	-.03
Affect balance	-.10	-.09	-.09	-.13
Positive Affect (happy)	.01	.10	.02	-.06
Negative Affect (sad, angry, afraid)	.18	.26	.17	.15
Income 2006	-.06	-.06	-.02	-.12

Consistent with the literature, cognitive measures show hardly any differences between men and women, and women score higher on negative affect (Table 7). However, this study did not show consistently higher levels of positive affect for women. As a result, women also scored lower than men on affect balance. Women also scored lower on objective income, but the difference was small.

Table 7 also shows that results vary by age group. In the older group, women consistently score lower in wellbeing. In the young and middle-age groups, gender differences are small and inconsistent. Only a notable correlation with negative affect remained. Moreover, after controlling for negative affect, all wellbeing measures except income showed either higher wellbeing for women than men or no gender differences. Thus, one important question is the nature of gender differences in negative affect.

Table 8

Partial correlations between gender and domain satisfactions controlling for average domain satisfaction (N = 5,580 to 9,889)

	2006	2007
Health	-.01	-.01
Work	.01	-.01
Housework	.03	.00
Household Income	.01	.02
Dwelling	.03	.02
Leisure	.02	.03
Family	-.03	-.02

Inspection of domain satisfaction revealed no strong unique relations with individual domains and gender. The stronger correlation of gender with the affectively weighted average is due to slightly negative partial correlations for health and family, which are weighted more heavily, and slightly positive relations for the other domains. In conclusion, overall the results suggest slightly lower wellbeing in women, due to gender differences in negative affect. The gender differences are negligible for younger men and women.

*Unemployment*

One of the most robust findings in wellbeing science is the effect of unemployment on wellbeing (see Diener et al., 1999, for a review). This finding has been demonstrated cross-sectionally and longitudinally with cognitive and affective measures of wellbeing. However, a recent study suggests that unemployment has stronger effects on satisfaction judgments than affective balance (see Schimmack, Wagner, & Schupp, in press). This discrepancy creates uncertainty about the strength of the effect of unemployment on wellbeing. The analyses for unemployment were limited to participants who were 30 to 60 years old. (51 unemployed, 4723 employed, 9.8% unemployment,  $SD = .30$ ). The reason was that people below 30 may not be fully financially independent (e.g., students) and that people over 60 may be in early retirement.

Table 9

*Correlations between unemployment and wellbeing measures (N = 5,234)*

<u>Measure</u>	<u>Pearson <i>r</i></u>
Unweighted Domain satisfaction 2006	-.18
Affect Weighted Domain satisfaction 2006	-.18
Satisfaction Weighted Domain satisfaction 2006	-.25
Unweighted Domain satisfaction 2007	-.18
Affect Weighted Domain satisfaction 2007	-.17
Satisfaction Weighted Domain satisfaction 2007	-.23
Life-satisfaction 2006	-.25
Life satisfaction 2007	-.23
Affect balance	-.13
Positive Affect (happy)	-.13
Negative Affect (sad, angry, afraid)	.07
<u>Income 2006</u>	<u>-.26</u>

All wellbeing measures show negative correlations between unemployment and wellbeing. The different weighing schemes of domain satisfaction make only a small difference, although

satisfaction weighted averages showed a stronger correlation. Consistent with Schimmack et al. (in press), the affect balance measure shows a weaker correlation than life-satisfaction measures. Closer inspection of the positive and negative component shows that both components are related to unemployment and that both components show weaker relations to unemployment than cognitive measures. Finally, it is important to realize that these coefficients reveal a substantial relation between unemployment and wellbeing because the standard deviation of unemployment is only  $SD = .30$ . Thus, correlations have to be divided by  $.30$  (approximately multiplied by 3) to obtain the effect size of unemployment on wellbeing. Changes in employment status are related to a  $.6$  change in wellbeing on the satisfaction measures. These coefficients increase when they are further adjusted for the unreliability of satisfaction measures (Schimmack et al., in press).

Closer inspection of individual domain satisfactions revealed the unsurprising finding that unemployment was more negatively related to satisfaction with household income and more positively related to satisfaction with leisure time than the unweighted average predicted. This finding implies that the relation with unemployment would change as a function of weighing these two domains.

In sum, the results do not support the hypothesis of hedonic adaptation to unemployment. Even a year after the assessment of unemployment, ratings of affect in the past month are related to employment status. The results also show that all measures have sufficient validity to reveal the impact of strong predictors such as unemployment.

### *Disability*

A famous study by Brickman, Coates, and Janoff-Bulman (1978) examined the well-being of accident victims. The study is often cited as evidence that people adapt even to extremely adverse conditions like being paraplegic. Lucas (2007) pointed out that the data actually provide no evidence for adaptation and provided new evidence that disability causes lower well-being for many years after disability occurs. Lucas (2007) used the SOEP data, but his analysis was limited to the global life-satisfaction item. I examined whether these results generalize to domain satisfaction and affect balance. I used disability in 2006 (wp9601) to examine this question. A

fairly large percentage of respondents claimed disability ( $N = 1273$ , 13%). The standard deviation of the item was  $SD = .34$ . Consistent with Lucas (2007), global life-satisfaction correlated negatively with disability. In addition, disability was negatively related to all well-being measures, including income (Table 10).

