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**Alternative Values-Based 'Recipes' for  
Life Satisfaction: German results with  
an Australian replication**

Bruce Headey and Gert G. Wagner

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# **Alternative Values-Based ‘Recipes’ for Life Satisfaction: German results with an Australian replication\***

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# **Alternative Values-Based ‘Recipes’ for Life Satisfaction: German results with an Australian replication**

## *Abstract*

In most research on Life Satisfaction (LS), it is assumed that the covariates of high and low LS are the same for everyone, or at least everyone in the West. In this paper, analysing data from the German Socio-Economic Panel, with a limited replication based on Australian panel data, we estimate models of alternative ‘recipes’ for LS. There appear to be at least *four distinct ‘recipes’*, which are primarily based on the values of different population sub-sets. These values are: altruistic values, family values, materialistic values and religious values. By a ‘recipe’ for LS we mean a linked set of values, behavioural choices and domain satisfactions, which appear to be held together by a person’s values, and which prove to have substantial effects on LS. Our German and Australian evidence indicates that individuals who follow recipes based on altruistic, family or religious values record above average long term LS, whereas the materialistic values ‘recipe’ is associated with below average LS.

*Keywords: life satisfaction; alternative recipes; values/life priorities; behavioural choices; domain satisfactions; panel data, SOEP*

## Introduction

### *One size fits all?*

In most research on the determinants of Life Satisfaction (LS), there is an implicit assumption that ‘one size fits all’. That is, it is usually assumed that the correlates of LS are similar for everyone, or at least everyone in the Western world (Diener et al, 1999). Even the rapidly growing body of research on LS in low and middle income countries appears to be based on the same assumption, except for recognition of the greater importance of income and corruption (Helliwell, Layard and Sachs, 2012-17).

Using data from the German Socio-Economic Panel, with a partial replication based on Australian panel data, we present evidence of *alternative ‘recipes’ for LS*.<sup>1</sup> We show that there appear to be *four distinct ‘recipes’*, which are held together by the *values (life priorities, goals, economists would just ‘preferences’)* of different subsets of the population (Kluckhohn and Strodtbeck, 1961). The values which provide the basis for the recipes, are:

- altruistic/pro-social values
- family values
- materialistic values
- religious values.

By a ‘recipe’ we mean a conceptually linked set of (1) values (2) behavioural choices and (3) domain satisfactions that we find to be empirically linked to each other, and to have substantial, and not merely statistically significant, effects on LS. For example, the altruistic ‘recipe’ involves giving high priority to altruistic, pro-social values which we hypothesise are linked to the behavioural choices of engaging in volunteer work and meeting often with friends, relatives and neighbours to provide help and support as well as friendship. Altruistic values and behavioural choices are then expected to be linked to high levels of satisfaction with volunteering and with one’s social life.

It turns out that individuals who prioritise altruistic values (like proponents of the other recipes) usually have partners who share their values (Aguiche and Trommsdorff, 2010; Headey, Muffels and Wagner, 2014). If they do, LS is further enhanced.

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<sup>1</sup> An extended analysis of the German results is in Headey and Wagner (2018).

Our panel data evidence shows that that three recipes – the altruistic, family and religious recipes – are relatively ‘successful’ in delivering above average levels of LS, whereas the materialistic recipe appears ‘unsuccessful’ in that it is linked to below average LS. A possible reason, it is suggested, for the first three recipes being relatively ‘successful’ may be that they involve pursuing *non-zero sum goals*. In other words, one person’s gains in pursuing altruistic, family or religious goals do not usually require losses for anybody else. But pursuit of materialistic– career and money goals – usually involves a zero sum game, so that gains achieved by one person imply losses for others.

*Previous research: the implicit assumption that ‘one size fits all’*

Here are some quotations from leading researchers in the LS field. They all imply that ‘one size fits all’.

- “Psychological wealth includes life satisfaction, the feeling that life is full of meaning, a sense of engagement in interesting activities, the pursuit of important goals, the experience of positive emotional feelings, and a sense of spirituality that connects people to things larger than themselves. Taken together, these fundamental psychological experiences constitute true wealth” (Diener and Diener, 2008).
- “The most salient characteristics shared by the 10% of students with the highest levels of happiness and the fewest signs of depression were their strong ties to friends and family and commitment to spending time with them” (Diener and Seligman, ‘Very happy people’, 2002).
- “The secrets to happiness are: a happy marriage, skill in the daily round – a fulfilling job pitched at a realistic level, and some all-absorbing private interest” (Argyle, 2002).
- “Six key variables contribute to explaining the full sample of national average happiness scores over the whole period 2005-2015. These variables include GDP per capita, social support, healthy life expectancy, social freedom, generosity and absence of corruption” (United Nations, *World Happiness Report*, 2016).

‘Positive psychology’ researchers, whose focus is more on eudaemonic happiness than LS, also usually imply that ‘one size fits all’. A well known positive psychology acronym is PERMA (Seligman, 2011). Human beings, it is claimed flourish when their lives are

characterised by **P**leasure, **E**ngagement, **R**elationships, **M**eaning and **A**ccomplishment (Seligman, 2011). Fredrickson's (2009) widely cited 'broaden and build' theory of personal development is also 'one size fits all'. It rests on the Logada ratio; the view that human beings tend to approach their full potential when they experience about two-thirds positive emotions and one-third negative (Fredrickson and Logada, 2005).

### *The effects of values on LS*

There is a vast body of research on human values, defined as the goals people rate as desire to live by. A key issue in this research has always been the extent to which, if at all, values or more generally attitudes, rather than situational factors, predict behaviour (Fishbein and Ajzen, 1974).<sup>2</sup> Here, we limit ourselves to reviewing research that has investigated linkages between values and LS.

Two Michigan pioneers of research on well-being, Andrews and Withey (1976), gave a negative assessment of the effects of values on LS. They gave their survey respondents a long list of potentially important values and asked for ratings on a scale running from 'not at all important' to 'very important'. They reported that responses were subject to social desirability bias, with almost all respondents giving high ratings to family values. Importance ratings, it appeared, had low test-retest reliability. Crucially, they reported that there was no procedure by which they could use values data (however transformed) to improve their predictions of LS.<sup>3</sup>

Subsequent to Andrews and Withey's investigation, there have been just a few research papers about possible linkages between values and LS. Diener and Fujita (1995), using student samples, examined links between life goals and resources, and found that high LS individuals appeared to be smarter than low LS individuals in selecting goals for which they had appropriate resources and skills. Nickerson, Schwarz, Diener and Kahneman (2003) reported that individuals who give priority to financial and career success (which they termed "the dark side of the American dream") had lower LS than their less materialistic people. Studies of volunteering – a clear form of altruistic behaviour – have shown that community

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<sup>2</sup> Fishbein and Ajzen's theory of reasoned action has provided a framework for much of the debate. Their focus is the attitude-behaviour link, rather than values and behaviour, but values are clearly one type of attitude.

<sup>3</sup> Specifically, they expected to find significant interactions between satisfaction with particular life domains and the importance attached to those domains. So it was expected that people who were satisfied in life domains that they rated as 'important' would record enhanced levels of LS, over and above levels predicted by the domain satisfactions alone. They found no significant interactions.

volunteers have significantly (but not much above) average levels of LS (Harlow and Cantor, 1996; Thoits and Hewitt, 2001).

In a previous paper, based on the German panel data, Headey (2008) reported that respondents who prioritise either altruistic or family values record higher LS than those who prioritise materialistic values. This paper continues the inquiry by showing links between values and associated behavioural choices and domain satisfactions in two countries.

#### *Framework for structural equation modelling*

Our approach in this paper is to estimate structural equation models based on the concepts and links set out in Figure 1:

INSERT FIGURE 1 HERE

The outcome variable is *Life Satisfaction (LS)*. At the first step of the model are *socio-economic variables* (e.g. gender, years of education) and *personality traits* (e.g. neuroticism, extroversion), which are viewed as temporally and causally antecedent to *values/life priorities*. Socio-economic variables may have effects on values, but are included mainly as ‘controls’. Personality traits clearly need to be in the model, because it is well established that LS is affected by the traits of neuroticism, extroversion, agreeableness and conscientiousness (Lucas, 2008).

At the second step of the model are the *values* that, so we hypothesise, drive *behavioural choices* (e.g. voluntary work, time spend with relatives, church attendance). Socio-economic variables, traits, values and behavioural choices then influence *domain satisfactions* (e.g. satisfaction with family, friends, work, income). Last, all antecedent variables jointly affect *Life Satisfaction*.

*Estimation strategy: structural equation models of overlapping 5-year periods 2003-07 to 2012-16*

By setting out a causal sequence in which variables are hypothesised to take effect, the model in Figure 1 implies a time sequence. LS is the outcome variable: we allow for time lags by modelling socio-economic variables and personality traits as lagging LS by four years, values are lagged by three years, behavioural choices by two years, and domain satisfactions by one



year. Estimates come from structural equation models (StataCorp, 2017), which cover overlapping 5-year periods from 2003-07 to 2012-16.

German results will be given in the main part of the paper. The part-replication, based on Australian data, will be covered in a short section towards the end.

## **Methods**

### *The German Socio-Economic Panel (SOEP) and the Australian HILDA panel*

Our main data are drawn from the German Socio-Economic Panel (SOEP) for the years 2003-16. Replicatory results for Australia are based on data from the Household Income and Labour Dynamics Survey Australia (HILDA) 2001-15.

