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A Longitudinal Analysis with Data for Germany**

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ABSTRACT

Authentic Happiness Theory Supported by Impact of Religion on Life Satisfaction: A Longitudinal Analysis with Data for Germany*

Using data from the German Socio-Economic Panel Survey (SOEP), this paper assesses the relationship between life satisfaction and religious practice. The main new result here is longitudinal. It is shown that individuals who become more religious over time record long term gains in life satisfaction, while those who become less religious record long term losses. This result holds net of the effects of personality traits, and also in fixed effects panel models. The paper has significant implications for the dominant, paradigm theory in SWB research, namely set-point theory. This theory holds that the long term SWB of adult individuals is stable, because SWB depends on personality traits and other stable genetic factors. It is already clear from the German panel data that about 20% of the population have recorded large long term changes in SWB. New evidence in this paper and elsewhere about the effects of consciously chosen life goals, including religious ones, on SWB is hard to reconcile with set-point theory. It is more in line with authentic happiness theory.

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1 Research Question

The dominant, paradigm theory in SWB research (research on subjective well being) is set-point theory. This theory holds that the long term SWB of adult individuals is stable, because it depends on personality traits and other stable genetic factors. It is already clear from the German panel data that about 20% of the population have recorded large long term changes in SWB (Headey, 2006, 2008a). New evidence about the effects of consciously chosen life goals, including religious ones, on SWB is also hard to reconcile with set-point theory as currently understood. It is more in line with authentic happiness theory (Petersen and Seligman, 2004). After a brief discussion of set-point and authentic theory of SWB, the paper assesses the relationship between life satisfaction and religious belief and practice. Using data from the German Socio-Economic Panel Survey (SOEP), it shows linkages between long term changes in religious practice and changes in life satisfaction.

1.1 *Emerging problems in set-point theory*

Set-point theory has or had all the marks of a paradigm theory for the field of SWB (Kuhn, 1962). It developed cumulatively over the last thirty years, originally going under the label of adaptation-level theory (Brickman and Campbell, 1971), and appeared to provide an integrated account of linkages between genetic traits, including personality traits, life events and SWB (Brickman, Coates and Janoff-Bulman, 1978; Costa and McCrae, 1980; Headey and Wearing, 1989; Lykken and Tellegen, 1996).

Arguably, however, the theory is now beginning to show serious deficiencies. Its major claim and prediction is that, despite transitory fluctuations, long term SWB does not change. Life events produce temporary fluctuations, but the theory claims that adults soon revert to the SWB set-points accounted for by their unchanging personality traits, notably their levels of extroversion (E) and neuroticism (N).

In fact, the central proposition that long term SWB does not change had never, until recently, been *directly* tested. The German Socio-Economic Panel Survey (SOEP), based

on annual interviews with a large representative national sample, has now been running for over twenty years and is the first dataset to enable a direct test. The evidence from SOEP is that about 20% of the West German prime age adult population have recorded large and apparently permanent changes in their levels of SWB. Taking five-year averages of life satisfaction in order (largely) to eliminate the effects of transitory annual fluctuations, it transpires that 20% recorded changes of two or more points on a standard 0-10 life satisfaction scale; close to one and a half standard deviations (Fujita and Diener, 2005; Headey, 2006, 2008a). These changes were enough to move them, for example, from the 25th to above the 75th percentile of the SWB distribution, or vice-versa. Many more individuals recorded substantial but lesser changes. Altogether, 35% recorded changes of one standard deviation or more, when their life satisfaction score in 2000-04 is compared with 1985-89.

The new evidence from SOEP cannot readily be reconciled with set-point theory as currently understood. The challenge in developing a new or revised theory is to account for the minority who record substantial changes in long term SWB, as well as for the majority who show little or no change.