Table 10

*Correlations between disability and wellbeing measures ( $N = 9,867$ )*

<u>Measure</u>	<u>Pearson <math>r</math></u>
Unweighted Domain satisfaction 2006	-.15
Affect Weighted Domain satisfaction 2006	-.25
Satisfaction Weighted Domain satisfaction 2006	-.23
Unweighted Domain satisfaction 2007	-.15
Affect Weighted Domain satisfaction 2007	-.24
Satisfaction Weighted Domain satisfaction 2007	-.23
Life-satisfaction 2006	-.17
Life satisfaction 2007	-.18
Affect balance	-.13
Positive Affect (happy)	-.13
Negative Affect (sad, angry, afraid)	.09
<u>Income 2006</u>	<u>-.11</u>

Closer inspection of each domain satisfaction via partial correlations revealed that health satisfaction was mainly responsible for this finding (Table 11).

Table 11

Partial correlations between disability and domain satisfactions controlling for average domain satisfaction ( $N = 5,875$  to  $10,395$ )

	<u>2006</u>	<u>2007</u>
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Health	-.32	-.31
Work	-.02	-.03
Housework	-.03	-.02
Household Income	.04	.05
Dwelling	.10	.09
Leisure	.19	.19
Family	.06	.06

In contrast, dwelling and housing satisfaction were positively related to disability, after controlling for overall domain satisfaction. The latter findings have to be interpreted with caution because they may be the result of confounding factors such as age. In sum, the most important finding is that disability is consistently negatively related to all wellbeing. This finding shows that Lucas's (2007) results generalize to affective measures of wellbeing. Domain satisfaction shows a strong relation with health, but not to other domains.

#### Romantic Relationships and Wellbeing

Romantic relationships play an important role in people's lives. Most people establish exclusive romantic relationships at least once in their lives. This behavior reveals a preference of most people to be in a romantic relationship. Thus, the definition of wellbeing as preference realization implies that, on average, people with a steady romantic partner should have higher wellbeing than people without a steady romantic partner. Empirical findings are generally consistent with this conclusion (Diener et al., 1999). The following analyses examine the consistency of these relationships across wellbeing measures. The analyses differ somewhat from previous studies by taking a life-course approach. For participants age 18 to 30, the focus is on the contrast between singles without a steady romantic partner and singles with a steady romantic partner. A relatively small group of married individuals was added to the group with a steady romantic partner. For ages 30 to 60, the vast majority of respondents in the SOEP is married. Married individuals are compared to divorced individuals without a steady romantic partner. Divorced individuals with a new steady partner are excluded from the analysis. For ages

60 and up, married individuals are compared to widowed individuals, as widowhood is the main cause for the termination of romantic relationships in this age group. Although the cut-off points are arbitrary, this approach avoids the problem of comparing the wellbeing of 18-year old singles with 85-year old widowers.

### *Single*

Relationship status was based on reports in 2006 (wp125) and 2007 (pfamst). Only two respondents changed status. These two respondents were excluded from the analysis. The single variable contrasted 662 singles without a romantic partner with 682 singles with a romantic partner and 221 married individuals ( $SD = .49$ ). Inclusion or exclusion of the married individuals had no notable effects on the results. Subsequently, I use the term single to refer only to the group without a steady romantic partner. Relationship status was correlated with birth year,  $r = .35$ , which may reveal both a preference for and more success in establishing committed romantic relationships with increasing age. Table 12 shows the correlations of single status with wellbeing. To control for age effects, I also computed the partial correlations controlling for age.

Table 12

*Correlations between single status (0 = not single, 1 = single) and wellbeing measures for respondents born after 1975 ( $N = 1,667$ )*

<u>Measure</u>	<u>Pearson <math>r</math></u>	<u>Partial (age)</u>
Unweighted Domain satisfaction 2006	.02	-.02
Affect Weighted Domain satisfaction 2006	.00	-.03
Satisfaction Weighted Domain satisfaction 2006	.01	-.02
Unweighted Domain satisfaction 2007	-.02	-.06
Affect Weighted Domain satisfaction 2007	-.02	-.06
Satisfaction Weighted Domain satisfaction 2007	-.02	-.05
Life-satisfaction 2006	-.05	-.06
Life satisfaction 2007	-.02	-.05
Affect balance	-.06	-.07

Positive Affect (happy)	-.15	-.16
Negative Affect (sad, angry, afraid)	-.06	-.05
<u>Income 2006</u>	<u>.11</u>	<u>.05</u>

Table 12 shows the result. In general, the results show higher wellbeing for respondents with a partner than for singles. Positive affect is most strongly correlated. The correlation with affect balance is reduced by higher levels of negative affect for respondents with a partner. The domain satisfaction measures show weaker simple correlations, but after controlling for age effects, the results are remarkably consistent. Only income produces divergent findings, indicating that the effects of relationships on wellbeing are independent of income. Thus, relationships may be one factor that contributes to wellbeing independently of individuals' monetary resources. However, the effect size of these relations is quite small (Cohen, 1988). With a standard deviation of .49, correlations have to be doubled to estimate the effect of a change in relationship status on wellbeing, suggesting a change by .2 standard deviations in wellbeing.

Inspection of individual domains showed the strongest correlation for family satisfaction, which was lower for singles. Singles had higher satisfaction for satisfaction with leisure time, but because this domain is weighted less heavily, it did not compensate for the effects of family satisfaction in the weighted measures.