SOEP was launched in 1984 in West Germany with a sample of 12,541 respondents (Wagner, Frick and Schupp, 2007). Interviews have been conducted annually ever since. Everyone in sample households age 16 and over is interviewed. In order to maintain representativeness, ‘split-offs’ (e.g. children who leave the parental home to set up their own household) and their new family members (if any) join the panel. The sample was extended to East Germany in 1990, shortly after the Berlin Wall came down, and since then has 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’ (e.g. welfare recipients). Over 80,000 people have now been interviewed, including some grandchildren as well as children of the original respondents (Goebel et al., 2018).

The sample used in this paper comprises prime age respondents 25-54, and is for the years 2003-16. The reason for the age restriction is that, in analysing family values, we want to focus on people in their main child-rearing years, and in analysing material (career and money related) values, we need to focus on working years. The reason for restricting the time period is that, as mentioned, SOEP only began to include some of the variables required for this paper in the early 2000s.

The Australian HILDA panel began in 2001 with a sample of 13,969 individuals in 7,700 households (Watson and Wooden, 2004). Face-to-face interviews were achieved in 61% of in-scope households. All household members age 15 and over are interviewed. As in Germany, the cross-sectional representativeness of the panel is maintained by interviewing

‘split-offs’ and their new families. A top-up sample (N=2153), partly with a view to including recent immigrants, was added to the panel in 2011. It may be noted that, as happens in many panels with good retention rates, the sample size is now increasing. That is, the number of individuals added to the panel each year, via split-offs and young people turning 15, exceeds the number who die, cannot be traced, or drop out by refusing an interview.

As with the German panel, only prime age people (25-54) are included in analyses.

*Dependent variables: single and multi-year measures of LS, and individual differences in volatility over time*

In both the German and Australian panels LS is measured annually on a 0-10 scale (‘totally dissatisfied’ to ‘totally satisfied’). Single item measures of LS are plainly less satisfactory than the best available multi-item measures, but they are internationally widely used in household panel surveys and have been reviewed as acceptably reliable and valid (Diener, Suh, Lucas and Smith, 1999).

For ease of interpretation, the LS scale has been transformed to run from 0-100 instead of 0-10. This means that coefficients linking explanatory variables to LS can be conveniently interpreted as ‘quasi-percentiles’.

*The Grand Standard Mean of LS 2007-16*

As well as including annual measures of LS in statistical models, we also make use of a multi-year measure: the Grand Mean of LS. An individual’s Grand Mean is his/her mean level of satisfaction for an extended period. For the German panel, the measure we use is for the decade 2007-16; in the Australian case, for reasons explained below, we restrict the period to 2002-05.

*Explanatory variables*

As indicated in Figure 1, several sets of explanatory variables will be used to account for levels and volatility of LS: socio-economic characteristics, personality traits, values, behavioural choices, and domain satisfactions.

### *Socio-economic characteristics*

It is common in reviews of LS to read that individual socio-economic characteristics have only small effects on LS (Argyle, 2001; Diener et al, 1999). However, it still makes sense to include socio-economic variables in statistical models, if only as ‘controls’. The following variables have been included in all equations underlying results reported in this paper: gender (female=1 male=0), age, partner/marital status (partnered=1 not partnered=0), years of education, household net income (natural logarithm), unemployed (unemployed=1 other=0), disability status (disability=1 other=0), and for Germany... East German (East=1 other=0) and foreign (foreign=1 German=0).

### *Personality traits*

The main personality traits measured in both SOEP and HILDA are the so-called Big Five, which many psychologists regard as adequately describing normal or non-psychotic personality: neuroticism, extroversion, openness to experience, agreeableness and conscientiousness (Costa and McCrae, 1991). These traits are partly genetic and interpersonally stable in adulthood (Lykken and Tellegen, 1996; Lucas, 2008), so it makes sense to treat them as antecedent to values, behavioural choices and satisfactions.

An additional personality trait, also measured both SOEP and HILDA, is risk willingness (risk aversion). In SOEP the relevant question is asked on a 0-10 scale and refers to risk-taking in general. It has been shown in laboratory settings that respondents’ answers correlate quite strongly with behavioural measures of risk-taking in financial and other areas (Mata et al, 2018). In HILDA the question relates specifically to financial risk-taking, measured on a 1-4 scale running from ‘not willing to take financial risks’ to ‘takes substantial risks expecting substantial returns’.<sup>4</sup>

### *Personal values*

Instead of trying to measure a long list of miscellaneous values – the approach taken in most previous research - the SOEP research team set out to measure just three sets of values/life priorities, based on an a priori classification proposed by Kluckhohn and Strodtbeck (1961).

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<sup>4</sup> There is also an option to report ‘never has any spare cash’.

- *Altruistic, pro-social values*: being there for others, friendship, social and political activism.
- *Family values*: marriage, children and the home
- *Materialistic values*: money, career success.

Items measuring values have been included in the SOEP questionnaire in seven waves: 1990, 1992, 1995, 2004, 2008, 2012 and 2016 (Richter et al, 2013). Questions are answered on a 1-4 scale with the end-points labelled ‘very important’ and ‘not at all important’.<sup>5</sup>

Importantly, factor analysis of all seven waves of data shows that the same stable three-factor structure is always found. Nevertheless, in our opinion, three of the items lack face validity, despite loading satisfactorily on their designated factor. The items we retained for measuring *materialistic values* are ‘being able to afford things for myself’ and ‘success in my career’. Items retained for measuring *family values* are ‘having a happy marriage/partnership’ and ‘having children’. An item relating to ‘owning your own home’ was dropped partly on face validity grounds, and also because it loaded moderately on the materialistic factor. The two items measuring *altruistic values* are ‘being there for others’ and ‘being politically and/or socially involved’.

Contrary to Andrews and Withey’s (1976) report the SOEP items measuring values have adequate over-time reliability. Family values correlated 0.65 measured four years apart in 2012 and 2016, materialistic values correlated 0.56, and altruistic values 0.48. This compares with a 4-year correlation for LS over the same period of 0.53. Plainly, 4-year correlations should be regarded as measures of stability, not test-retest reliability, but it is reasonable to conclude that respondents’ values are not subject to excessive fluctuations.

Andrews and Withey’s other main concern was that values measurement is subject to social desirability bias. There is perhaps some evidence of this in the SOEP data, particularly with regard to family values, which receive a mean rating of 3.15 (s.d = 0.61) on the 1-4 ‘importance’ scale. However, it is reasonable to think that most people really do attach considerable importance to family life. We also find that ratings on the family values index

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<sup>5</sup> The scale was reversed so that a high rating means ‘very important’.

correlate in expected ways with behavioural choices (time spent with relatives, hours spent on home repairs and yard work etc). This would surely not be the case if responses reflected little more than social desirability bias.

*Religious values* are not included in the list of values which the SOEP team took from Kluckhohn and Strodtbeck (1961). However, a single item about the ‘importance’ of faith (Glaube) and religion has been included in the 1994, 1998, 1999, 2013 and 2016 questionnaires. It is measured on the same 1-4 scale as other ‘importance’ items.

In the Australian panel respondents have only been asked about their values/life goals once; in the first wave in 2001. Responses were on a 0-10 importance scale (‘not at all important’ to ‘very important’). The Australian altruism values index is based on an item about the importance of ‘involvement in your local community’, which is moderately correlated with a sociability (but not really pro-social) item about the importance of ‘leisure activities such as hobbies, sports and contact with friends’ (Spearman’s  $\rho=0.28$ ). The family values index is comprised of items about the importance of ‘family life’ and ‘the home you live in’ (Spearman’s  $\rho=0.28$ ). Materialistic values are less than adequately measured by a single item about the importance of ‘your financial situation’. Religious values are assessed by ratings on the importance of ‘religion in your life’.

### *Behavioural choices*

The behavioural choices that we hypothesise to be positively linked to altruistic, pro-social values in Germany are frequency of *volunteering*, asked on a 1-5 scale (‘never’ to ‘daily’) and a two-item index – *meet/help friends, relatives and neighbours* – which combines answers to questions on frequency of reciprocal visits to friends, relatives or neighbours, and frequency of helping out friends, relatives or neighbours (1-5 scale).<sup>6</sup>

In the Australian panel, the behavioural choices linked to pro-social values are volunteering, being an active club member and active involvement in a social network. The social network index is comprised of ten survey items, asked on a 1-7 scale (Henderson, Byrne and Duncan-Jones, 1981). Typical items are: ‘When I need someone to help me out, I can usually find someone’ and ‘I don’t have anyone I can confide in’.

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<sup>6</sup> In previous papers we have referred to this as a social participation index.

The behavioural choices hypothesised to be positively related to family values in both panels are the number of children a person has had,<sup>7</sup> hours per day on child care, hours on housework, and (German file only) hours on home repairs and yard work. Frequency of visiting family and relatives (1-5 scale) is also expected to depend on family values. The children and ‘hours’ variables both have long upper tails, so the natural logarithm (ln) of these variables is used in estimation.<sup>8</sup>

We expect people who prioritise materialistic values to work longer hours than average and to earn more. Hours of work (in all jobs combined if a person has more than one job) are measured in every wave of SOEP and HILDA. The natural logarithm of the constructed variable ‘annual hours’ is used in estimation.