Obviously, in any new theory, stable personality traits, which are the linchpin(s) of set-point theory, will still have an important role to play. But it is important to realise that these traits are usually regarded as accounting for 40-50% of the variance in SWB, although estimates differ widely (Huppert, 2005; Lucas, 2008; but see Lykken and Tellegen, 1996 for a higher estimate). The SOEP data, in fact, reveal that there are substantial minorities of individuals who have personality traits which would seem to predispose them to low levels of long term SWB, but who actually record high levels. For example, among those recording what is usually thought of as the worst possible combination of traits for SWB – below the mean on E and above the mean on N – 27.0% were in the top two quintiles of life satisfaction in 2000-04 and 11.7% were in the top

quintile. Clearly, then, other variables besides personality traits must play a significant role in accounting for SWB, and especially in accounting for long term change.¹

1.2 Authentic happiness theory

An emerging body of theory which is certainly intended to account for and promote long term change in SWB is authentic happiness theory (Petersen and Seligman, 2004; Lyubomirsky, King and Diener, 2005; Seligman, Parks and Steen, 2005). Authentic happiness theorists, who are mainly psychologists, are critical of what they regard as the excessive focus of mainstream SWB theory on satisfaction and pleasure. Their theory has strong moral, sometimes biblical or Christian overtones, but is nevertheless clearly empirically testable.

They hypothesise that high levels of *long term SWB* come from a life characterized by *meaning* and *engagement*, as well as pleasure (Seligman, Parks and Steen, 2005). Life will only appear meaningful to the individual, and will only be satisfying in the long term, if his/her goals or priorities in life are pro-social (altruistic) and are perceived to have intrinsic value, rather than being purely self-oriented and materialistic. Effective *engagement* in pursuit of these goals/priorities is hypothesized to benefit from the development of various *character strengths*, which include gratitude, humility and forgiveness (Petersen and Seligman, 2004). Religious beliefs and behaviours are viewed by many authentic happiness theorists as a valid approach towards achieving long term SWB (Petersen and Seligman, 2004; Myers, 2008).

Authentic happiness theorists (and others) have conducted both observational and intervention studies designed to test their main hypotheses. Here we briefly review evidence about links between SWB and pro-social goals and behaviours, with particular focus on religion. Lyubomirsky, Sheldon and Schkade (2005) conducted an experiment

¹ Personality variables themselves may play a modest role in accounting for change. Headey (2006), again using the SOEP data, reported that people who rate both high on E and low on N are more likely than average to record long term gains in life satisfaction. Individuals who score low on E and high on N are more likely to record a long term decline in life satisfaction.

in which subjects performed random acts of kindness on a daily basis. Their feelings of positive affect immediately improved and the effect lasted several weeks. Fredrickson (2008) conducted a series of studies of subjects with high levels of positive affect, whether observed or experimentally induced, and found that they recorded improved performance in a wide range of tasks. Exercises involving gratitude ('counting your blessings') have been found to prolong feelings of positive affect and lengthen the period before reversion to an SWB baseline or set point occurs (Emmons and McCullogh, 2003; Frederickson and Joiner, 2002).

In a recent thorough review of links between SWB and religious beliefs and behaviours, Myers (2008) reports that almost all cross-sectional studies have found positive cross-sectional correlations. Generally, the correlations between life satisfaction and religious practice appear to be in the 0.10 to 0.15 range. Further, religious people appear to cope better with stressful life events (Myers, 2008; Clark and Leikes, 2008), and achieve this partly by finding greater meaning in the events and lessons to be learned from them (Niederhoffer and Pennebaker, 2002; Lyubomirsky, Sheldon and Schkade, 2005).

Religious people tend to have a relatively healthy lifestyle (better diet, less smoking and drinking) and partly for that reason they live a few years longer than average (Myers, 2008). They more commonly serve as volunteers than other citizens and volunteering is associated with somewhat higher SWB (Harlow and Cantor, 1996; Thoits and Hewitt, 2001). It is perhaps worth noting, in this context, that brain imaging research appears to indicate that altruistic and cooperative behaviours, especially if reciprocated, are directly gratifying and stimulating to the same areas of the brain as sexual activity and other pleasurable interactions (Rilling et al, 2004).

2 Research plan: Linking authentic happiness theory to set-point theory and long term SWB by analyzing the effects of religious beliefs and activities

It is clear that the authentic happiness school is assembling an increasingly impressive body of supporting evidence. At this stage, however, the evidence has several limitations in contributing to a theory of long term SWB. First, much of it comes from intervention studies which demonstrate only short term effects on changes in SWB. Secondly, the links between SWB and pro-social or religious goals and behaviours are quite modest. Thirdly, nearly all of the studies report these links to SWB without controlling for personality traits. Personality variables should clearly be regarded as temporally and causally antecedent to life goals, so in principle they should be controlled. This is certainly essential in the context of contributing to development of a long term theory of SWB.