In short, the results show that having a steady romantic partner is positively correlated with wellbeing, but the effect is not very strong. The reason for the relatively weak effect may be that some singles are not yet interested in establishing committed relationships. Moreover, the positive effects of having a romantic partner on positive affect are partially undermined by higher levels of negative affect. Thus, different weights of the two affective components could easily eliminate or reverse the correlation with relationship status.

*Divorced*

Divorce is another reliable correlated of wellbeing (Diener et al., 1999). This correlation has to be interpreted with caution. Longitudinal studies suggest that wellbeing is lowest immediately before divorce (Lucas, 2004). Thus low wellbeing may actually cause divorce, rather than divorce causing lower wellbeing. The present analyses examine only the consistency of the correlation across different wellbeing measures. I limited the analyses to the age of 30 to 60. As noted earlier, marriage before age 30 is rare in Germany. As a result, divorce is an even less common phenomenon ( $N = 13$ ,  $< 1\%$ ). Furthermore, it is relatively easy for divorced people under 30 to find a new partner because many individuals are still without a steady partner. In contrast, in the age range from 30 to 60 the vast majority is married (70% in 2006). I limited divorced individuals to those who indicated that they do not have a steady new partner ( $N = 211$ ) and compared them to married individuals ( $N = 3792$ ). Due to the unequal frequencies, the variable has reduced variability ( $SD = .22$ ).

Table 13

*Correlations between divorce status (0 = married, 1 = divorced) and wellbeing measures (N = 4,003)*

<u>Measure</u>	<u>Pearson <i>r</i></u>
Unweighted Domain satisfaction 2006	-.13
Affect Weighted Domain satisfaction 2006	-.17
Satisfaction Weighted Domain satisfaction 2006	-.17
Unweighted Domain satisfaction 2007	-.14
Affect Weighted Domain satisfaction 2007	-.17
Satisfaction Weighted Domain satisfaction 2007	-.17
Life-satisfaction 2006	-.15
Life satisfaction 2007	-.14
Affect balance	-.14
Positive Affect (happy)	-.14

Negative Affect (sad, angry, afraid)	-0.08
<u>Income 2006</u>	<u>-0.23</u>

The main finding for divorce is that it is consistently negatively related to all wellbeing indicators, including household income. The weighing of domains has a relatively weak effect on the relation with domain satisfaction, although the affectively weighted measure produced stronger correlations. The effects size of these correlations is moderate to large because observed correlations need to be multiplied by 4.5 ( $1 / .22$ ) to obtain standardized effect size measures (e.g.,  $-.15 * 4.5 = .68$ ). Affect balance shows the same effect size as other satisfaction measures. Partial correlations controlling for income were weaker, but remained negative indicating that loss of income does not fully account for the negative correlation of divorce with wellbeing. Inspection of individual domains shows that household income and family were more negatively related to divorce after controlling for average domain satisfaction. In contrast, work satisfaction and amount of leisure time were positively related. In sum, the results provide strong evidence that divorce has negative effects on wellbeing. Although some of these effects may be caused by changes in household income and satisfaction with household income, other non-economic factors also contribute to this relationship. Thus, this finding provides further evidence that a purely economic indicator is insufficient to capture all aspects of wellbeing.

#### *Widowhood*

Widowhood is another interesting objective variable for two reasons. First, widowhood has been shown to have a strong negative effect on life-satisfaction ratings (Lucas et al., 2002). Second, the loss of a loved one elicits prolonged experiences of grief and sadness (Bonanno). Thus, it is possible that widowhood is a stronger predictor of affective measures of wellbeing than cognitive measures of wellbeing. The analyses were limited to participants born before 1947 to reduce other differences between widowed and non-widowed respondents. Furthermore, widowed respondents were only compared to married participants because married individuals provide a better comparison group to examine the effects of widowhood than people with other

marital status. For example, people who never married may not have a preference to be married. In contrast, married and widowed individuals both revealed a preference for marriage when they married. Finally, widowers with a steady romantic partner ( $N = 107$ ) were excluded because the new romantic partner may help to realize many of the preferences that the loss of a spouse leaves unfulfilled. As a result, the inclusion of these individuals would weaken the effect of having or not having a romantic partner for people who have a preference for a romantic partner. The final comparison was based on 505 widowed and 2157 married individuals ( $SD = .39$ ). Widowhood was correlated with age,  $r = -.39$  and gender,  $r = .30$ . To control for confounding effects of these variables, I also computed partial correlations.

