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What Is the Role of Environmental Concern on Positional Behaviour?

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Abstract

The main focus of this thesis is how concerns for environmental degradation relate to positional behaviour, and whether the association between subjective well-being and household income depend on individual level of environmental concern. The empirics of the thesis is based on micro panel data during the years 1992-2017. Using an interaction model, I find that the association between absolute and relative income measures and subjective well-being is weaker for people who are very concerned about the environment. Results are robust with respect to estimators and alternative measures of relative income position, and I further investigate individual heterogeneity based on known correlates of positional behaviour and variables expected to correlate with individual level of environmental concern. The paper briefly discusses the implications of the results with respect to environmental policy.

Key Words: Environmental Concerns, Relative Income, Subjective Well-Being
JEL Codes: C90; D63.

Acknowledgements

Table of Contents

1. Introduction

The literature on subjective well-being (SWB hereafter), also referred to as happiness or life-satisfaction, has found a wide range of factors that significantly affect individual well-being. A part of this literature is concentrated on the classic question: Does money make people happy? Robust evidence show that income is positively related to life-satisfaction but that the income of peers also matters (e.g. Ferrer-i-Carbonell, 2005; Luttmer, 2005). Life-satisfaction is negatively related to the income of relevant others, reflecting that people evaluate own absolute level of income in light of comparable peers and become less satisfied with own income as reference income increases. How strongly the income of others affects individuals' SWB, i.e. the level of positional concern, has been shown to depend on factors such as age (Akay & Martinsson, 2019; FitzRoy, et al., 2014) and personality (Akay & Karabulut, 2020; Budría & Ferrer-i-Carbonell, 2018), but also on structural factors such as income security and level of absolute income (e.g. Senik, 2004; Akay, et al., 2014). Although literature examining the correlates of positional concerns is increasing in numbers, an unexplored area of this research is how morals, concerns and beliefs interact with positional behaviour. I improve on this knowledge by examining how environmental concern affect relative concerns, a subject which not only relates to the literature on relative concerns, but that also could give new perspectives on the topic of environmental policy.

More precisely, I ask if the association between SWB, absolute and relative income differs depending on the individual level of concern for environmental degradation. The source of data for the empirics of this thesis is the German Socioeconomic Panel (SOEP), an extensive longitudinal dataset that has been developed for research within the social sciences. Using a set of subsamples of SOEP between the years of 1992 and 2017, the analysis is conducted in three steps; First, results from previous work on positional concerns is reproduced, in order to provide a base for the main analysis. Second, the connection between well-being and people's worry for the environment is explored with a fixed effect regression model relating self-reported life-satisfaction (the measure of SWB) to concern for the environment, while controlling for absolute and relative income measures. Third, differences in the association between SWB, absolute and relative income between people with high and low level of concern for environmental degradation

is examined by interacting people's concern for the environment with absolute and relative income. Later, four sub-hypotheses are constructed to investigate whether results are driven by any particular group in the sample. More precisely, heterogeneity in effect based on age, sex, prosocial behaviour, education and industry of occupation is explored.

Main results show that the association between SWB, absolute and relative income is significantly weaker for people who are very concerned about environmental degradation, suggesting that own and peer income is less important for well-being among people who self-report higher concern for the environment. Results are robust to changes in the definition of income and altered assumptions of to whom individuals compare their income. Further, I find that individual level of concern matters more for people whose income is lower than the reference group, and that the relationship between SWB and income parameters is the most sensitive to environmental concern among older women.

The remainder of this thesis is structured as follows; In section two, the reader will find a review of existing literature on the topics discussed, as well as the hypotheses of the thesis. In the third section, the data and variables used are described and discussed, followed by the specification of econometric models used in section four. Main results, robustness tests and test of heterogeneity are found in section five, followed by the conclusions of the thesis in section six.