The most obvious behaviour we expect of people who espouse religious values is attendance at church (mosque, synagogue) services and other religious events. Frequency of attendance is measured in SOEP on a 1-5 scale running from ‘never’ to ‘daily’, and in HILDA on a 9-point scale (‘never’ to ‘every day’). We also expect that religious people engage more in volunteering activities than most others. Last, we expect them to be strongly family-oriented, and so hypothesise that they visit more than average with family and relatives.

### *Domain satisfactions*

The domains satisfactions most relevant to altruistic values in SOEP are satisfaction with volunteering activities and satisfaction with one’s social life. In HILDA the most relevant domain is ‘satisfaction with your local community’. Satisfaction with family life is obviously the key domain for people who prioritise family values. In HILDA there is also a measure of satisfaction with ‘the balance between work and family life’. Clearly, job satisfaction and satisfaction with income are most relevant domains for people with materialistic values.<sup>9</sup> Questions about these domain satisfactions are answered on the same 0-10 scale as LS.

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<sup>7</sup> The variable included here measures the number of children a person has ever had (not the number currently living in the household).

<sup>8</sup> Respondents are asked to estimate time spent per week on various activities. This approach to measurement is not as accurate as the daily diary method of collecting time use data. However, it has generally been found to be adequate for producing rank order data, comparing the time uses of different population groups (Juster, Hiromi and Stafford, 2003).

<sup>9</sup> We used satisfaction with household income, rather than personal income, in our estimations because the former question is asked every year in SOEP, while the latter has only been asked intermittently. However, results were very similar, regardless of the question included.

Domain satisfaction scales, like the LS scale, have been transformed to run from 0-100 for clarity of presentation.

There is no domain satisfaction in either the German or Australian panels which is obviously appropriate for people who prioritise religious values; no question, for example, about satisfaction with one's religious or spiritual fulfilment. However, we hypothesised that religious people give quite high priority to family life, and also to volunteering. So, as fall-back options, we included satisfaction with these domains in the German model. In the Australian model, we included satisfaction with the local community, which is quite strongly related to religious values and church attendance.

#### *Partners: measuring the values, behaviours and satisfactions of partners/spouses*

A valuable feature of both panels is that interviews are held with both partners (spouses). So partner values can be included in estimations to assess whether they make a difference to outcomes, additional to the effects of respondents' own values.

#### *Imputations/or really just interpolations for missing years*

Not all questions are asked every year in the panels, so in order to avoid too many data gaps, some missing values are imputed. For example, in the German survey questions about values/life priorities have usually been included every four years; most recently in 2004, 2008, 2012 and 2016. We impute missing values simply by inserting values from the nearest non-missing year, or the nearest two non-missing years, if two are equidistant from the missing year in question.

Imputation of missing values for personality traits is necessary to avoid large data gaps, but is somewhat problematic. Most psychologists believe that inter-individual differences in personality are stable in adulthood, but the SOEP and HILDA data appear to show non-trivial changes (Shaefer, 2017). For present purposes, we decided to assume that traits are stable. So we calculated each respondent's mean value on each trait, averaged over available years. These mean values were then imputed for missing years.

#### *Panel effects*

In any panel survey, what are called 'panel conditioning effects' are a possible source of bias. That is, panel members might tend to change their answers over time – and answer differently

from the way non-panel members would - as a consequence just of being in a panel. There is evidence that SOEP and HILDA panel members report higher LS ratings in their first years of responding than they do in later years (Frijters, Haisken-DeNew and Shields, 2004). This is likely to be due to ‘social desirability bias’; a desire to look good and appear to be a happy person, which is stronger in the first survey years than later.

To allow for possible bias, all results below are drawn from equations that include a variable which ‘controls’ for the number of years panel members have participated in their national survey.



### **Data analysis: structural equation modelling**

Structural equation modelling is an appropriate technique when the aim is to estimate a 'system' of equations, rather than a single equation. The structural equations in this article are estimated by maximum likelihood analysis.

The equation underlying a standard structural equation model, expressed in matrix form, is:

$$Y = \text{Beta}Y + \text{Gamma}X + \text{alpha} + \text{zeta}$$

In this notation, Beta is the matrix of coefficients for those endogenous variables (Y) which predict other endogenous variables. Gamma is the matrix of coefficients linking exogenous variables (X) to endogenous variables (Y). Alpha is a vector of the intercepts of the endogenous variables. The error terms, the zetas, are assumed to have a mean of zero and to be uncorrelated with X variables in the same equation.

Maximum likelihood coefficients and standard errors can be given the same interpretation as metric regression coefficients. However, assessing the 'goodness of fit' of structural models is more complicated than for regression models. It is necessary to assess the overall fit between estimates for several equations and the input data for the model; a variance-covariance matrix. Several measures of fit are conventionally used. The root mean squared error of approximation (RMSEA) is directly based on comparing differences (residuals) between the actual input matrix with the matrix implied by model estimates. It has become conventional to regard a RMSEA under 0.05 as satisfactory (Bentler, 1990; Browne and Cudeck, 1993).

More complicated assessments of the fit of one's entire model are provided by the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI). The CFI is based on a likelihood ratio (LR) chi-square test and takes account of the contribution of each estimate in the model to overall goodness of fit. The TLI is also derived from an LR chi-square test, and is useful because it rewards parsimony by adjusting for the degrees of freedom in one's model. So it penalises models that include explanatory variables which account for little variance, even though they may be just statistically significant. CFI and TLI fits above 0.90 are conventionally regarded as satisfactory (Bentler, 1990; Browne and Cudeck, 1993; Satorra and Bentler, 1994; Kline, 2016). Another valuable measure of fit is the coefficient of

determination (CD). In regression analysis the CD (R-squared) only applies to the dependent variable. In structural equation models the CD is a measure of fit for the whole model.

In summary, the measures of fit we use are the RMSEA, the CFI, the TLI and the CD.<sup>10</sup>

We used the STATA 14 module for structural equation modelling to generate the results reported here (StataCorp., 2017). This package offers a range of estimators, including maximum likelihood, and includes the tests of goodness of fit described above.

Initial model estimates were generated using standard maximum likelihood analysis. However, in final models runs, we implemented an option to estimate missing values as part of the overall maximum likelihood estimation (StataCorp., 2017). This option is arguably preferable, because the usual procedure of listwise deletion of cases which are missing on any single variable can yield seriously biased estimates (StatCorp., 2017).

Strictly speaking, maximum likelihood estimation requires an assumption of multivariate normality, with endogenous variables being measured on a continuous scale. In fact, most of the endogenous variables in our equations, including LS and domain satisfactions, are measured on fairly long ordinal scales. Rightly or wrongly, it has become fairly routine in research on LS to treat these data as if they were continuous. Andrews and Withey (1976) were the first LS researchers to recommend that, since results using interval-level statistics generally led to the same substantive conclusions as those using ordinal statistics, it was preferable to make 'strong' assumptions and so be able to use more powerful statistical tests. Texts on structural equation modelling typically suggest that it is acceptable to use maximum likelihood estimation with ordinal scales that have five or more categories (Brown, 2015; Kline, 2016).

An important practical reason for assuming that scales are continuous in structural equation models is that, although it is feasible to estimate models with ordinal, binary, count or multinomial endogenous variables, few measures of model fit are available, so it is often practically impossible to assess whether one model is statistically preferable to another. In

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<sup>10</sup> Another commonly used measure, also based on residuals, is the Standardised Root Mean Squared Residual (SRMR). However, this is not applicable when missing values are imputed, as is the case in all our final model runs.

preparing this paper, we re-ran all models using Stata's Generalized Structural Equation Modelling (GSEM) software (StataCorp., 2017). It was reassuring that the inferences to be drawn from the estimates of main interest, relating to values, were similar to those reported in the Results section.

### **German panel results – ‘one size does not fit all’**

We first give the main German estimates relating to the four recipes. The partial Australian replication is covered at the end of the Results section.

Results for all 5-year overlapping periods (2003-07, 2004-08...2012-16) are combined.

#### *Altruistic values recipe*

The core of the altruistic ‘recipe’ consists of links between altruistic values, the behavioural choices of engaging in voluntary work and meeting/helping friends, relatives or neighbours...and gaining substantial satisfaction from volunteering and one’s social life.

Figure 2 (below) shows estimates of these *core links*. It should be understood that these estimates are just extracts from a four-step structural equation model, which is printed in full as Appendix 1 Table 1.

Before discussing results, it may be mentioned that the fit of the full model is satisfactory. The RMSEA is 0.02. The comparative fit index (CFI), which measures overall model fit, is 0.98 and the Tucker-Lewis index (TLI), which rewards model parsimony, is 0.93. The coefficient of determination (CD) for variance accounted for in all endogenous variables combined is 31.0%. The RMSEA, CFI, TLI and CD estimates indicate an acceptable model fit.

INSERT FIGURE 2 HERE

The key results here show the impact of altruistic values on behavioural choices and domain satisfactions. Every one-point difference in altruism (measured on a 1-4 scale) is associated with 0.36 points ( $p < 0.001$ ) difference in frequency of volunteering (1-5 scale) measured one year later. There is also quite a strong link between altruism and regularly meeting and supporting friends, relatives and neighbours ( $b = 0.17$   $p < 0.001$ ).