Table 14

*Correlations between widowhood (0 = married, 1 = widowed) and wellbeing measures (N = 2,662)*

<u>Measure</u>	<u>Pearson <math>r</math></u>	<u>Partial (age, gender)</u>
Unweighted Domain satisfaction 2006	-.15	-.13
Affect Weighted Domain satisfaction 2006	-.26	-.21
Satisfaction Weighted Domain satisfaction 2006	-.18	-.15
Unweighted Domain satisfaction 2007	-.12	-.10
Affect Weighted Domain satisfaction 2007	-.22	-.17
Satisfaction Weighted Domain satisfaction 2007	-.15	-.12
Life-satisfaction 2006	-.10	-.07
Life satisfaction 2007	-.06	-.02
Affect balance	-.19	-.12
Positive Affect (happy)	-.23	-.18
Negative Affect (sad, angry, afraid)	.07	.01
<u>Income 2006</u>	<u>-.26</u>	<u>-.19</u>

Table 14 shows several important findings. First, as expected widowhood is negatively related to all wellbeing measures. The results also show a stronger relation of widowhood with the affect measure than with the global life-satisfaction judgments. This is the first evidence that objective measures can be more strongly correlated with an affective measure of wellbeing than with a cognitive measure of wellbeing. This finding shows that hedonic adaptation is not necessarily stronger than cognitive adaptation. The relatively weak relation with negative affect is due to conflicting effects on specific affects. As expected, widowed respondents reported more sadness,  $r = .18$ , but also less anger,  $r = -.10$ . Table 14 shows that widowhood has a substantial negative effect on household income. However negative relations with subjective wellbeing measures remained after controlling for household income as well as age and gender. Thus, the negative effects of widowhood go beyond the effects on individuals' economic status.

Inspection of the partial correlations reveals a strong negative correlation with satisfaction with family life. A weaker positive correlation with satisfaction with leisure time failed to compensate for this effect.

I also examined the wellbeing of widowers with a steady partner. The wellbeing of this group did not differ significantly from the wellbeing of married participants. This finding suggests that widowhood does not have to result in permanent wellbeing losses. This finding may also suggest avenues for increasing wellbeing among widowers by decreasing barriers and increasing opportunities for older people to find new partners.

#### *Distance to Work (wp4101)*

Distance to work was included because it has received so much attention in the public media. The claim is that people underestimate the effect of commuting on their wellbeing. In contrast, they overestimate the positive effect of income on wellbeing. If this prediction is correct, it is possible that focusing illusions reduce the correlation between commuting and satisfaction measures, whereas affect balance shows the true costs of commuting on wellbeing. This hypothesis was examined for respondents who reported the distance to their work place, ranging from 1 to 99km (longer commutes were excluded as unrealistic or atypical values).

Additional analysis with categories (1-5 km, 6 to 20km) (21 to 50km, more than 50km) produced similar results. Distances below 1km were excluded because the wellbeing of people who work from home is irrelevant for individuals who have to commute to work, but have some control over the distance of their commute. Men and older respondents tended to have longer commutes than women and young respondents. Therefore, I also computed partial correlations controlling for age and gender.

The most notable finding is the lack of any systematic relation between distance to work and wellbeing measures except a positive relation with household income (Table 15). The results provide no evidence that affective measures produce different results than cognitive measures. The previous results for widowhood suggest that the lack of a correlation with affect balance is not a problem of low validity of the affect balance measure.

Table 15

*Correlations between distance to work and wellbeing measures (N = 4,569)*

<u>Measure</u>	<u>Pearson <i>r</i></u>	<u><i>Partial (age, gender)</i></u>
Unweighted Domain satisfaction 2006	-.01	-.02
Affect Weighted Domain satisfaction 2006	.00	-.01
Satisfaction Weighted Domain satisfaction 2006	.01	.00
Unweighted Domain satisfaction 2007	-.01	-.02
Affect Weighted Domain satisfaction 2007	.00	-.01
Satisfaction Weighted Domain satisfaction 2007	.01	.00
Life-satisfaction 2006	.01	.00
Life satisfaction 2007	.01	.01
Affect balance	.02	.00
Positive Affect (happy)	.01	.01
Negative Affect (sad, angry, afraid)	-.01	.01
<u>Income 2006</u>	<u>.09</u>	<u>.10</u>

Inspection of individual domains via partial correlations sheds some light on the lack of a positive correlation. As expected, commuting does have negative effects on satisfaction with amount of leisure time. However, even this relationship is relatively weak (partial  $r = -.09$  in 2006 and  $-.06$  in 2007). In addition, commuting is positively related to satisfaction with household income (partial  $r = .05$  in both years). Because household income is weighted more heavily in the affectively and satisfaction weighted measures, it cancels out the slightly stronger negative effect on leisure satisfaction.

The results are more consistent with the hypothesis of standard economics that people generally make rational choices to maximize their wellbeing. They commute longer distances only if higher income compensates for the negative effects of commuting. The lack of a correlation does not imply that commuting has no influence on wellbeing. It only suggests that benefits such as a higher income (or any income at all) may justify the costs. Policies that could reduce distances or increase the quality of commuting could increase wellbeing. Due to the lack of notable relations with wellbeing measures, I dropped commuting from further analyses.

### *Conclusion*

The analyses with selective objective correlates of wellbeing produced a number of important findings. First, the empirical findings in this study were mostly consistent with those in previous studies (Diener et al., 1999). Second, relationships between objective variables were generally consistent across wellbeing measures, especially if the objective variable was a strong predictor of wellbeing. This finding can be considered as an extended form of convergent validity. If A is a measure of wellbeing (e.g., life-satisfaction) and B is a measure of wellbeing (e.g., affect balance), and C (e.g., unemployment) is a predictor of wellbeing, then the correlation between C and A should be similar to the correlation between C and B. However, the magnitude of the correlations was influenced by the wellbeing measure. Often the affect balance measure revealed weaker correlations than other measures. However, the affectively weighted measure of domain satisfaction did not produce weaker correlations. This finding suggests that correlations with affect balance are attenuated by more measurement error in this measure. However,

measurement error alone is not sufficient to explain all findings. The correlation between affect balance and widowhood was as strong as the correlation for satisfaction measures. This finding suggests that the affect balance measure captures unique aspects of wellbeing that satisfaction measures fail to capture. Thus, affect balance should be included in a composite measure of wellbeing, although its weight in the index is difficult to determine. Nevertheless, the results provide no support for the hypothesis that affect balance is a superior indicator of wellbeing, nor does it show that affect balance produces dramatically different results than other wellbeing measures (Kahneman et al., 2006).