2. Literature Review

2.1. Previous Literature

Overall feeling and satisfaction with life is increasingly used as measures of SWB in the field of Economics. These types of measures have been shown to be robust measures of SWB (Dolan & White, 2007) and can be considered proxies of actual utility (Frey & Stutzer, 2002). A growing number of studies explore variables that influence SWB. Some examples are inflation and unemployment (Di Tella, et al., 2001), health (Ferrer-i-Carbonell & van Praag, 2002) and environment (e.g. Welsch, 2006; Maddison & Rehdanz, 2011). For a review of the literature, see Frey and Stutzer (2002) and Dolan, et al. (2008). A perk of using a SWB measure, such as life-satisfaction, compared to the traditional way of proxying well-being by income or life span, is the possibility of

capturing the effect of non-economic variables on individual well-being. With a subjective measure of well-being, it is also possible to examine how different non-economic factors interact with income for individual SWB and, as in the present case, explore whether psychological stress or emotions connected to being worried about the environment mediates how the individual thinks about income and material well-being.

The idea that people does not only attain utility from absolute levels of income and consumption, but that SWB also depend on the income and consumption of others, is not new. Veblen (1899) and Duesenberry (1949) contributed to seminal theory about the relativity of income, consumption and savings. Duesenberry also made assumptions of to whom people compare themselves – mainly to those who are "better off". In more modern research the *Easterlin-paradox* has been influential. Using cross-country data, Easterlin (e.g. 1995; 2001) found income to be weakly correlated with SWB; people who live in countries with higher income are happier on average, however, increases in income over time does not result in increasingly happier individuals. Among others, Easterlin argues that this is mainly because of the comparison income effect.

"…judgments of personal well-being are made by comparing one's objective status with a subjective living level norm, which is significantly influenced by the average level of living of the society as a whole." (Easterlin, 1995, p. 36)

Today, the link between individual SWB and the income of others is well-documented. The relative income measure used in most studies is reference income, which is calculated as the average income in the individuals assumed reference group. Commonly, people are assumed compare their income to others who are relatively similar in for example age, sex and education (e.g. Ferrer-i-Carbonell, 2005), and that comparisons are more frequent between people who live in proximity to each other (e.g. Luttmer, 2005). Several studies find evidence of a negative relationship between individual life-satisfaction and reference group income (e.g. Ferrer-i-Carbonell, 2005; FitzRoy, et al., 2014; Luttmer, 2005; McBride, 2001). Ferrer-i-Carbonell (2005) found the SWB effect from reference income to be assymetric between deprived and non-deprived individuals, suggesting Duesenberry's (1949) theory on upwards comparisons to be credible. Further, Luttmer (2005) provide evidence that the comparison income effect is stronger among the individuals who socialize more with their neighbours, implying that frequent social

contact with the assumed reference group increase peer comparisons. Relative income theory is also explored using an experimental method to look at individual degree of relative concerns for different goods and "bads". Common results are that visible goods, such as cars, are more positional compared to invisible goods such as the safety of the car (e.g. Carlsson, et al., 2007). The level of positionality does not only differ between goods but has been shown to differ among old and young individuals. Positionality for goods that are traditionally thought of as being status-goods, e.g. cars and income, increases with age, whereas people under the age of 40 are more positional when it comes to leisure, which is not traditionally thought of as being a positional good (Akay & Martinsson, 2019). Fitzroy, et al. (2014) find similar results using the SWB method to compare relative concerns between people over and under the age of 45.

Some studies suggest that relative concerns depend on income security and the absolute level of income. One example is Senik (2004), who found a positive relationship between reference group income and SWB using Russian panel data, and discuss income volatility and feelings of uncertainty being the driving factors behind the result. Senik concludes her results to be a sign of the "tunnel effect" by Hirschman (1973). According to Hirschman's theory, for some, high average income increases individual SWB since it signals a greater possibility of higher future earnings. Similarly, studies conducted using data from low income countries provide evidence of lower degree of positionality compared to similar work in developed countries (e.g. Akay, et al., 2014), but sometimes also a positive relationship between reference income and SWB (Kingdon & Knight, 2007; Bookwalter & Dalenberg, 2010).