In assessing the impact of altruistic values on satisfaction gained from voluntary work and from one's social life, we need to take account of both *direct effects* and *total effects*. Total effects are perhaps of greatest interest. Technically, total effects = direct effects + the sum of indirect effects (StataCorp., 2017). The Stata structural equation software usefully prints out all these effects. The direct effect of altruistic values on satisfaction with volunteering is quite large ( $b=3.58$   $p<0.001$ ) and the total effect (which includes indirect effects via behavioural choices) is larger still ( $b=7.28$   $p<0.001$ ). Similarly, the direct effect of altruistic values on satisfaction with social life is substantial ( $b=2.06$   $p<0.001$ ), with the total effect more again ( $b=3.01$   $p<0.001$ ).

Behavioural choices linked to altruism also have significant effects on satisfaction with volunteering and with one's social life. The direct link between frequency of volunteering and satisfaction with volunteering is very strong ( $b=8.39$   $p<0.001$ ). The link between frequency of meeting/helping friends, relatives or neighbours and satisfaction with one's social life is also substantial ( $b=5.75$   $p<0.001$ ).

Two of the personality traits measured in SOEP – openness to experience ( $b=0.07$   $p<0.001$ ), and agreeableness ( $b=0.05$   $p<0.001$ ) – predispose people towards prioritising altruistic values. Women, especially young women, tend to subscribe to altruistic values more strongly than men.

#### *Partners' values matter too*

We mentioned in the introduction that partners tend to share similar values and that, if they do, they can benefit each other in terms of domain satisfactions and LS. The previous model (Figure 2) related to all panel members. We also ran a model just for partnered people... with some striking results.<sup>11</sup> First, note that the bivariate Spearman correlation ( $\rho$ ) between the altruism ratings of partners is 0.32. It then transpires that partner's altruism significantly reinforces an individual's own frequency of undertaking voluntary work and meeting/helping friends, relatives or neighbours. Similarly, satisfaction with volunteering activities and with one's social life are enhanced if partner too prioritises altruistic values.

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<sup>11</sup> This simply involved inserting partners' altruistic values on the RHS of equations that were otherwise the same as reported in Figure 2 and Appendix Table 1.

### *Family values recipes*

The core of the family values ‘recipe’, which is endorsed more by women than men, is having more children than most other people, spending more time on child care, also on home repairs and yard work, and more time than average with family and relatives. Family values, together with these choices and activities, yield above average satisfaction with family life.

The family values model is also an acceptable fit to the input data. The RMSEA is 0.01, the CFI is 1.00 and the TLI is 0.98. The coefficient of determination (variance accounted for in all endogenous variables) is 60.2%.

Figure 3 gives estimates for the core of the model. The full model is printed in Appendix 1 Table 2.

INSERT FIGURE 3 HERE

People who subscribe strongly to family values are more likely to have children in the first place, and the stronger their commitment to these values, the more children they have ( $b=0.29$   $p<0.001$ ). Women (but not men) with strong family values also spend more time than most other people on child care, even controlling for the number of children they have. Family values are linked to spending more time than average in the company of family and relatives, and with much above average satisfaction with family life. The direct effect of family values on family satisfaction is substantial ( $b=3.69$   $p<0.001$ ), with total effects (including indirect effects via behavioural choices) being 4.04 ( $p<0.001$ ). Women adhere somewhat more strongly to family values than men, and partnered/married people are more family-oriented than people who are single or not currently married. People on higher incomes and foreigners living in Germany (compared with Germans) are also relatively family-oriented.

Unemployed people, who tend to have time on their hands, spend more hours than most other people on child care, household repairs and yard work. They also have more children than average, as do foreigners living in Germany. Women of course spend more time on child care and most other household tasks than men, but following the traditional role division, men do

most of the repairs and yard work. However, net of other variables, women with high family incomes spend less time on child care than most other women.

Most results relating to family values are much the same for men as for women. Like their partners, men who subscribe to family values have more children than less family-oriented men, and they spend more time on repairs and yard work. They report well above average levels of satisfaction with family life ( $b=5.04$   $p<0.001$ ).

Unlike currently partnered/married women, and perhaps due to bitter experience, single mothers are less family-oriented than average. However, those who subscribe strongly to family values do spend more time than other single mothers with family and relatives, and also more time on child care, repairs and yard work. They are much less satisfied than most other people with family life.

The effects of *partner's family values* on one's own behavioural choices and satisfactions are substantial. First, note that the bivariate correlation between partners' family values is high; Spearman's  $\rho=0.55$ . Then, over and above the effects of one's own family values, partners' family values affect the number of children born to the family ( $b=0.33$   $p<0.001$ ). They also have an effect on time spent on child care ( $b=0.58$   $p<0.001$ ), an effect on satisfaction with family life of 1.84 ( $p<0.001$ ), and an effect on LS of 0.70 ( $p<0.001$ ).

#### *Materialistic values recipe*

The core of the materialistic 'recipe' is aiming to be successful in career and financial terms. People who subscribe to this recipe work long hours and make good money, but they report being overworked, and while they have about average job satisfaction, they are dissatisfied with their incomes.

Figure 4 gives core results (see Appendix 1 Table 3 for the full model). The model fits the data satisfactorily. The RMSEA is 0.02, the CFI is 1.00 and the TLI is 0.98. The coefficient of determination, summarising the variance accounted for in all endogenous variables, is 38.3%.

INSERT FIGURE 4 HERE

The focus here is partly on careers and earnings, so only individuals in employment are included in the analyses reported in Figure 4. More men than women, especially young and middle-aged men, subscribe to materialistic values, and nearly all the men in this prime age group (25-54) are in employment. Women with strong materialistic values are mostly in paid employment, while women who rate lower on materialistic values are somewhat more likely to be homemakers.

A key point is that materialistic people follow through on their values by working considerably longer hours than average ( $b=0.22$   $p<0.001$ ), and by earning more than most other people ( $b=0.44$   $p<0.001$ ). However, their high earnings are due to working long hours; their hourly rate of pay is just average. People with materialistic values have about the same level of job satisfaction as those who prioritise other values, with their satisfaction being reduced by working long hours ( $b= -1.98$   $p<0.001$ ). The women, in particular, report working longer hours than they prefer.<sup>12</sup> Despite their strenuous efforts, and their objectively high earnings, people with materialistic values are seriously dissatisfied with their household incomes. The direct effect of materialistic values on satisfaction with income is ( $b= -1.62$   $p<0.001$ ), with the total effect being somewhat less negative ( $b= -1.40$   $p<0.001$ ) due to above average earnings.

Materialistic values are linked to the personality traits of conscientiousness and willingness to take risks. Conscientiousness, and also rating low on the neuroticism trait, are strongly linked to above average earnings and to above average job satisfaction and household income satisfaction (see also Duckworth, Weir, Tsukuyama and Kwok, 2012).

The evidence suggests that being materialistic, and spending long hours at work, has knock-on effects in reduced time spent on family matters and caring activities. Materialistic people actually have fewer children than people who prioritise other values, and so spend less time on child care and housework. Individuals with materialistic values tend to have partners with similar values (Spearman's  $\rho=0.26$ ).

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<sup>12</sup> In each wave respondents are asked their preferred hours of work, as well as their actual hours.

### *Religious values recipe*

The religious values ‘recipe’ is not as distinct from other recipes as the previous ones. Religious people, presumably partly because they are religious, have relatively strong family values and altruistic values. In addition to regular church (mosque, synagogue) attendance, their behavioural choices include having more children than average (although not as many as those who espouse family values from a more secular perspective) and spending a lot of time with family and relatives. They immerse themselves in family and home-based activities. Their altruistic side comes out in a high level of volunteering. They report above average satisfaction with family life.

The religious values model fits the data satisfactorily with a RMSEA of 0.01, a CFI of 0.99, a TLI of 0.97 and a coefficient of determination of 37.8%.

Figure 5 gives results of main interest (see Appendix 1 Table 4 for the full model).

INSERT FIGURE 5 HERE

The population groups in Germany who espouse religious values are quite sharply defined. More women than men are religious, especially older women. Partly as a legacy of communist times, East Germans are much less religious than West Germans ( $b = -0.55$   $p < 0.001$ ). Immigrants/foreigners are more religious than either group of Germans ( $b = 0.40$   $p < 0.001$ ). Single and separated/divorced individuals subscribe to religious values less than married/partnered couples.

Religious values are linked to the behavioural choices of regular church attendance ( $b = 0.47$   $p < 0.001$ ) and to volunteering ( $b = 0.14$   $p < 0.001$ ), presumably in many cases through religious charities. In this respect, people who espouse religious values overlap with the group holding altruistic values. They also overlap with the group holding family values in that they meet more frequently than most other people with family members and relatives.

As mentioned, there is no questionnaire item in SOEP which directly taps into the domains in which religious people might be expected to be more satisfied than others. However, religious people, who are mostly regular church attenders, report above average satisfaction



with family life (although not rating as highly as those who prioritise family values). They undertake a great deal of voluntary work, and derive some satisfaction from it (total effect = 2.06  $p < 0.001$ ), although less than volunteers with more secular values.

People who themselves subscribe to religious values generally have partners/spouses who follow the same beliefs and practices. The bivariate correlation between the religious values of partners is 0.56, and the correlation for church (mosque, synagogue) attendance is 0.67. Model runs in which partner's religious values are also included indicate that, over and above one's own values, partner's religious values influence one's own propensity to undertake voluntary work, and also influence (add to) satisfaction with family life.

#### *Recipes that succeed - and recipes that fail - in promoting LS*

Which 'recipes' promote LS and which fail to do so? The dependent variables we use in making this assessment are individual LS Grand Means for 2007-16. The explanatory variables of main interest are the four values. Socio-economic variables and personality traits are also included in both equations as 'controls'.