### *Subjective Correlates of Wellbeing*

The next set of analyses examines subjective correlates of wellbeing. Subjective correlates are self-report measures of characteristics that may be related to wellbeing, but are not considered measures of wellbeing *per se*. For example, extraversion is often considered a personality disposition to experience more positive affect (Diener et al., 1999). If this hypothesis were correct, extraversion would be a disposition that contributes to wellbeing (assuming people have a preference for higher levels of positive affect), but it would not be a comprehensive measure of wellbeing. Moreover, objective measures of extraversion or other personality dispositions are lacking. Thus, researchers have to rely on subjective reports of these personality dispositions, which creates problems for the interpretation of empirical correlations. First, people may rely on actual experiences of positive affect to make judgments of their personality dispositions. As a result, wellbeing could contaminate measures of personality dispositions. Second, correlations of self-ratings of personality dispositions and self-ratings of wellbeing could be contaminated by shared method variance.

### *Personality Measures (vp12501 to vp12515)*

The 2005 wave included a three-item measure of the Big Five personality traits. The psychometric properties of these scales have been published in previous analyses of the SOEP data (Rammstedt, 2007). Numerous studies and meta-analytic reviews have demonstrated correlations between measures of personality traits and wellbeing. The strongest predictor is by

far neuroticism. Some researchers have proposed that extraversion is a stronger predictor than other personality traits, but meta-analytic reviews do not always support this conclusion (DeNeve & Cooper, 1998; Heller, Watson, & Ilies, 2004).

With personality measures simple correlations have to be interpreted with caution because shared method variance can produce spurious correlations between personality ratings and wellbeing ratings by the same rater (Schimmack, 2008). Schimmack et al. (in press) used structural equation modeling to remove shared method variance. However, a simpler alternative approach is to regress dependent variables on all Big Five measures simultaneously and to interpret the standardized regression as unbiased (although attenuated by random measurement error) estimates of the correlations (Anusec & Schimmack, 2008). I present both simple correlations and regression coefficients to examine the contribution of method variance.

Table 16

Correlations between Big Five personality measures (2005) and wellbeing measures (N = 9,892)

Measure	N	E	O	A	C
Unweighted Domains 2006	-.24	-.10	.13	.16	.16
Affect Weighted Domains 2006	-.26	-.12	.14	.12	.14
Satisfaction Weighted Domains 2006	-.27	.11	.14	.12	.14
Unweighted Domains 2007	-.22	.11	.13	.16	.14
Affect Weighted Domains 2007	-.24	.12	.14	.14	.13
Satisfaction Weighted Domains 2007	-.25	.12	.14	.13	.13
Life-satisfaction 2006	-.25	.13	.15	.09	.09
Life satisfaction 2007	-.23	.10	.14	.09	.07
Affect balance	-.31	.11	.11	.12	.10
Positive Affect (happy)	-.16	.13	.15	.08	.07
Negative Affect (sad, angry, afraid)	.35	-.05	-.01	-.11	-.10
Income 2006	-.12	.05	.11	-.08	-.02

As expected, neuroticism is the strongest predictor (Table 16). Also expected is the finding that neuroticism is a stronger predictor of affective balance than of cognitive measures of wellbeing, and that it is more strongly related to negative affect than positive affect (Costa & McCrae, 1980; Schimmack et al., 2002; Schimmack, 2008; Schimmack et al., in press). It is noteworthy that this correlation is the strongest correlation although personality was assessed in 2005 and affective balance was assessed in 2007, and that respondents were asked to report their affect in the past month. Second, the results provide no support for a strong effect of extraversion on wellbeing. The simple correlations are similar to those for the other personality traits. This finding replicates other studies with the SOEP data (Rammstedt, 2007; Schimmack et al., in press). Third, correlations of personality measures with different cognitive wellbeing measures are quite consistent.

Two measurement problems make it difficult to interpret the correlations in Table 11 as evidence for the influence of personality dispositions on wellbeing. First, the correlations in Table 11 are inflated by shared method variance. Second, the correlations are attenuated by measurement error in the assessment of personality traits. It is possible to correct for these biases. First, shared method variance can be removed by regressing wellbeing measures onto all Big Five traits and to rely only on the standardized regression coefficients as measures of the unbiased correlation. The reason is that the shared variance among Big Five traits reflects mostly rating biases (Anusic & Schimmack, 2007; Biesanz & West, 2004). To correct for measurement error in personality measures, it is possible to use self-informant correlations as estimates of valid variance in self-ratings of personality. For short scales, a reasonable estimate is .4. Thus, observed coefficients can be divided by the square root of .4 (~ .6) to obtain adjusted estimates of the true correlations.