Recently, it has been shown that some personality traits significantly correlate with higher levels of relative concern (Akay & Karabulut, 2020; Budría & Ferrer-i-Carbonell, 2018). People who score high on agreeableness and positive reciprocity tend to be less positional on average. These traits are connected to different pro-social behaviours such as collaboration, altruism and empathy (Budría & Ferrer-i-Carbonell, 2018), which in turn can be associated with a more intrinsic set of values (Pandelaere, 2016). On the other hand, people who score high on extraversion, conscientiousness, external locus of control, and negative reciprocity, traits that are related to extrinsic values such as; high valuation of wealth-accumulation, social comparison and lower levels of satisfaction, are more positional (Budría & Ferrer-i-Carbonell, 2018; Akay & Karabulut, 2020).

2.2. What is the Relationship Between Environmental and Relative Concerns?

Before presenting predictions on the relationship between individuals' concerns toward environment and their relative concerns, I briefly discuss on the relation between environmental concerns and SWB and the potential mechanisms suggested in the literature that explain the relationship. As in most studies in the literature (e.g. Binder & Blankenberg, 2016; Suárez-Varela, et al., 2014; Ferrer-i-Carbonell & Gowdy, 2007), the measure of environmental concern used in this thesis is subjective in its nature. When asking people of their level of environmental concern in general, people who state that they are more concerned tend to be happier (Binder & Blankenberg, 2016; Suárez-Varela, et al., 2014), and both studies suggest that environmental concern is related to prosocial behaviour such as volunteering. Binder and Blankenberg find no significant effect of environmental concern on SWB when controlling for volunteering, whereby they conclude that concern for the environment "picks up" the positive SWB effect from being prosocial. However, when interacting concern and volunteering, both Binder and Blankenberg (2016) and Suárez-Varela et al. (2014) find that people who are concerned for the environment *and* volunteer are happier compared to those who do not volunteer. Further, Ferrer-i-Carbonell and Gowdy (2007) explore the relation between SWB and stated concern for pollution and biodiversity and finds asymmetry in the effect on SWB between the two areas of concern. When looking at concern for specific environmental issues, being concerned for issues with positive connotations, such as animal extinction, is positively related SWB. On the other hand, environmental issues with negative associations, in their case pollution that destroys the ozone layer, is negatively related to SWB.

Awareness and concern for environmental degradation does not always lead to pro-environmental behaviour, in the literature referred to as the *knowledge-concern-action paradox* (Lenzen & Cummins, 2011). Overall, contributing to environmental protection by adapting pro-environmental behaviours such as saving water, recycling and purchasing environmentally friendly products correlates with higher levels of SWB (e.g. Suárez-Varela, et al., 2014; Xiao & Li, 2010; Welsch & Kühling, 2010). The traditional

explanation to these findings is pure and impure altruism (Andreoni, 1989; 1990). The theory of impure altruism as an explanation for the positive relationship between SWB and pro-environmental behaviour is supported by Videras and Owen (2006), who argue that the mechanism behind the satisfactory feeling people experience when contributing to the protection of the environment, lies in social signalling and the perks of following societal norms. In this way, changing behaviours in the aim of protecting the environment can be a way for the individual to signal good traits and increase social status. Similarly, Welsch and Kühling (2015) suggest that social norms of sustainability and green consumption explains the positive relationship between green behaviour and SWB. However, Binder and Blankenberg (2017) criticize previous literature on the relation between pro-environmental behaviour and SWB for not properly separating green behaviour from green self-image. With data from the UK, they specify models including both green self-image and lifestyle and find environmentally friendly behaviour to be insignificant in the determination of SWB, whereas there is a significant positive relationship between green self-image and SWB. Thus, they suggest that having a green self-image, i.e. having the perception that you act environmentally friendly, is a greater contributor to SWB compared to actual pro-environmental behaviours.