In a recent paper on life goals/priorities, using the long term German panel data, the first author attempted to deal with some of these issues (Headey, 2008b; see also Diener and Fujita, 1995). It was shown that individuals who persistently, over a period of years, pursue pro-social goals register long term gains in life satisfaction, whereas those who pursue self-oriented success and material goals register declines in life satisfaction (see also Nickerson et al, 2003; Diener and Seligman, 2004). These linkages held, controlling for the personality traits E and N. However, as expected, links between life goals and SWB (and changes in SWB) remained modest, although statistically significant at the 0.001 level.

In theorising about why pro-social goals can enhance SWB, it was suggested that pro-social goals are non-competitive or non-zero sum (my gain does not detract from your gain, and may even increase your gain), so many people can become better off at the same time. By contrast, material and success goals are generally zero sum, meaning that

one person's gains come at the expense of someone else's losses. So, on average, the community perceives itself as no better off.²

In our empirical analysis we follow a similar approach in relation to religious beliefs and behaviours. In general terms, these too can be regarded as non-zero sum. We use the SOEP data to assess whether individuals who, over the years, rate religion as highly important in their lives and who regularly engage in religious activities record long term gains in life satisfaction. Personality traits and other fixed effects are included in our statistical models.

So far as we know, these will be the first analyses to assess the impact of *changes* in religious practice on *changes* in life satisfaction. Previous analyses have focused only on the static relationship. If, indeed, we find that the two sets of changes are linked, it will have important implications for SWB theory. Set-point theory, as now understood, cannot readily accommodate results showing that consciously chosen life goals, or consciously chosen religious beliefs and practices, can make a significant difference to SWB. We discuss these broader implications in the concluding section of the paper.

3 Methods

3.1 Data: SOEP panel data

The SOEP is the longest-running panel survey in the world to collect data on life satisfaction (Wagner et al, 2007). It began in 1984 in West Germany with a sample of 12541 respondents. Interviews have been conducted annually ever since. Everyone in the household aged 16 and over is interviewed. The cross-sectional representativeness of the

² Easterlin (1974), who first documented that material gains do not normally improve SWB, attributes the result to social comparison and adaptation; individuals only record increased SWB if they make gains *relative* to others. In a later paper (2005), he finds that changes in the family life and health domains do result in changes in SWB. He comments that social comparison and adaptation are less pervasive in these domains. The distinction between zero sum and non-zero sum domains, mentioned above, seems to us to account for the findings more convincingly.

panel is maintained by interviewing ‘split-offs’ and their new families. So when a young person leaves home (‘splits off’) to marry and set up a new family, the entire new family becomes part of the panel. The sample was extended to East Germany in 1990 and since then has also been boosted by the addition of new immigrant samples, a special sample of the rich, and recruitment of new respondents partly to increase numbers in ‘policy groups’. The main topics covered are family, income and labor force dynamics, but a question on life satisfaction has been included every year.

This paper is confined to analysing links between life satisfaction and religious beliefs and practices. One issue was whether to include adherents of all religions or whether to confine analysis to Christians and non-religious people only. All main findings were essentially unchanged whichever approach was adopted, so it was decided to include everybody. In Germany most adherents of religions other than Christianity are immigrants; the largest minority being Muslims. The inclusion of Muslims and other non-Christians probably introduces cultural differences which we cannot fully control for in the analysis. Note, however, that the variable ‘foreign born’ is included as a control in analyses.

Balanced panel results reported in this paper (Tables 3 and 4) relate to the approximately 1500 respondents who repeatedly reported their levels of life satisfaction, religious attitudes and behaviour between 1990 and 2005.³ Analyses using cross-sectional and unbalanced panels are based on much larger samples (Tables 1, 2, 5). In 2005 – the latest year in which data on religion were collected – just over 20000 respondents answered the relevant questions.

3.2

Measures

³ Balanced panel samples only include panel members who responded to questions in all waves used in the analysis. Unbalanced panels also include members who answered in multiple waves but not all waves.

Life satisfaction. The dependent (outcome) variable in all equations is life satisfaction, which is measured in SOEP on a 0-10 ('totally dissatisfied' to 'totally satisfied') scale. This single item measure is plainly not as reliable or valid as multi-item measures of SWB, but it is widely used in international surveys and has been reviewed as acceptably valid (Diener et al, 1999).