Table 17

Standardized regression coefficients predicting wellbeing from Big Five measures (N = 9,892)

Measure	N	E	O	A	C
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Unweighted Domains 2006	-.21	.01	.08	.10	.09
Affect Weighted Domains 2006	-.23	.03	.09	.06	.08
Satisfaction Weighted Domains 2006	-.24	.02	.09	.06	.08
Unweighted Domains 2007	-.19	.03	.08	.10	.07
Affect Weighted Domains 2007	-.21	.04	.08	.08	.07
Satisfaction Weighted Domains 2007	-.22	.03	.09	.07	.07
Life-satisfaction 2006	-.23	.04	.11	.04	.03
Life satisfaction 2007	-.21	.02	.10	.05	.02
Affect balance	-.29	.03	.05	.06	.04
Positive Affect (happy)	-.14	.06	.11	.04	.02
Negative Affect (sad, angry, afraid)	.35	.01	.03	-.06	-.05
Income 2006	-.13	-.01	.12	-.10	-.02

Table 17 shows that correlations with neuroticism remain largely unchanged. After adjusting the coefficients, correlations with satisfaction measures average about .3 (.2 / .6), which is consistent with Schimmack et al.'s (in press) findings. Extraversion no longer has a notable relation to wellbeing measures except positive affect. However, because positive affect is only one component of affect balance, and extraversion is not related to negative affect, extraversion has a negligible relation with wellbeing. Openness, agreeableness, and conscientiousness remain predictors of wellbeing, but even the corrected effect size is typically below .2.

The results have a number of implications. First, the relation between extraversion and wellbeing has to be reexamined. Schimmack et al. (in press) discuss various explanations for the inconsistent findings in the literature. Second, neuroticism is a strong predictor of wellbeing, and future research needs to examine how neuroticism influences wellbeing. One possibility is a direct effect of neuroticism on levels of negative affect irrespective of people's life circumstances. Another possibility is that neuroticism influences how people respond to negative life circumstances. Finally, neuroticism could have negative effects on people's ability to realize preferences. For example, it may reduce income or make it harder to find a romantic partner.

Inspection of individual domain satisfactions provided little evidence for substantive effects of personality traits on specific life aspects. The three strongest partial correlations were observed for neuroticism and health satisfaction (partial  $r = -.09$  in 2006,  $-.11$  in 2007), conscientious and housing satisfaction (partial  $r = .10$  in 2006 and  $.09$  in 2007) and conscientiousness and amount of leisure time (partial  $r = -.12$  in 2006 and  $r = -.10$  in 2007).

In sum, neuroticism is a strong predictor of wellbeing, whereas other personality traits have notably weaker effects. Neuroticism is more strongly related to affect balance than to satisfaction measures. One plausible interpretation of these results is that neuroticism is a personality disposition to experience more negative moods independent of actual life circumstances, which influences people's satisfaction judgments. This could be seen as a bias in self-ratings. However, an alternative view is that people not only want to have a good life, but also have a preference to enjoy their lives. In this regard, neuroticism actually undermines wellbeing.

#### *Political Orientation and Wellbeing*

In recent years, the relation between political orientation and wellbeing has received a lot of attention based on the finding that conservatives in the US report higher levels of wellbeing than liberals (Taylor, Funk, & Craighill, 2006). A recent article suggested that attitudes towards inequality contribute to this difference (Napier & Jost, 2008). The main claim is that "conservatives (more than liberals) possess an ideological buffer against the negative hedonic effects of economic inequality" (p. 565). Based on my definition of wellbeing as preference realization, self-ratings of wellbeing can be influenced by three factors: (a) individual differences in the objective circumstances, (b) individual differences in the perception of these circumstances, and (c) individual differences in preferences. We can eliminate individual differences in objective circumstances because the object of the preference, economic equality, is constant for all individuals at the same moment in time. Individual differences in the perception of inequality (e.g., Republicans living in small towns may encounter less inequality than Democrats living in urban centers) could have an effect, but this has not been explored. Napier

and Jost (2008) proposed that differences in preferences for equality are the causal factor. Preferences for equality can vary in two ways across individuals. First, people may have different ideals about the degree of equality. Second, individuals can vary in the weight that they attach to equality. Presumably, left-leaning individuals are more likely to differ from right-leaning individuals in both ways. Political orientation is a construct that combines several, typically moderately related preferences. For example, people with a preference for equality may also have a preference against capital punishment. Thus, a measure of political orientation is a composite measure that includes preference for equality as a component. The inclusion of other preferences is likely to weaken the empirical relation with wellbeing.

In 2005, the SOEP included a direct question about political orientation. Respondents were asked to make a global rating on a left-right scale ranging from 0 = totally left to 10 = totally right (a better translation might be extremely left, but extreme has a negative connotation in the context of political orientation that the wording totally avoids). Table 13 shows the simple correlations between political orientation and all wellbeing measures.

Table 13

Correlations between political orientation (left-right) and wellbeing (N = 10,426).