Note also that the knowledge of behaviours and negative externalities associated with positional concerns may be a lead to how environmentally concerned peoples' SWB is related to the income of others. A common discussion is how positional concerns creates a treadmill effect, where people consume in order to keep up with the consumption of others. Such conspicuous or excessive consumption is undeniably damaging the environment further. People who worry about environmental degradation might therefore be less concerned with relative income, as they do not want to cause further harm to the environment due to zero-sum consumption races. Following the same logic, the relation between SWB and absolute income may also be weaker among environmentally concerned individuals, since income and consumption is not as strongly associated with social signalling and status.

2.3. Hypotheses

In this section I present four hypotheses aimed at exploring the relation between SWB, income and environmental concern. The first objective is to confirm the expected effects

of absolute and relative income on SWB. Throughout *Hypothesis 1a-c*, SWB is assumed to be a function of absolute (y) and relative income (y$_r$), and a vector of demographic and socioeconomic variables (X).

$$SWB = f(y, y_r, X) \tag{1}$$

The first model specification points to test the standard economic assumption that individual SWB increases with own income and that SWB decreases when the income of other's increase, as suggested by the literature on relative concerns. The latter expresses positional concern, where it is assumed that the individual become less satisfied with their own income when the income of peers (the reference group) is increasing. The first hypothesis that will be tested *(H1a),* is that the relation between SWB and absolute income is positive, and that SWB decreases with reference income.

Hypothesis 1a: $SWB_y > 0$

$$SWB_{y_r} < 0$$

The second specification explores possible heterogeneity between people who are relatively deprived, i.e. people with incomes below the reference income, and people whose family income exceeds the reference income (non-deprived individuals). This specification is related to the assumed asymmetry in income comparison between deprived and non-deprived people and has previously been tested by e.g. Ferrer-i-Carbonell (2005). Duesenberry (1949) theorized that income comparisons are mostly upwards, in this case meaning that changes in relative income should be associated with no or small changes in SWB for non-deprived people, while deprived individuals have a larger negative effect on SWB from reference income. SWB from absolute income may also differ between the groups. As non-deprived persons, in general, have a higher income compared to deprived individuals, the marginal benefit of household income should be smaller in the non-deprived group, reflecting the standard assumption of decreasing marginal utility of income. Thus, the hypothesis is that the association between SWB, household and reference income is weaker among non-deprived individuals.

Hypothesis 1b: $SWB_{y, \ deprived} > SWB_{y, \ non-deprived}$

$$SWB_{y_r, \, deprived} > SWB_{y_r, \, non-deprived}$$

The third specification assumes that SWB depends on the distance between own income and the reference income (y-y$_r$) (Ferrer-i-Carbonell, 2005). The higher (lower) own income is compared to the reference income, the happier (less happy) people are expected to be. Thus, the predicted direction of the relationship between relative distance and happiness is positive.

Hypothesis 1c: $SWB_{distance} > 0$

The second aim is to explore the relationship between environmental concern and life-satisfaction while taking absolute and relative income into consideration. Now we assume SWB to also, in addition to household and reference income, depend on environmental concern (c).

$$SWB = f(y, y_r, c, X) \tag{2}$$

Limited research has found a positive relationship between environmentalism and SWB (Binder & Blankenberg, 2016; Suárez-Varela, et al., 2014), although the underlying mechanisms of this result are not clear. Being worried and concerned implies emotional costs to the individual that reasonably should lead to lower SWB, unless other psychological mechanisms balance this loss in utility. A suggested explanation to finding a positive relationship between SWB and environmental concern is that the subjective measure of environmental concern picks up the propensity of prosocial behaviour (Binder & Blankenberg, 2016), which gives the individual altruistic satisfaction. Therefore, a proxy prosocial behaviour, namely, frequency of volunteering, is included as a control in specifications that involve environmental concern. Based on previous research, the expected relationship between environmental concern and SWB is positive and the intention is to test this hypothesis before and after including the proxy for prosocial behaviour.