In this article we often require longer term measures of life satisfaction – indications of each individual's set point – rather than one-off measures which are subject to temporary fluctuations. So, in line with earlier research, five-year averages of life satisfaction scores (1990-94, 1995-99 and so on) will be used (see also Fujita and Diener, 2005; Headey, 2006, 2008ab).

It has become more or less conventional, when using a 0-10 life satisfaction scale, to acknowledge that the scale is strictly speaking only ordinal, but then to proceed to treat it as an interval scale in regression analysis.⁴

Religious beliefs and activities. Religious beliefs and activities are measured intermittently rather than annually in SOEP. In 1994, 1998 and 1999 respondents were asked about the importance of religion in their lives. A four-point scale was used, running from 'not at all important' to 'very important'. On eleven occasions between 1990 and 2005 respondents have also been asked about the frequency with which they attend church or engage in other religious activities. Again, a four-point scale is used, running from 'never' to 'at least once a week'.⁵

⁴ Andrews and Withey (1976) first showed that results based on treating life satisfaction scales as interval level were substantively much the same as when the scales were treated as ordinal.

⁵ In fact, the scale used was extended to 5 points in four of the interviews. This was done by including the option 'at least once a day'. Less than 1% of the population reported activities of this frequency.

As was the case with life satisfaction, we shall want to use longer term measures of the ‘importance of religion’ and of ‘religious activity’.⁶ As before, the approach will be to average scores from multiple waves of data. Again, the only practical approach in regression analysis is to treat the resulting long ordinal dimensions as interval scales.⁷

As expected, the two variables ‘importance of religion’ and ‘religious activity’ are highly correlated; over 0.65. So it probably only makes sense in our analyses to include one or the other (but not both) as explanatory variables on the right hand side of equations. In some preliminary runs both were included. The effect was simply to partition the variance accounted for by ‘religion’ into roughly two equal parts.

The questions about religion are of course put to all SOEP respondents: Christians, adherents of other religions, and non-religious people. Muslims comprise the largest non-Christian religious group. Preliminary analysis indicated that links between life satisfaction and religious belief and practice appeared not to vary between groups, so all are included in this paper.

Personality traits. In 2005 the SOEP study made its first major investment in measuring personality traits. The chosen instrument was a short version of the Big Five Personality Domains – NEO-AC (Costa and McCrae, 1991). The traits in the Big Five are extraversion (E), neuroticism (N), openness (O), agreeableness (A) and conscientiousness (C). SOEP used short versions of the five scales which are reported to be satisfactorily correlated with the much longer versions developed by psychologists (Gerlitz and Schupp, 2005).

⁶ We do not use measures of affiliation to a particular church, because we know that in Germany a lot of people who “belong” to a church are in fact not religious. Data from a special SOEP-Study in 2008 show that about 10 percent of Protestant and Catholic respondents have no religious feelings or reported spiritual experiences at all. About 50 percent of both groups have weak feelings of spiritual experience.

⁷ Inspection of cross-tabulations between life satisfaction and both ‘importance of religion’ and ‘religious activity’ suggest that, in fact, there is larger break in the middle of both 4-point scales than at the extremes. The largest differences in life satisfaction were recorded between those who reported that religion was ‘not very important’ and ‘important’ (points 2 and 3 on the scale), and those who reported religious activity ‘less than once a month’ and ‘once a month’ (also points 2 and 3).

For present purposes the inclusion of personality traits is essential because it is certain that some traits, notably E and N, are related to life satisfaction and so should be ‘controlled’ on the right hand side of equations in which the aim is to assess the impact of religious attitudes and behaviour on life satisfaction. As noted above, this approach is also necessary in any attempt to integrate the insights of set-point theory with those of the authentic happiness school.⁸

It should be stressed that, by including personality traits measured in 2005 on the right hand side of equations to account for life satisfaction in earlier years, we are in effect assuming that personality is stable. If it were completely stable, then of course it would not matter when it was measured. However, the assumption is not completely correct. It is thought that ratings on personality traits can be changed to a moderate degree, especially among younger adults, by life experiences like having a stable marriage or an absorbing job (Roberts, Walton and Viechtbauer, 2006; Scollon and Diener, 2006).