Measure	r	partial r (income)	partial r (income,age)
Unweighted Domain satisfaction 2006	.04	.03	.02
Weighted Domain satisfaction 2006	.03	.02	.02
Unweighted Domain satisfaction 2007	.03	.01	.01
Weighted Domain satisfaction 2007	.02	.01	.01
Life-satisfaction 2006	.02	.01	.01
Life satisfaction 2007	.01	-.01	.00
Affect balance	.02	.01	.01
Positive Affect (happy)	-.01	-.02	-.01
Negative Affect (sad, angry, afraid)	-.04	-.03	-.03

Income 2006 .06 - -

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Two findings are noteworthy. First, the results replicate the consistent relationship between political orientation and wellbeing across all measures, including income. Second, the effect size of these correlations is very small. Even if we allow for 50% measurement error in the wellbeing measures, the correlations would remain below .10. The second column in Table 13 shows the correlations with subjective wellbeing measures after controlling for income. Controlling for income implies that political orientation does not influence income. Effect sizes decrease by 50% and in some cases the sign reverses. On average effects are now close to zero. An interesting finding is that political orientation is negatively related to positive affect and negative affect. One possible explanation for this finding is a confounding effect of age because age has a negative relation to both affect components. However, partial correlations that control for income and age show similar results.

The next analysis examined the relation between political affiliation and domain satisfaction. The hypothesis that preferences for economic equality play an important role suggests that domains that reflect economic status (household income, dwelling) should be more strongly related to political orientation than other domains. The pattern of partial correlations is consistent with this prediction, although it is important to note that the effect size of all partial correlations is very small (Table 14).

Table 14

Partial correlations between political orientation and domain satisfactions controlling for average domain satisfaction (N = 5,886 to 10,394)

	2006	2007
Health	-.01	-.01
Work	-.01	-.03
Housework	-.03	-.02

Household Income	.01	.02
Dwelling	.04	.05
Leisure	-.01	-.01
Family	-.02	-.03

In conclusion, the data replicate a correlation between political orientation and wellbeing and show that this relation generalizes across various measures of wellbeing, but the relationship is weak. A stronger correlation might have been obtained if a more direct measure of preferences for equality had been available. However, even if individual differences in preferences for equality were more strongly correlated with wellbeing, causality has not yet been established. Moreover, it is unclear how this research could be used to improve people's wellbeing. Should left-leaning individuals worry less about inequality? Few left-leaning individuals will welcome this recommendation to increase their wellbeing. Should society strive for more income equality? The answer to this question is not a scientific question for wellbeing scientists, but the result of political decision-making. Due to the small effect sizes of this variable, it is not included in subsequent analyses.

#### Correlations between Objective Life Events and Personality Traits

The following analyses examine the correlations among personality measures and objective variables. Some studies suggest that personality traits can influence life-events. For example, one study demonstrated that genetic dispositions that increased the probability of divorce were mediated by higher extraversion and neuroticism, and lower conscientiousness (Johnson, McGue, Krueger, & Bouchard, 2004). However, it is also possible that life-events can change personality ratings (Roberts, 1997). If this were the case, effects of objective life-events on wellbeing could be mediated by changes in personality traits. Schimmack et al. (in press) found that effects of unemployment on wellbeing were not mediated by changes in personality. Specifically, unemployment was related to wellbeing measures, but not to personality ratings. However, the sample size was relatively small.

Table 13

Correlations between objective variables and personality traits (2005)

Measure	N	E	O	A	C
Birth Year	-.06	.08	.07	-.08	-.14
Unemployment	.08	.01	-.03	.01	-.01
Single	-.10	-.07	.00	-.04	-.10
Divorce	-.07	.04	.02	.04	-.04
Widowhood	-.01	.00	-.11	.13	-.02

Table 13 shows the simple correlations between the objective variables and personality measures. Consistent with the literature, age shows positive correlations with agreeableness and conscientiousness, and negative correlations with extraversion and openness. Contrary to the literature, age is not negatively related to neuroticism. In fact, the correlation is positive. The present results do not reveal whether this is a cohort effect, but the results are either inconsistent with the aging literature, which assumes a decrease in neuroticism with age, or an increase in neuroticism in younger generations. The results provide no evidence for the popular claim of a depression epidemic.

Correlations for unemployment are consistent with previous findings (Schimmack et al., in press). The correlation between neuroticism and unemployment is virtually identical. Due to the larger sample size in this study, the finding suggests a reliable correlation between self-reported neuroticism and unemployment. Nevertheless, the correlation is weaker than the correlations of unemployment with wellbeing measures, especially cognitive ones. Thus, the finding does not alter Schimmack et al.'s (in press) conclusion that unemployment has direct effects on wellbeing that are not mediated by neuroticism. Moreover, longitudinal analyses are needed to examine the causal processes underlying the relation between neuroticism and unemployment.

Few studies have examined personality correlates of being single. As all correlations, the correlations in Table 13 have to be interpreted with caution. For example, the finding that singles are less conscientious disappears after controlling for age. The negative relation with extraversion may indicate that introverts have a harder time finding romantic partners. Most surprising is the finding that singles were less neurotic, even after controlling for age. The causal processes that produce this correlation are unclear. However, the results show that neuroticism cannot account for lower wellbeing of singles. Rather, the correlation suggests that the relation would strengthen slightly after controlling for neuroticism.

A relatively large literature has examined personality correlates of divorce. Consistent with this literature, extraversion is positively correlated with divorce, and conscientiousness is negatively correlated with divorce. However, contrary to other studies, neuroticism is negatively related to divorce. This finding is surprising and requires more detailed examination. However, the results suggest that neuroticism is not a third variable that explains the relation between divorce and wellbeing.