Hypothesis 2: $SWB_{environmental \; concern} > 0$

The third, and main, interest of this thesis is to examine whether SWB stemming from absolute and relative income depend on individual level of environmental concern. To form an expectation of how environmental concern impacts the importance of absolute and relative income for wellbeing, I draw on knowledge from the literature relating income and environmental concern to SWB. Regarding absolute income there is, to the author's best knowledge, no empirical evidence suggesting how marginal utility for income is affected by concern for the environment. Hence, the prediction of how the relation between SWB and absolute income is influenced by environmental concern is based on logical deduction. Most of an individual's income is designated towards consumption of housing, goods and services, and as we know, most types of consumption are associated with CO_2 emission or other practices that may harm the environment. As previously discussed, it is therefore reasonable to believe that people who are worried about environmental degradation may have a smaller propensity to consume, at least excessively, which could imply a lower marginal utility of income.

Knowing that some personality traits are connected to positional behaviour and environmental concerns, it is reasonable that also values and morals interact with relative concerns to some extent. The question of environmental protection is partly a moral issue that can be related to altruism and prosocial behaviour but can also be a more egoistic concern in the sense that people worry about environmental degradation threatening personal interest. Thus, what it means to be concerned about environmental degradation is not straight forward; some people may be concerned mainly for wildlife and the destruction of beautiful nature sights, others may be concerned because they feel insecure regarding future earnings or environmental issues otherwise adversely affecting them personally. People could also feel inclined to protect the environment as environmental degradation can have adverse effects for others' or common resources. The various underlying reasons for being worried about the environment leads to a somewhat ambiguous expectation of the impact of environmental concern on the relationship between SWB and income. There are, however, some empirical evidence that concern for the environment is related to prosocial behaviour. People with personality traits that are associated with prosocial behaviour have been shown to be less positional (Akay & Karabulut, 2020; Budría & Ferrer-i-Carbonell, 2018), and considering this, you would expect a weaker association between the income of others and SWB among people who are concerned about the environment.

To summarize this discussion, I hypothesize that the SWB of people who are concerned about the environment is less affected by absolute and relative income, compared to the SWB of peers that does not care for the environment. As in the baseline setup, the direction of the relationship between life-satisfaction and absolute income is expected to be positive, however, the size of the correlation should be smaller among environmentally concerned individuals. Regarding the relative income measures, we similarly expect the same direction of correlation as in the baseline case (negative), but a smaller effect size among people who are concerned about environmental degradation.

Hypothesis 3: $\quad\quad\quad SWB_{y,\ high\ concern} < SWB_{y,\ low\ concern}$

Hypothesis 4: $\quad\quad\quad SWB_{y_r,\ high\ concern} < SWB_{y_r,\ low\ concern}$

3. Data

3.1. Sample Selection

The following empirical analysis use data from a set of subsamples in the German Socioeconomic Panel (SOEP). The first wave of SOEP was conducted in 1984, then only including the former Federal Republic of Germany (West Germany). In 1990 the survey expanded to also encompass individuals living in the former German Democratic Republic (East Germany). For the present analysis, the original Western and Eastern sample and subsequent refresher subsamples[1] are used in the time period 1992-2017. People with a background of migration is sorted out of the sample, since research show that the relationship between SWB and reference income differs between migrants and non-migrants (Akay, et al., 2012). Migrants experience a positive effect on SWB from reference income when the reference group consists of people who are native to the area. The likely explanation for this is that migration often take place for economic and social gains, thus, high average income in the new country is taken as a sign that own income will increase in the future. Table 1 provide brief summary statistics for the full sample.

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[1] Subsamples used: A, C, E, F, H, J, K, N. Details about sampling technique and strategy can be found on the SOEPcompanion website (SOEP, 2018).