4 Empirical Results

A preliminary point of information, which is relevant to the linkage between religion and life satisfaction, is that 18-19% of Germans – about 22% in West Germany and 8% in the East – report that they now attend church at least once a month. The figures suggest that church-going must, in most cases, be a chosen activity, not a matter of social conformity. It is also of interest that in the sixteen years for which SOEP provides evidence (1990-2005), there was no decline in church attendance, although some observers believe that they detect a longer term secularization of German society (Halman and Pettersson, 2006; see also Beck, 2008). Additional descriptive information relating to religion and other variables is provided in the Appendix.

⁸ The traits, conscientiousness and agreeableness, are also moderately correlated with life satisfaction. However, including them as explanatory variables in the equations given below made no substantive difference to results.

4.1 Cross-sectional results: support for the literature

As noted in the introduction, researchers in many countries have found statistically significant but substantively quite modest cross-sectional relationships between life satisfaction and aspects of religious belief and behaviour. The SOEP data replicate these results for Germany, both with regard to the importance people attach to religion in their own lives and to frequency of engagement in religious activities, including church attendance.⁹ However, a new contribution in Table 1 comes from assessing whether the linkages still hold, controlling for the personality traits extroversion and neuroticism, as well as other potentially confounding variables. In model (1) we control only for variables which should plainly be regarded as causally antecedent to or coterminous with the religion variables: gender, age and country of birth, plus personality traits. In model (2) controls are also in place for marital/partner status, education, income and health. The causal logic here is debatable, since it might plausibly be argued that these variables could be influenced by religious beliefs and behaviours.

⁹ This result is strongly supported by new results reported by Trautmueller (2008) who finds – based on SOEP data too – that religious people (believers and/or attenders of church services) have larger networks of friends and see their friends more frequently than non-religious people. A special cross-sectional study of SOEP which was in the field in August 2008 shows that highly religious respondents report much higher ratings on dimensions like “empathy”, “forgiveness”, “reconciliation”, “fairness” and “teamwork” than respondents with average religiosity. Another indicator for the relevance of religiosity is that on some of the latter dimensions non-religious respondents score above the average, but never above the religious respondents. So it is clear that highly religious people have very different self-perceptions than other respondents.

Table 1

**Impact of Religious Belief and Behaviour on Life Satisfaction:
OLS regressions (metric coefficients)**

Explanatory variables	Life Sat. (0-10) Model (1)	Life Sat. (0-10) Model (1)	Life Sat. (0-10) Model (2)	Life Sat. (0-10) Model (2)
Importance of religion	0.19***		0.19***	
Religious activities	-	0.18***	-	0.17***
Gender	0.04	0.06	0.06	0.07
Age	-0.05***	-0.05***	-0.08***	-0.09***
Age squared/10	0.00***	0.01***	0.01***	0.01***
Foreign born (1-0)	-0.16**	-0.11	-0.09	-0.05
Extroversion	0.13***	0.14***	0.13***	0.14***
Neuroticism	-0.29***	-0.28***	-0.27***	-0.26***
Partnered (1-0)			0.37***	0.36***
Years of education			0.01	0.00
HH disposable income/1000			0.01***	0.01***
Health disability (1-0)			-0.59***	-0.59***
Adj. R squared	7.1%	7.1%	11.1%	11.0%
N	7329	7319	6929	6918

Source: SOEP 1999; the latest year in which both variables relating to religion were included in the same survey.

***significant at 0.001 **significant at 0.01 *significant at 0.05

The bivariate correlation between life satisfaction and ‘importance of religion’ is only 0.09 and the correlation with ‘religious activities’ is 0.10. Despite these lowish correlations, the regression results in Table show that the relationships remain significant at the 0.001 level in both models. In fact, in the multivariate analysis the two religious variables appear to be about as strongly (or weakly) related to life satisfaction as extroversion, which SWB researchers generally regard as a key explanatory variable.¹⁰

In Germany, as elsewhere in Europe, more women than men profess religious belief and attend church. A plausible hypothesis, perhaps, is that religion is more closely

¹⁰ One way to assess their relative importance is to compare the size of standardized coefficients (Betas). In model (1) the Beta for extroversion was 0.09, for importance of religion Beta=0.10 and for religious activities also Beta=0.10.

associated with life satisfaction for women than men. Table 2 reports similar results to Table 1 but with a gender breakdown.