The most important finding for widowhood is the lack of a correlation with neuroticism. As a result, neuroticism is neither a mediator nor a third variable that produces a correlation between widowhood and wellbeing. The finding that widowhood had a strong influence on affect balance, but no relation with neuroticism could suggest that the correlation between neuroticism and unemployment is more likely to reveal a causal effect of neuroticism on employment status because it is more plausible that personality traits influence employment than widowhood.

In sum, correlations between objective variables and personality variables are quite small, and much smaller than the correlations of objective variables with wellbeing measures. This finding implies (a) discriminant validity of personality ratings and wellbeing ratings, (b) effects of objective events on wellbeing are not mediated by personality changes, and (c) personality effects on objective life-events and wellbeing do not produce spurious correlations between

objective events and wellbeing. This conclusion is consistent with longitudinal evidence that wellbeing ratings of individuals change in response to divorce, widowhood, and unemployment.

#### Personality Traits as Moderators of Objective Life Events

The next set of analyses examined the possibility that personality traits moderate the relation between objective life-events. Molecular genetics research has identified a specific genetic marker of neuroticism. Specifically, polymorphisms of the serotonin reuptake transporter gene (HTTP5) predicts neuroticism scores. Moreover, the same genetic polymorphism has been shown to moderate the effect of stressful life-events on depression (Caspi et al., 2003). In addition, personality research suggests that neuroticism amplifies affective responses to negative events (Diener et al., 1999). Thus, previous research suggests that neuroticism predicts stronger responses to negative life-events like unemployment, divorce, or widowhood. To examine this hypothesis, I conducted moderated regression analyses (Cohen & Cohen, 1983). Events were coded as 1 for unemployment, widowhood, and divorce, and 0 for the complementary status (employed or married). As a result, a negative interaction term indicates that participants with high neuroticism scores who encountered a negative event are more strongly (negatively) affected by the event.

Table 13

Standardize regression coefficients for the interaction between neuroticism and negative events.

Measure	UE	DIV	WID
Unweighted Domain satisfaction 2006	-.06	-.04	.00
Weighted Domain satisfaction 2006	-.09	-.03	-.01
Unweighted Domain satisfaction 2007	-.10	-.05	.01
Weighted Domain satisfaction 2007	-.09	-.04	.02
Life-satisfaction 2006	-.08	-.02	-.02
Life satisfaction 2007	-.04	-.04	.00

Income 2006	-.09	.02	.06
Affect balance	.01	-.04	-.01
Positive Affect (happy)	.04	-.03	.00
Negative Affect (sad, angry, afraid)	.02	.04	.02

*Note.* UE = unemployment, DIV = divorce, WID = widowhood

Table 13 shows the results for the various measures of wellbeing. Unemployment shows the predicted negative coefficients for all cognitive measures of wellbeing, but not for the affect balance measure. Closer inspection of the affective components shows that this is due to a positive coefficient for positive affect. Surprisingly, even income shows a negative interaction term. The inconsistent findings for cognitive and affective measures create problems for the interpretation of the results. Either measurement problems in the affect measure are responsible, or neuroticism influences cognitions rather than affective reactions. Inspection of domain satisfactions revealed consistently negative coefficients for work and household income in 2006 and 2007, and less consistent findings for other domains. One interpretation of this finding is that neuroticism is a disposition to worry more about unemployment specific aspects of life rather than a disposition that induces depression and general dissatisfaction with all aspects of lives.

The results for divorce provide consistent support for the hypothesis, although all coefficients are small. Moreover, income does not show the same pattern, which is to be expected because it is an input indicator of wellbeing. Thus, even with similar income, neurotic individuals suffer a bigger loss in wellbeing after divorce. Inspection of individual domain satisfaction showed consistent negative relations for the family domain. Results for other domains were more mixed but generally negative. The low statistical power of these analyses makes it difficult to draw firm conclusions about the generality of the interaction across domains.

The results for widowhood are mixed and show no consistent pattern.

In conclusion, the results provide some evidence for statistical interaction effects that warrant further attention. The effect size of this interaction effect suggests that only extremely

low neurotic individuals may be buffered from the negative effects of unemployment on wellbeing. For example, for global life-satisfaction in 2006, the main effect of unemployment (for average levels of neuroticism) was  $-.21$ , and the interaction term was  $.09$ . Thus, even participants who are two standard deviations below the mean in neuroticism would suffer a small decrease in wellbeing ( $-.21 + 2 * .09 = -.03$ ). As in Caspi et al. (2003), there is no evidence for a cross-over interaction. Moreover, widowhood showed no interaction effects, indicating that it has the same effect on people with different levels of neuroticism. Thus, a simple main effect model does capture adequately the sign, if not the magnitude, of these life-events for most people. Thus, I will treat neuroticism and objective life events as independent predictors in a final causal model, even though these analysis suggest that the effects are not perfectly independent.

#### Putting the Pieces Together: A Causal Model

To examine the stability of parameter estimates across various subgroups and to allow for the inclusion of different relationship variables in different age groups, the sample was split into three age groups (under 30, 30-60, over 60). To account for additional age effects, birth year was included as a continuously varying predictor variable within each age group.

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