Table 1: Summary Statistics

	Mean	SD
Life-Satisfaction	6.961	1.756
Household Income	35864.314	23532.828
Concern for Environment	1.195	0.615
Frequency of Volunteering	0.620	1.008
Sex=1 if female	0.513	0.500
Age	47.319	15.163
Years of Education	12.180	2.546
Self-Reported Health Status	2.386	0.927
Disability Status	0.115	0.319
Household Size	2.670	1.189
Annual Hours of Work	1197.730	1107.267
Number of Kids in Household	0.497	0.854
Region=1 if East Germany	0.304	0.460
N	338 828	

Summary statistics over dependent and a selection of control variables 1992-2017.

3.2. Measuring Subjective Well-Being: Life-Satisfaction

Following the literature on the relation between SWB, income and environmental concern (e.g. Binder & Blankenberg, 2016; Ferrer-i-Carbonell, 2005; FitzRoy, et al., 2014; Luttmer, 2005), life-satisfaction is used as a measure of SWB. Life-satisfaction is a latent, ordered, categorical variable based on the following question from the SOEP questionnaire: "How satisfied are you with your life, all things considered?". Participants are given response options from "0 - completely dissatisfied" to "10 – completely satisfied". Figure 1 and 2 provide a histogram and trend of mean life-satisfaction during
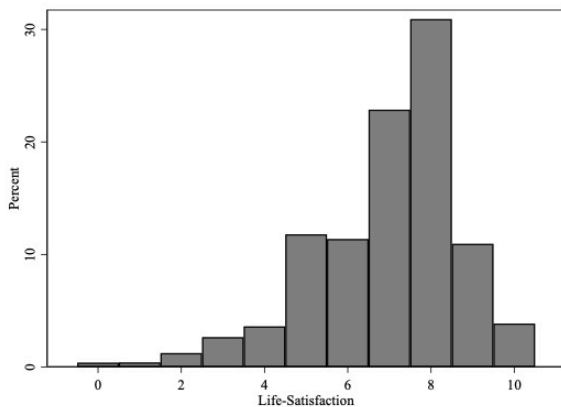

Figure 1: Distribution of Life-Satisfaction

Source: Author's own calculation of SOEP data.
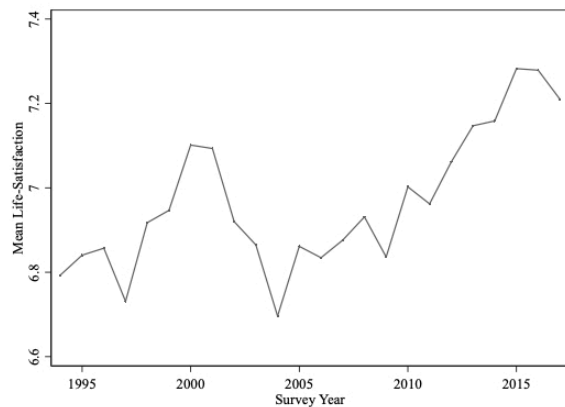
Figure 2: Mean Life-Satisfaction During Years of Analysis

Source: Author's own calculation of SOEP data.

the period of interest. The distribution of life-satisfaction is negatively skewed, centred around 8, and there is a clear upward trend in mean life-satisfaction since the early 2000s.

3.3. Measuring Income

Absolute income is measured using net household income, i.e. household income after taxes and transfers. Household income as opposed to personal income is preferred, since some groups of individuals may have no or very low income although enjoying a high standard of living based on the income of family members. The baseline variable for measuring relative income is reference income, which is defined as the average income in the individuals reference group. The baseline reference group will be defined based on the individual's age, sex, region and survey year. Age is divided into five groups: 20-29, 30-39, 40-49, 50-59 and 60-75, thus, the individual's reference group contains all individuals within the same age group, of the same sex, living in the same region each year. There is, however, no clear consensus on how the reference group should be defined. Previous studies has created reference groups solely based on area of living (Luttmer, 2005) and by combining different demographic criteria (Ferrer-i-Carbonell, 2005; FitzRoy, et al., 2014). Therefore, the robustness of with respect to reference groups is checked by altering reference group criteria (result in robustness section). First, another spatial dimension will be added by adding state of residence to the list so that people of the same sex and age-group who are living in the same state forms the individuals reference group. Second, a criterion of whether the individual has above or below median education (11.5 years) will be added so that people of a more similar length of education are assumed to compare income.