#### INSERT TABLE 1 HERE

The evidence indicates that non zero sum priorities - altruistic values, family values and religious values - all have positive effects in promoting long run LS. These values each enhance LS by 1-2 'quasi-percentiles'. Materialistic values reduce long term LS, lowering it by 1.27 'quasi-percentiles'.

Partner's values also have some influence on an individual's long term LS. Somewhat surprisingly, it appears that one's own and partner's altruistic values have about the same influence on an individual's LS Grand Mean; coincidentally both coefficients are 1.31 ( $p < 0.001$ ). Partner's family values also have a positive effect on an individual's own Grand Mean ( $b = 0.57$   $p < 0.001$ ), as do partner religious values ( $b = 0.63$   $p < 0.001$ ). Partner materialistic values have a negative effect ( $b = -0.62$   $p < 0.001$ ), adding to the negative effect of one's own materialistic values.

*A partial replication: Australian panel results for the four recipes are similar*

Clearly, it is important to see whether our results replicate in panel data for other Western countries. However, finding another panel which includes evidence about values, together with associated behavioural choices and domain satisfactions, proved difficult. The Australian HILDA panel comes closest to meeting our requirements. As mentioned earlier, data on values have been collected in HILDA just once in 2001. Given data limitations, we decided that a sensible approach would be to model the effects of values in 2001 on subsequent behavioural choices, domain satisfactions and LS in the period 2002-05.

Core results for the four ‘recipes’ are given in Figures 6-9.<sup>13</sup> It is clear that, despite differently worded measures of values, choices and domain satisfactions, the Australian results are highly similar to the German ones. The altruistic values index (see Figure 6) is linked to subsequent behavioural choices to engage in volunteer work ( $b=0.15$   $p<0.001$ ), to being actively involved in a social network ( $b=0.15$   $p<0.001$ ), to being an active club member ( $b=0.04$   $p<0.001$ ), and to satisfaction with the local community ( $b=2.77$   $p<0.001$ ). Family values are linked to having more children ( $b=0.13$   $p<0.001$ ), to spending more time than most people on child care ( $b=0.96$   $p<0.001$ ), and to more time doing housework ( $0.22$   $p<0.01$ ). Family values are also strongly linked (see Figure 7) to two domain satisfactions: satisfaction with family members<sup>14</sup> ( $b=3.05$   $p<0.001$ ) and satisfaction with the balance between work and family life ( $b=1.42$   $p<0.001$ ).

As previously mentioned, materialistic values are measured in the Australian panel by just a single item about the importance attached to ‘your financial situation’. Given this relatively ‘weak’ measure, it is no surprise that estimated links to subsequent behavioural choices and domain satisfactions are weaker, although quite similar to those reported for Germany (see Figure 8). Statistically significant links are found to hours of paid work ( $b=0.02$   $p<0.001$ ) and to earnings ( $b=0.14$   $p<0.001$ ). As in Germany, Australians with materialistic values rate no higher than people with alternative values on job satisfaction, and they are below average in the domain that matters most to them, namely their financial situation. So, in Australia too, it appears that materialism is a recipe that fails to deliver.

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<sup>13</sup> As with the German models, these core results are extracted from large structural equation models that also include socio-economic variables, personality traits and LS.

<sup>14</sup> We combined into a single index measures of satisfaction with partner, children and other relatives.

The importance attached to religious values is linked to church (mosque, synagogue etc) attendance ( $b=0.39$   $p<0.001$ ) and to undertaking volunteer work ( $b=0.06$   $p<0.001$ ). As in the German survey, there is no domain satisfaction which is clearly applicable to people with religious values. However, satisfaction with the local community was included in the model and proved to be significantly ( $p<0.001$ ) related to religious values, church attendance and engaging in voluntary work.

As reported beneath Figures 6-9, all four Australian models fit the data satisfactorily, recording measures of fit similar to the German models.<sup>15</sup>

Similarly to Germany, we also assessed the combined effects of Australians' values (measured in 2001) on their subsequent LS (averaged for 2002-05).<sup>16</sup> As in the German data, altruistic values ( $b=1.11$   $p<0.001$ ) and family values ( $b=1.19$ ) are linked to well above-average levels of LS. Materialistic values are linked to below-average LS ( $b= -0.16$   $p<0.01$ ). The coefficient linking religious values to LS is not statistically significant (see Table 2).

## **Discussion**

The aim of this paper has been to suggest that there are alternative values-based 'recipes' for LS. Plainly, our data only relate to two Western countries. It seems highly likely that in other countries - particularly non-Western, non-Christian background countries - many other approaches to LS have been attempted. Our hope is that it will prove possible, in future research, to identify these approaches and assess their efficacy in promoting LS.

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<sup>15</sup> The measures of fit printed below Figures 6-9 for the Australian models relate to the full m

<sup>16</sup> As in the German analysis, socio-economic variables and personality traits were included as 'controls'.

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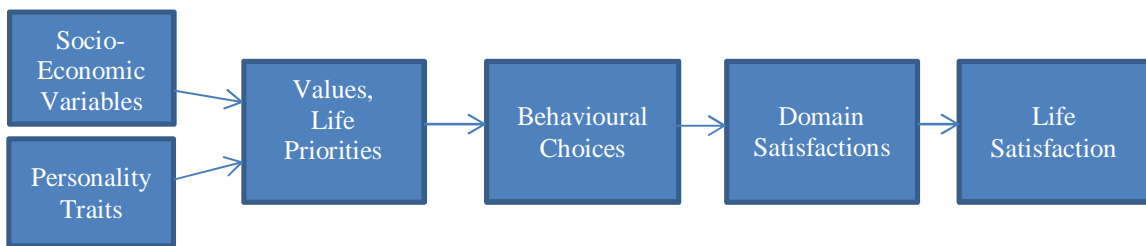
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## FIGURES & TABLES

Figure 1  
Concepts and assumptions about possible causal links<sup>a</sup>

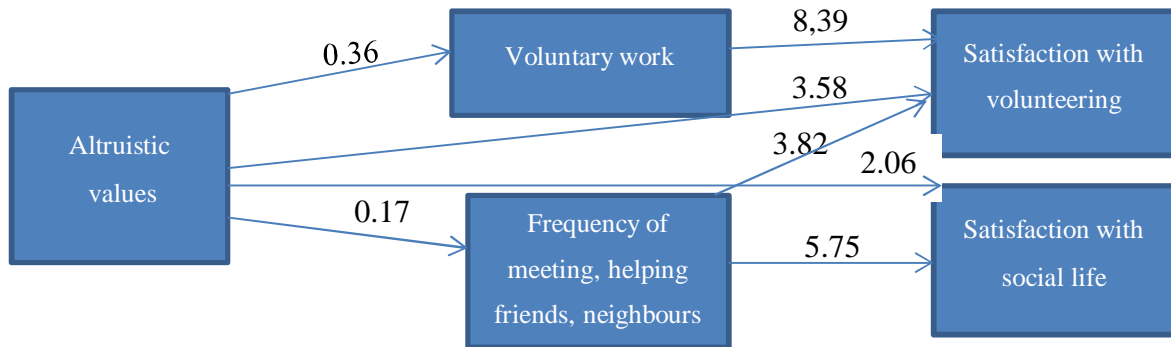


- a. To avoid clutter, Figure 1 only shows arrows linking adjacent variables adjacent in the model. Some additional direct links (e.g. from personality traits to LS) are also estimated.



Figure 2 Germany

Altruistic values: links between values, behavioural choices and domain satisfactions  
(N=74026)

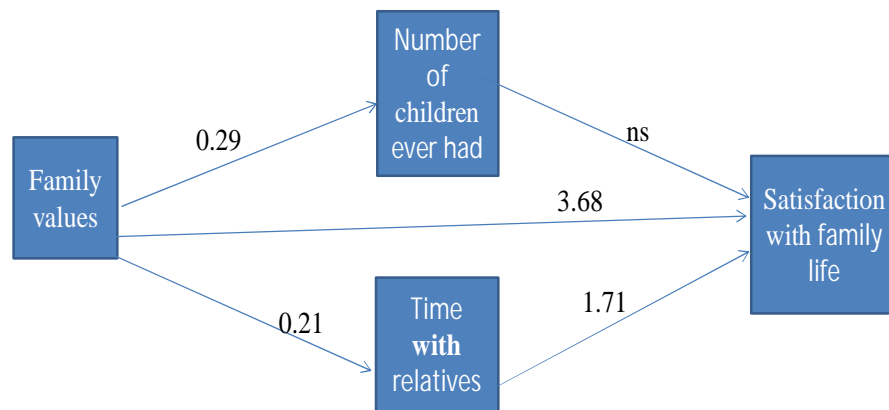


\*All coefficients significant at 0.001

Measures of fit: RMSEA=0.02 CFI=0.98 TLI=0.93 CD=31.0%

Figure 3 Germany

Family values: links between values, behavioural choices and domain satisfactions  
(N=122028)



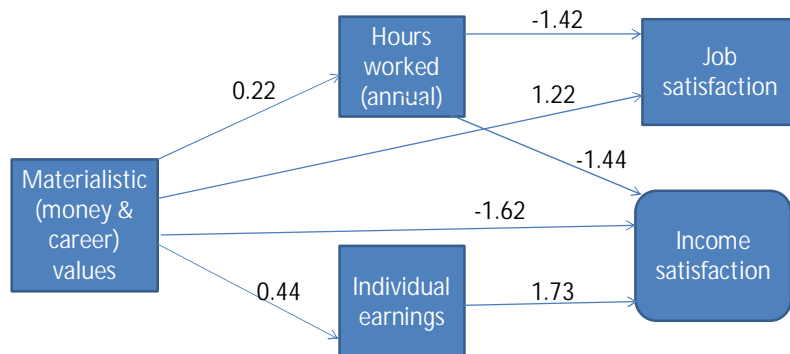
\*Coefficients significant at 0.001 unless marked ns