Table 2
Impact of Religious Belief and Behaviour on Life Satisfaction: Comparing Men and Women
OLS regressions (metric coefficients)

Explanatory variables	Men Life Sat. (0-10) Model (1)	Women Life Sat. (0-10) Model (1)	Men Life Sat. (0-10) Model (1)	Women Life Sat. (0-10) Model (1)	Men Life Sat. (0-10) Model (2)	Women Life Sat. (0-10) Model (2)	Men Life Sat. (0-10) Model (2)	Women Life Sat. (0-10) Model (2)
Importance of religion	0.18***	0.20***	-	-	0.17***	0.20***	-	-
Religious activities	-	-	0.18***	0.18***	-	-	0.17***	0.16***
Age	-0.06***	-0.04***	-0.06***	-0.04***	-0.10***	-0.07***	-0.10***	-0.07***
Age squared/ 10	0.01***	0.00***	0.01***	0.00***	0.01***	0.01***	0.01***	0.01***
Foreign born (1-0)	-0.23*	-0.08	-0.19*	-0.03	-0.16	-0.02	-0.12	0.02
Extroversion	0.09***	0.17***	0.10***	0.18***	0.10***	0.16***	0.11***	0.17***
Neuroticism	-0.31***	-0.27***	-0.30***	-0.27***	-0.29***	-0.25***	-0.28***	-0.24***
Partnered (1-0)					0.48***	0.25***	0.46***	0.25***
Years of education					0.01	0.00	0.01	-0.00
HH disposable income/1000					0.01***	0.02***	0.01***	0.02***
Health disability (1-0)					-0.47***	-0.72***	-0.49***	-0.71***
Adj. R squared	7.7%	7.0%	7.8%	6.8%	11.5%	11.0%	11.7%	11.0%
N	3464	3865	3455	3864	3277	3652	3267	3651

Source: SOEP 1999; the latest year in which both variables relating to religion were included in the same survey.

***significant at 0.001 **significant at 0.01 *significant at 0.05

The ad hoc hypothesis that religion would have greater impact on the life satisfaction of women than men receives no support. There were no statistically significant gender differences at all in the coefficients linking the importance of religion or religious activity to satisfaction.

It should also be recorded that there were no East-West German differences in the strength of the link between religion and life satisfaction, although church-going is over twice as prevalent in the West. As noted earlier, results were also unaffected by inclusion or exclusion of the fairly small number of SOEP respondents, mostly immigrants, espousing religions other than Christianity. In the case of Muslims – the largest of the ‘minority’ groups – the links between religion and life satisfaction appeared to be about the same as among Christians.

4.2 Longitudinal results: Long term changes in religious activity are associated with long term changes in life satisfaction

A major advantage of the panel data is that we are able to assess whether long term changes in religious practice are associated with long term changes in life satisfaction. A reasonable hypothesis, in line with authentic happiness theory, is that people who become more religious over time may record gains in life satisfaction. Conversely, people who become less religious may show a decline in satisfaction. Further, theory would suggest that gains and losses are more likely – and certainly more likely to last – if changes in religious belief and practice are maintained for a lengthy period, rather than being transient.

Evidence of long term change is only available for the variable measuring frequency of religious activities; data were collected on eleven occasions from 1990-2005.¹¹ To assess whether long term change has occurred, we average both life satisfaction scores and scores for the frequency of religious activity scale during the first five-year period,

¹¹ Recall that the variable ‘importance of religion in your life’ was included only in the 1994, 1998 and 1999 surveys.

1990-94, and then again for the last five years, 2001-05. Our measures of change for both variables are simply the first difference scores obtained by subtracting Life Satisfaction 1990-94 from Life Satisfaction 2001-05, and Religious Activity 1990-94 from Religious Activity 2001-05.

We then regress change in life satisfaction on change in religious activity. The same variables are used as ‘controls’ as in Tables 1 and 2. Additionally, Life Satisfaction 1990-94 is also included on the right hand side of equations because it is highly negatively correlated with the dependent variable.¹²

Table 3

Impact of Long Term Change in Religious Activity on Long Term Change in Life Satisfaction: OLS regressions (metric coefficients)

Explanatory variables	Change in Life Sat. between 1990-94 & 2000-05 Model (1)	Change in Life Sat. between 1990-94 & 2000-05 Model (2)
Change in frequency of religious activities from 1990-94 to 2000-05	0.14***	0.17***
Gender	0.11	0.16*
Age	-0.00	-0.00
Age squared/10	0.00	0.00
Foreign born (1-0)	-0.11	-0.04
Extroversion	0.11***	0.13***
Neuroticism	-0.22***	-0.23***
Life satisfaction 1990-94	-0.45***	-0.48***
Partnered (1-0)		0.02
Years of education		0.03*
HH disposable income/1000		0.01***
Health disability (1-0)		-0.07
Adj. R squared	20.1%	23.1%
N	1816	1525

Source: SOEP 1990-2005.