3.4. Measuring Environmental Concerns

The present thesis employs the same measure of environmental concern as is used in Binder and Blankenberg (2016). It is a subjective measure based on the following question from the SOEP questionnaire: "How concerned are you with the following issues? – Environmental protection", with three possible responses: "1 - very concerned", "2 - somewhat concerned" and "3 - not concerned at all". The scale is recoded such that "0" indicate no environmental concern, "1" indicate some concern and "2" indicate very

concerned. As with life-satisfaction, the variable is a latent, ordered, categorical variable, where a higher value indicate a higher level of concern. Note that the question is asked in such a way that the response captures a general level of concern for the environment, and there is no way of identifying specific environmental issues that the individual worries over. This is sufficient, since the aim is to examine the relationship between concern, income and SWB irrespective of the exact worries of the individual. For the purpose of simple interpretation, models are specified using a dummy equal to one if the individual is very concerned for the environment and zero otherwise. Thus, the analysis will compare differences between people with high (very concerned) and low (somewhat or not concerned) levels of concern, conditional on the full set of individual, family and regional characteristics as well as their personality measures. Figure 3 and 4 shows a histogram and average concern for the environment during the period of analysis.
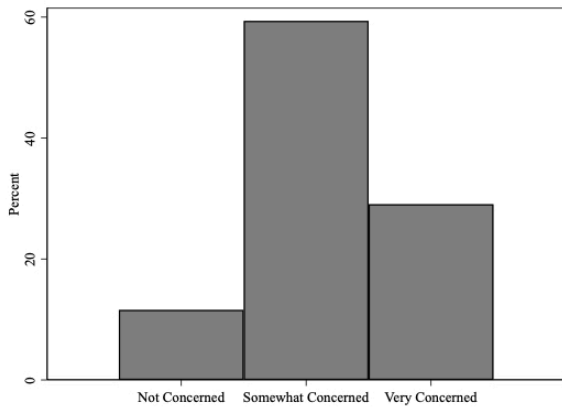
Figure 3: Distribution of Environmental Concern

Source: Author's own calculation of SOEP data.
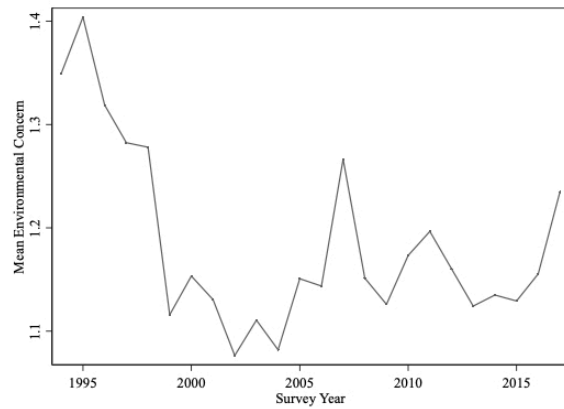
Figure 4: Mean Environmental Concern During Years of Analysis

Source: Author's own calculation of SOEP data.