Measures of fit: RMSEA=0.01 CFI=1.00 TLI=0.99 CD=60.2%

Figure 4 Germany

Materialistic values: links between values, behavioural choices and domain satisfactions

(N=93676)

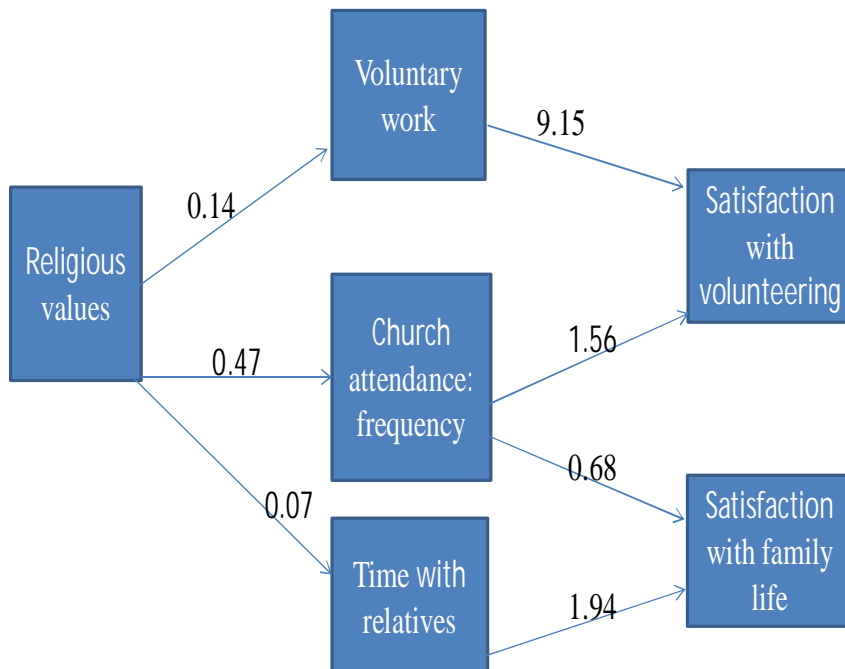


\*All coefficients significant at 0.001

Measures of fit: RMSEA=0.02 CFI=1.00 TL1=0.98 CD=38.3%

Figure 5 Germany

Religious values: links between values, behavioural choices and domain satisfactions  
(N=122208)

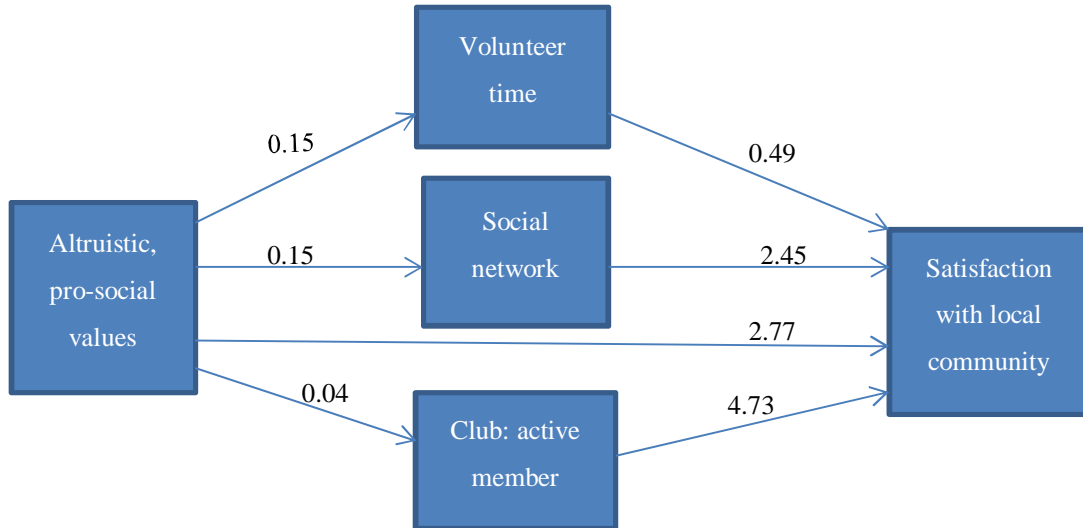


\* All coefficients significant at the 0.001 level.

Measures of fit: RMSEA=0.01 CFI=0.99 TLI=0.97 CD=37.8%

Figure 6 Australia

Altruistic values: links between values, behavioural choices and domain satisfactions  
(N=29720)

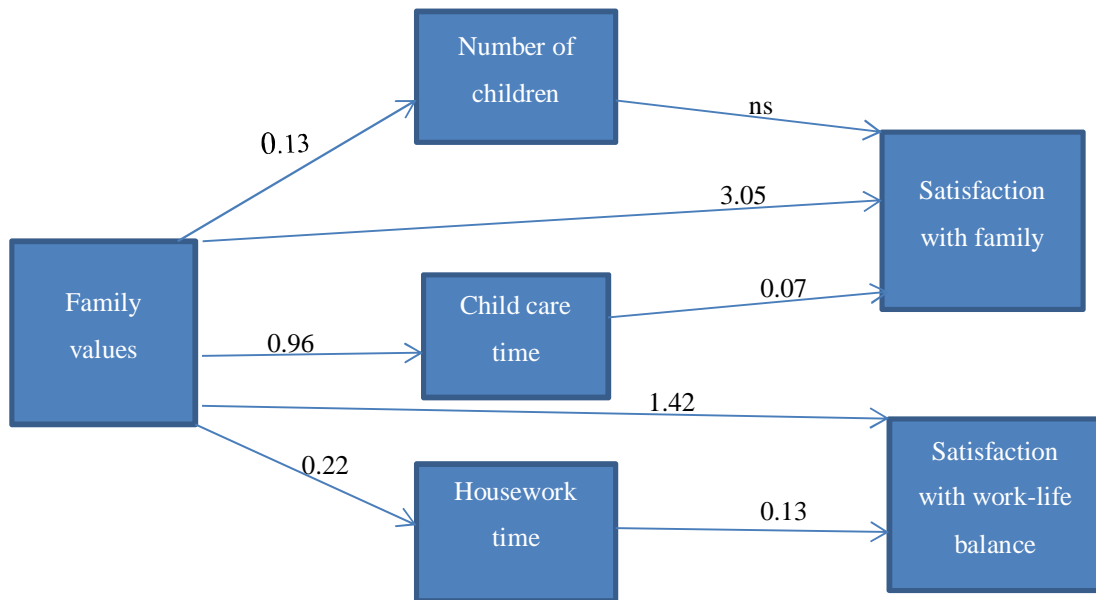


\*All coefficients significant at 0.001.

Measures of fit: RMSEA=0.02 CFI=0.99 TLI=0.96 CD=29.5%

Figure 7 Australia

Family values: links between values, behavioural choices and domain satisfactions  
(N=29720)



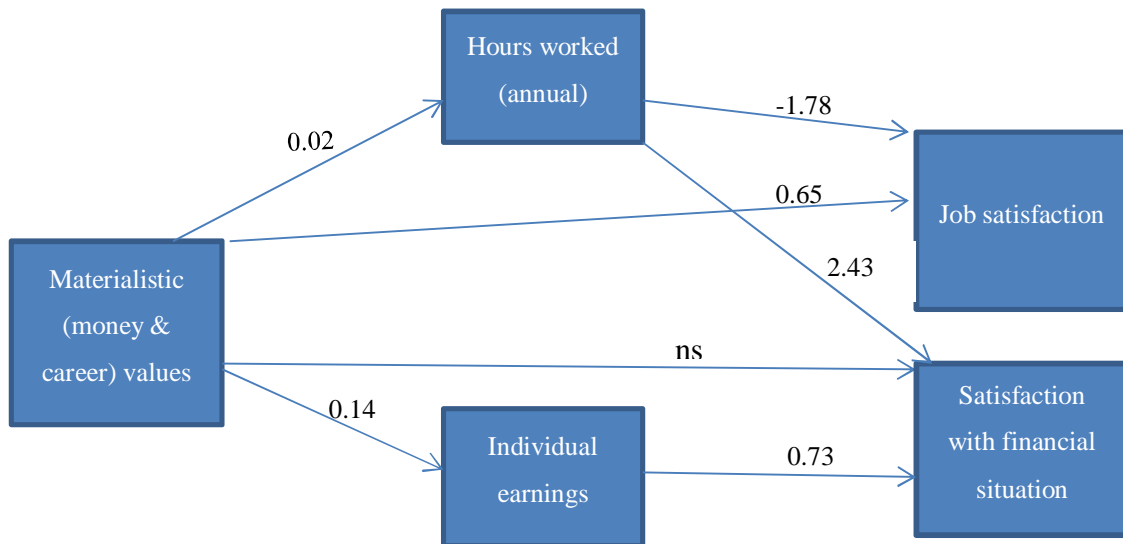
\*All coefficients significant at 0.001, unless marked n.s.