***significant at 0.001 **significant at 0.01 *significant at 0.05

¹² SWB researchers are well aware of the large negative correlation found in all panel surveys between life satisfaction at baseline and change in life satisfaction a year later.

Table 3 gives a new and perhaps quite important result. It is clear that increases and decreases in religious activity are associated with long term gains and losses in life satisfaction. The effect size is not large but the relationship is significant at the 0.001 level, controlling for a range of possible confounding factors.

In view of the claim in set-point theory that the SWB of mature age people is normally stable, it is important to check whether the result just given holds for this population group. Mature age people, for these purposes, can be defined as those aged between 30 and 69 throughout the period. This excludes not just young people, including young adults, but also seniors whose life satisfaction and levels of religious activity might be changed by declining health, or perhaps approaching death.

Table 4

Mature Age Adults: Impact of Long Term Change in Religious Activity on Long Term Change in Life Satisfaction: OLS regressions (metric coefficients)

Explanatory variables	Change in Life Sat. between 1990-94 & 2000-05 Model (1)	Change in Life Sat. between 1990-94 & 2000-05 Model (2)
Change in frequency of religious activities from 1990-94 to 2000-05	0.18***	0.19***
Gender	0.10	0.12
Age	0.03	0.02
Age squared/10	-0.00	-0.00
Foreign born (1-0)	-0.19*	-0.10
Extroversion	0.12***	0.13***
Neuroticism	-0.19***	-0.19***
Life satisfaction 1990-94	-0.43***	-0.46***
Partnered (1-0)		-0.06
Years of education		0.04*
HH disposable income/1000		0.01**
Health disability (1-0)		-0.02
Adj. R squared	19.3%	22.0%
N	1373	1248

Source: SOEP 1990-2005.

***significant at 0.001 **significant at 0.01 *significant at 0.05

In the event, it transpires that the impact of changes in frequency of religious activity on life satisfaction is no weaker – if anything marginally stronger - among mature age adults than in the population as a whole. It appears that the set-points of prime age can be changed by religion.

4.3 Controlling for unobserved fixed effects : Could the link between religious practice and life satisfaction be due to unmeasured variables?

It remains a possibility that the apparent linkage between religious practice and life satisfaction is wholly or partly due to *unmeasured variables*, or what economists usually term ‘unobserved heterogeneity’. Researchers routinely note this possibility and some speculate on which unmeasured variables may be implicated. For example, Clark and

Lelkes (2008) suggest that religious people may be happier than average because they mostly come from religious homes, which may have offered them more stability and emotional security in childhood than is found in the average home. Generally speaking, however, researchers cannot address these issues, precisely because of non-measurement. However, when long-run panel data are available, it is possible to estimate *fixed effects models* which control for the effects of any omitted confounding variables which, from an intra-person (within-person) standpoint, are fixed or unchanging in their effects. For example, the stability of one's childhood home background – the variable which Clark and Lelkes suggest may be important – is a fixed effect (or constant) within persons, although it is of course variable between persons.

The availability of eleven waves of SOEP data on religious activities and life satisfaction makes it feasible to estimate generalized least squares (GLS) fixed effects models of the relationship between the two variables. The first step is to see if there is any evidence that fixed effects may account for a significant percentage of over-time variance in life satisfaction, when life satisfaction is regressed on religious activity, plus standard control variables (as in Tables 1-4 above). A standard diagnostic test for the presence of variance due to fixed effects is the Breusch-Pagan (1979) test.

In the event, the diagnosis indicated that substantial and statistically significant variance appeared to be due to fixed effects. So we then estimated two fixed effects (within-person) models of year-on-year changes in life satisfaction (Table 5). In the first model the only explanatory variable was frequency of religious activity. Other variables included in previous equations, like gender, age and personality traits, could not be included precisely because, from a within-person perspective, they are fixed. In the second model, variables on which individuals do record change over time were included: marital/partner status, years of education, disposable income and disability status.