Measures of fit: RMSEA=0.01 CFI=1.00 TLI=1.00 CD=33.0%

Figure 8 Australia

Materialistic values: links between values, behavioural choices and domain satisfactions

(N=29720)

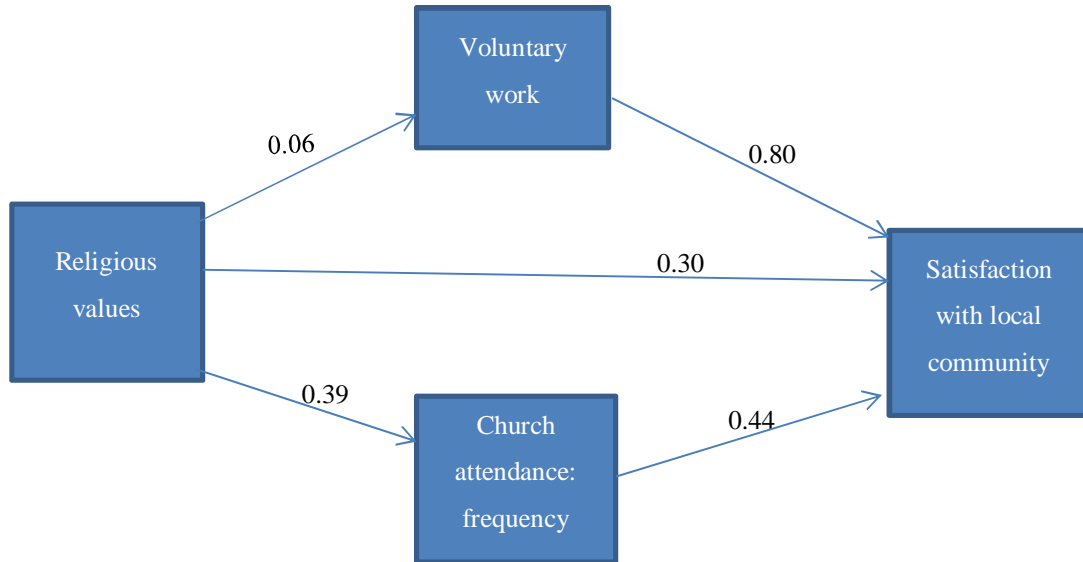


\*All coefficients significant at 0.001, unless marked n.s.

Measures of fit: RMSEA=0.02 CFI=1.00 TLI=0.97 CD=31.5%

Figure 9 Australia

Religious values: links between values, behavioural choices and domain satisfactions  
(N=29720)



\*All coefficients significant at 0.001

Measures of fit: RMSEA=0.02 CFI=1.00 TLI=0.98 CD=12.9%



Table 1

Germany: Recipes that succeed – and recipes that fail – in promoting Life Satisfaction.

Structural equation models (N=123981)<sup>a</sup>

<i>Values</i>	<i>LS Grand Mean (0-100)</i>
Altruistic values	1.68***
Family values	1.56***
Materialistic values	-1.27***
Religious values	1.07***
<i>Adjusted R-squared</i>	26.8%

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

- a. Socio-economic variables and the Big Five personality traits are included in both equations as 'controls'.

Table 2

Australia: Recipes that succeed – and recipes that fail – in promoting Life Satisfaction.

Structural equation models (N=29720)<sup>a</sup>

<i>Values</i>	<i>LS Grand Mean (0-100)</i>
Altruistic values	1.11***
Family values	1.19***
Materialistic values	-0.16***
Religious values	ns
<i>Adjusted R-squared</i>	<i>19.8%</i>

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

- a. Socio-economic variables and the Big Five personality traits are included in both equations as 'controls'.

# APPENDIX

## Appendix 1

### German Results

#### Full Model Estimates: Altruistic Values Model

Appendix Table 1 (like Tables 2, 3 and 4 below) gives results in four panels, reflecting the four steps in the model. Panel 1 shows the effects on altruistic values of lagged socio-economic variables and personality traits. Panel 2 gives the effects on behavioural choices of lagged socio-economic variables, traits and altruistic values. In panel 3 the outcome variables are domain satisfactions – satisfaction with volunteering and one’s social life – and the explanatory variables are lagged socio-economic characteristics, traits, values and behavioural choices. In panel 4 the outcome variable is LS with variance being accounted for by lagged socio-economic variables, traits, values, choices and domain satisfactions.

Appendix 1 Table 1

The Altruistic ‘Recipe’:

A Longitudinal 4-Step Structural Equation Model (N=74026)

Panel 1: Effects on **values** of socio-economic variables and personality traits

<i>Explanatory variables</i>	<i>Values: Altruistic values</i>	<i>Explanatory variables</i>	<i>Values Altruistic values</i>
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Female	0.05***	Extroversion	0.02***
Age	-0.00***	Openness	0.07***
Years of education	0.03***	Agreeableness	0.05***
HH net income	0.03***	Risk willingness	0.01***
East German	-0.06***		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 2: Effects on **behavioural choices** of socio-economic variables, traits and values

<i>Explanatory variables</i>	<i>Behavioural choice</i> Voluntary work	<i>Behavioural choice</i> Meet/help friends, relatives or neighbours
<i>Socio-economic variables (lagged)</i>		
Female	-0.08***	ns
Age	0.01***	-0.01***
Years of education	0.01***	ns
HH net income (ln)	0.09***	ns
East German	-0.14***	-0.13***
Foreign	-0.23***	ns
<i>Personality traits (lagged)</i>		
Neuroticism	-0.03***	-0.04***
Extroversion	ns	0.02***
Openness	ns	ns
Agreeableness	-0.03***	ns
Conscientiousness	-0.03***	-0.03***
<i>Values (lagged)</i>		
<b>Altruistic values</b>	<b>0.36***</b>	<b>0.16***</b>

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 3: Effects on **domain satisfactions** of socio-economic variables, traits, values and behavioural choices

<i>Explanatory variables</i>	<i>Domain satisfaction Volunteering</i>	<i>Domain satisfaction Social life</i>
<i>Socio-economic variables (lagged)</i>		
Age	ns	-0.13***
Years of education	0.42***	ns
HH net income (ln)	3.10***	2.57***
Unemployed	-3.70***	ns
East German	-3.22***	-0.62***
Foreign	-3.54***	ns
<i>Personality traits (lagged)</i>		
Neuroticism	-0.84***	-1.59***
Extroversion	ns	1.70***
Agreeableness	1.63***	1.59***
Conscientiousness	0.99***	1.55***
<i>Values (lagged)</i>		
<b>Altruistic values</b>	<b>3.58***</b>	<b>2.06***</b>
<i>Behavioural choices (lagged)</i>		
Voluntary work	8.39***	ns
Meet/help friends, relatives	3.88***	5.75***

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 4: Effects on **LS** of socio-economic variables, traits, values, behavioural choices and domain satisfactions

<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>	<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>
<i>Socio-economic variables (lagged)</i>		<i>Behavioural choices (lagged)</i>	
Female	1.18***	Voluntary work	ns
Age	-0.18***	Meet/help friends, relatives, neighbours	ns
Years of education	0.32***	<i>Domain satisfactions (lagged)</i>	
HH net income (ln)	3.18***	Volunteering: satisfaction	0.09***
Unemployed	-4.29***	Social life: satisfaction	0.25***
Disability	-4.77***		
East German	-1.55***		
<i>Personality traits (lagged)</i>			
Neuroticism	-2.00***		
Extroversion	ns		
Openness	0.19***		
Agreeableness	0.37***		
Conscientiousness	0.26**		
Risk willingness	0.25***		
<i>Values (lagged)</i>			
<b>Altruistic values</b>	<b>1.19***</b>		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Appendix 1 Table 2

The Family Values ‘Recipe’:

A Longitudinal 4-Step Structural Equation Model (N=122208)

Panel 1: Effects on **values** of socio-economic variables and personality traits

<i>Explanatory variables</i>	<b>Values: Family Values</b>	<i>Explanatory variables</i>	<b>Values: Family values</b>
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Female	0.01***	Neuroticism	0.02***
Age	0.01***	Extroversion	0.03***
Partnered	0.49***	Agreeableness	0.04***
HH net income (ln)	0.10***	Conscientiousness	0.05***
Unemployed	-0.06***		
Disability	-0.15***		
Foreign	0.07***		
East German	0.03***		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant



Panel 2: Effects on **behavioural choices** of socio-economic variables, traits and values

<i>Explanatory variables</i>	<i>Behavioural choice</i> Number of children (ln)	<i>Behavioural choice</i> Hours per week on childcare (ln)	<i>Behavioural choice</i> Hours per week on home repairs/yard (ln)	<i>Behavioural choice</i> Time with family, relatives
<i>Socio-economic variables (lagged)</i>				
Female	0.11***	0.48***	-0.11***	0.09***
Age	0.01***	-0.02***	0.04***	-0.01***
Partnered	0.30***	0.50***	0.06***	0.05***
Years of education	-0.01***	ns	-0.02***	-0.03***
HH net income (ln)	-0.01***	-0.07***	0.01***	-0.04***
Unemployed	0.10***	0.19***	0.04***	ns
Disability	-0.12***	ns	ns	ns
East German	0.09***	ns	0.07***	-0.04***
Foreign	0.14***	ns	-0.09***	ns
<i>Personality traits (lagged)</i>				
Neuroticism	ns	ns	ns	-0.02***
Extroversion	0.01***	-0.01***	ns	0.04***
Openness	-0.02***	ns	-0.01**	ns
Agreeableness	0.01***	ns	-0.02***	0.03***
Conscientiousness	-0.01***	ns	0.02***	0.01**
Risk willingness	0.00***	ns	ns	ns
<i>Values (lagged)</i>				
<b>Family values</b>	<b>0.29***</b>	<b>0.30***</b>	<b>0.10***</b>	<b>0.21***</b>

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 3: Effects on **domain satisfactions** of socio-economic variables, traits, values and behavioural choices

<i>Explanatory variables</i>	<i>Domain satisfaction</i> Family life	<i>Explanatory variables</i>	<i>Domain satisfaction</i> Family life
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Age	-0.21***	Neuroticism	-1.52***
Partnered	3.75***	Extroversion	0.63***
HH net income (ln)	2.24***	Openness	0.16*
Unemployed	-1.43***	Agreeableness	1.54***
Disability	-1.31***	Conscientiousness	1.26***
East German	-0.89***	<b>Values (lagged)</b>	
		<b>Family values</b>	3.69***
		<i>Behavioural choices (lagged)</i>	
		Time with family, relatives	1.73***

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 4: Effects on **LS** of socio-economic variables, traits, values, behavioural choices and domain satisfactions

<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>	<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Female	1.40***	Neuroticism	-2.09***
Age	-0.20***	Extroversion	0.27***
Partnered	-0.29***	Openness	0.40***
Years of education	0.67***	Agreeableness	0.31***
HH net income (ln)	2.07***	Conscientiousness	0.15*
Unemployed	-4.88***	Risk willingness	0.31***
Disability	-5.50***	<b>Values (lagged)</b>	
East German	-2.11***	<b>Family values</b>	
		<i>Behavioural choices (lagged)</i>	
		Number of children	1.12***
		Time with family, relatives	0.67***
		<i>Domain satisfaction (lagged)</i>	
		Family life	0.30***

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Appendix 1 Table 3

The Materialistic Values 'Recipe'

A Longitudinal 4-Step Structural Equation Model (N=93676)

Panel 1: Effects on **values** of socio-economic variables and personality traits

<i>Explanatory variables</i>	<i>Values: Materialistic Values</i>	<i>Explanatory variables</i>	<i>Values: Materialistic Values</i>
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Female	-0.12***	Neuroticism	0.01***
Age	-0.03***	Extroversion	0.05***
Age-squared	0.03***	Openness	0.02***
East German	0.06***	Agreeableness	-0.02***
Foreign	0.04***	Conscientiousness	0.08***
		Risk willingness	0.01***

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 2: Effects on **behavioural choices** of socio-economic variables, traits and values

<i>Explanatory variables</i>	<i>Behavioural choice</i> Annual working hours (ln)	<i>Behavioural choice</i> Individual labour earnings (ln)
<i>Socio-economic variables (lagged)</i>		
Female	-0.59***	-1.34***
Age	0.14***	0.38***
Age-squared/10	-0.16***	-0.43***
Partnered	-0.17***	ns
Years of education	0.07***	0.27***
East German	0.10***	-0.26***
Foreign	ns	-0.27***
<i>Personality traits</i>		
Neuroticism	-0.07***	-0.23***
Openness	ns	-0.02*
Agreeableness	-0.07***	-0.22***
Conscientiousness	0.11***	0.27***
Risk willingness	0.01***	0.03***
<i>Values (lagged)</i>		
<b>Materialistic values</b>	<b>0.22***</b>	<b>0.44***</b>

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 3: Effects on **domain satisfactions** of socio-economic variables, traits, values and behavioural choices

<i>Explanatory variables</i>	<i>Domain satisfaction Job</i>	<i>Domain satisfaction Household income</i>
<i>Socio-economic variables (lagged)</i>		
Age	-0.24***	-0.81***
Partnered	2.49***	5.10***
Years of education	0.50***	1.48***
East German	-2.12***	-5.82***
Foreign	ns	-2.94***
<i>Personality traits</i>		
Neuroticism	-3.20***	-2.48***
Extroversion	0.85***	0.58***
Openness	0.40***	0.45***
Agreeableness	1.05***	ns
Conscientiousness	1.29***	1.02***
Risk willingness	0.14***	ns
<i>Values (lagged)</i>		
<b>Materialistic values</b>	<b>1.22<sup>a</sup>***</b>	<b>-1.62***</b>
<i>Behavioural choices (lagged)</i>		
Annual working hours (ln)	-1.42***	-1.44***
Earnings (ln)	0.82***	1.37***

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

- a. This coefficient is *not* higher than for individuals who prioritise other values.

Panel 4: Effects on **LS** of socio-economic variables, traits, values, behavioural choices and domain satisfactions

<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>	<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>
<i>Socio-economic variables (lagged)</i>		<i>Behavioural choices (lagged)</i>	
Female	1.35***	Annual working hours (ln)	-0.43***
Age	-0.23***	Earnings (ln)	0.27***
Partnered	2.01***	<i>Domain satisfactions</i>	
Years of education	0.32***	Job	0.17***
Disability	-4.58***	Household income	0.21***
East German	-1.38***		
<i>Personality traits (lagged)</i>			
Neuroticism	-1.86***		
Extroversion	0.63***		
Openness	0.42***		
Agreeableness	0.58***		
Conscientiousness	0.30***		
Risk willingness	0.28***		
<b>Values (lagged)</b>			
<b>Materialistic values</b>	<b>-0.70***</b>		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Appendix 1 Table 4

The Religious Values ‘Recipe’

A Longitudinal 4-Step Structural Equation Model (N=122208)

Panel 1: Effects on **values** of socio-economic variables and personality traits

<i>Explanatory variables</i>	<i>Values: Religious values</i>	<i>Explanatory variables</i>	<i>Values: Religious Values</i>
<i>Socio-economic variables (lagged)</i>		<i>Personality traits (lagged)</i>	
Female	0.11***	Neuroticism	0.04***
Partnered	0.20***	Openness	0.06***
Years of education	-0.01***	Agreeableness	0.07***
East German	-0.55***	Conscientiousness	0.02***
Foreign	0.39***		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant



Panel 2: Effects on **behavioural choices** of socio-economic variables, traits and values

<i>Explanatory variables</i>	<i>Behavioural choice Church attendance</i>	<i>Behavioural choice Voluntary work</i>	<i>Behavioural choice Time with family, relatives</i>
<i>Socio-economic variables (lagged)</i>			
Female	ns	-0.08***	0.07***
Age	ns	0.00***	-0.01***
Partnered	0.16***	ns	0.14***
Years of education	0.02***	0.03***	-0.03***
Household income (ln)	0.08***	0.10***	-0.02*
Unemployed	-0.08***	ns	-0.08***
East German	-0.12***	-0.11***	ns
Foreign	ns	-0.35***	ns
<i>Personality traits (lagged)</i>			
Neuroticism	ns	-0.03***	ns
Extroversion	-0.02***	0.02***	0.06***
Agreeableness	0.02***	-0.02***	0.05***
Conscientiousness	ns	-0.04***	ns
Risk willingness	-0.01***	ns	-0.00*
<b>Values (lagged)</b>			
<b>Religious values</b>	<b>0.47***</b>	<b>0.14***</b>	<b>0.07***</b>

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

Panel 3: Effects on **domain satisfactions** of socio-economic variables, traits, values and behavioural choices

<i>Explanatory variables</i>	<i>Domain satisfaction Family</i>	<i>Domain satisfaction Volunteering</i>
<i>Socio-economic variables (lagged)</i>		
Age	-0.23***	ns
Partnered	5.13***	ns
Years of education	ns	0.57***
Household income (ln)	2.64***	2.48***
Unemployed	-1.69***	-4.38***
Disability	-1.71***	ns
East German	-0.48***	-4.49***
Foreign	ns	-5.59***
<i>Personality traits (lagged)</i>		
Neuroticism	-1.50***	-1.13***
Extroversion	0.71***	ns
Openness	0.17*	0.50*
Agreeableness	1.62***	1.84***
Conscientiousness	1.41***	0.75***
<i>Values (lagged)</i>		
<b>Religious values<sup>a</sup></b>	-	-
<i>Behavioural choices (lagged)</i>		
Church attendance	0.68***	1.56***
Time with family, relatives	1.94***	ns

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant

- a. Religious values are omitted because they are highly collinear with church attendance, which has a larger effect on both these domain satisfactions.

Panel 4: Effects on **LS** of socio-economic variables, traits, values, behavioural choices and domain satisfactions

<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>	<i>Explanatory variables</i>	<i>Life Satisfaction (LS)</i>
<i>Socio-economic variables (lagged)</i>		<b>Values (lagged)</b>	
Female	1.50***	<b>Religious values</b>	<b>1.23***</b>
Age	-0.21***	<i>Behavioural choices (lagged)</i>	
Partnered	0.34**	Church attendance	0.75***
Years of education	0.59***	<i>Domain satisfactions (lagged)</i>	
Household income	1.88***	Family life	0.28***
Unemployed	-4.53***	Volunteering	0.07***
Disability	-5.77***		
East German	-1.06***		
<i>Personality traits (lagged)</i>			
Neuroticism	-2.03***		
Extroversion	0.40***		
Openness	0.21***		
Agreeableness	0.25***		
Conscientiousness	0.20**		
Risk willingness	0.32***		

\*\*\* significant at 0.001 \*\*significant at 0.01 \*significant at 0.05 ns=not significant