Table 5

Fixed Effects Models of the Link Between Year-On-Year Changes in Religious Activity and Life Satisfaction: GLS regressions (metric coefficients)

Explanatory variables	Annual changes in Life Sat. 1990-2005 Model (1)	Annual changes in Life Sat. 1990-2005 Model (2)
Annual changes in frequency of religious activities from 1990 to 2005	0.07***	0.05***
Partnered (1-0)		0.18***
Years of education		-0.01
HH disposable income/1000		0.01***
Health disability (1-0)		-0.15***
Adj. R squared	1.2%	3.7%
N	131485	73072

Source: SOEP 1990-2005. Life satisfaction was measured in all years. Religious activity was measured in all years except 1991, 1993, 2000, 2002 and 2004. The Ns relate to all years of data combined.

***significant at 0.001 **significant at 0.01 *significant at 0.05

The main difference between the analyses reported in Table 5, compared with Tables 3 and 4, needs to be reiterated. The previous tables dealt with the important issue for SWB theory of the linkage between long term changes in religious activity and long term changes in life satisfaction. Table 5 really just addresses a methodological issue about unmeasured variables/unobserved heterogeneity, and uses only short term (year-on-year) data about change. The results from these final analyses show that the link between religious activity and life satisfaction holds up, and remains significant at the 0.001 level, when account is taken of unmeasured fixed effects. The effect sizes (Bs) for the religious activity variable are weaker than in the previous analysis, dealing with long term change, but this is exactly what one would expect, given annual data and controls for fixed effects.

5 Discussion: Implications for SWB theory

Evidence from the long running German Socio-Economic Panel has increasingly important implications for SWB theory. This paper has shown that religious beliefs and activities can make a substantial difference to life satisfaction. This result is very much in line with authentic happiness theory and sits uneasily with set-point theory, which is

currently the dominant theory in the field. Previous analyses based on the German panel have already dented set-point theory by showing that the SWB of at least 20% of adults appears to have undergone long term change during the last twenty years (Headey 2006, 2008a). Further, and also in line with authentic happiness theory, it has been shown that differences in life goals have long term effects on life satisfaction (Headey, 2008b). Individuals who persistently pursue pro-social/altruistic goals record long term gains in satisfaction, just as do people who increase their involvement in religious activities.

Set-point theory and authentic happiness theory are not directly contradictory, but they point in very different directions. Set-point theory implies that happiness is mainly in the genes. A clear implication is that neither individuals, nor public policy, nor therapeutic interventions can do much to improve matters. Authentic happiness theory, on the other hand, claims that consciously chosen individual goals and behaviours can affect long term SWB. Is it possible to develop a revised account which integrates insights from the two theories? Clearly this is likely to prove a difficult assignment, but a preliminary observation may be made. It is clear that the effects of stable traits, of all genetic influences on SWB, are much larger than the effects of life goals and priorities, including religion. So any new or revised theory will need to be based on accepting that genetic endowments should be seen as basic building blocks, or multipliers, in any SWB production function. There is a place for life goals, including religion, but the effect sizes – the coefficients linking them to SWB - seem relatively small.

APPENDIX

Sample Descriptives^a

	Mean	S.D.	Corr with LS ^b
Life Satisfaction (0-10)	6.95	1.83	-
Importance of Religion (1-4)	2.22	0.96	0.09
Frequency of Religious Activity (1-4)	1.75	0.94	0.12
Protestant (%)	33.33	-	0.05
Catholic (%)	29.97	-	0.06
Other Christian (%)	2.30	-	0.00 (ns)
Non-Christian (%)	3.97	-	0.03
Non-religious (%)	30.42	-	-0.10
Female (%)	50.21	-	0.00 (ns)
Age	40.06	21.80	-0.06
Foreign born (%)	20.77	-	-0.04
Extroversion (1-7)	5.29	1.23	0.19
Neuroticism (1-7)	3.96	1.22	0.28

- a. Results are for the latest year available in 1990-2005 (usually 2005). Sample sizes vary.
- b. Pearson product moment correlations with Life Satisfaction. All are significant at the 0.001 level unless marked 'ns'. 'ns' = not significant at the 0.001 level.

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