4. Econometric Specifications

4.1. The Model

The first aim of the thesis is to establish the basic relationships between SWB, absolute and relative income (*H1a*-c) and to unravel how environmental concern relates to SWB (*H2*). For these purposes, the following model was constructed:

$$SWB_{it} = \alpha + \lambda_a \log(Y_{it}^{abs}) + \lambda_r \log(Y_{rt}^{rel}) + \pi C_{it} + X\beta + \varepsilon_{it} \qquad (3)$$

The dependent variable of Eq. (3) is SWB_{it}, measured for each individual i, during survey year t. Y_{it}^{abs} and Y_{rt}^{rel} are the absolute and relative income measures, respectively. Following previous research (e.g. Ferrer-i-Carbonell, 2005; Luttmer, 2005), absolute and reference income will appear in its logged form in all specifications. Absolute income is measured with household income, whereas there are two definitions of relative income in order to examine income comparison effects. The main specification employs reference group income as the relative income measure. Reference income is calculated as the average of household income Y^r for the individuals m within individual i's reference group r in each year t: $Y_{rt}^{rel} = \frac{1}{N_r-1}\sum_{m=1}^{N_r-1} Y_{mt}^r$. The second relative measure of income is the ratio between household income and reference group income: $log(Y_{it}^{abs}) - log(Y_{rt}^{rel})$. C_{it} is a dummy variable measuring individual level of environmental concern each year. Vector X contains control variables that have been shown to impact SWB. Examples are health and labour status, number of children and relationship status[2]. The main interest of this model lies in the significance and sign of λ_a, λ_r and π. Second, a model evaluating the interaction between environmental concern and both income measures (*H3 and H4*) was created as follows:

$$SWB_{it} = \alpha + \lambda_a^{C=1} C_{it} * log(Y_{it}^{abs}) + \lambda_a^{C=0}(1 - C_{it}) * log(Y_{it}^{abs}) + \lambda_r^{C=1} C_{it} * log(Y_{rt}^{rel}) +$$
$$\lambda_r^{C=0}(1 - C_{it}) * log(Y_{rt}^{rel}) + \theta C_{it} + X\beta + \varepsilon_{it} \tag{4}$$

The main interest of Eq. (4) is to examine any differences in the size of λ_a and λ_r, depending on environmental concern. Therefore, Wald tests under the null-hypothesis of $\lambda_a^{C=1} = \lambda_a^{C=0}$ and $\lambda_r^{C=1} = \lambda_r^{C=0}$ are conducted to determine if the relation between SWB, absolute and relative income statistically significantly differ between people with high and low level of concern. The Wald test statistic is asymptotically chi-square distributed under the null-hypothesis, and the limit for rejecting the null-hypothesis is set to 10%.

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[2] See complete list and definitions of control variables in appendix A.

4.2. Econometric Concerns

The outcome variable life-satisfaction is a latent, ordered categorical variable that is measured with a discrete ordered variable. Responses are ordered from low to high, however, life-satisfaction equal to 10 does not mean that the individual is twice as happy as someone who states their life-satisfaction to be equal to 5, merely that the individual who responds 10 is happier compared to the individual who responds 5. To correctly take the ordering of the outcome variable into consideration, specifications should be estimated using an Ordered Probit Model (Stock & Watson, 2015). A downside to using Ordered Probit and retrieving marginal effects is that it is complex while presenting the results. The literature also suggests that there are no large differences between ordered choice and linear models (Ferrer-i-Carbonell & Frijters, 2004). Therefore, all main results will be estimated using linear panel data models. However, the robustness of the chosen estimator will be checked by running the interaction specification using Ordered Probit.

A common concern in econometric regression is unobserved variables that may cause omitted variable bias, violating the OLS assumption $E[\varepsilon_i|X_i] = 0$. Working with life-satisfaction data, it must be noted that a large part of SWB may not be explainable but can be attributed to difficult-to-measure characteristics such as personality, and it has also been suggested that some people are born happier because of their genetics (Sirgy, 2012). The panel-structure of the data allows to control for such time-invariant, individual specific effects by estimating models with fixed effects (Stock & Watson, 2015). Panel data also allows to control for time and spatial trends by introducing year and state fixed effects. The time-fixed effects will e.g. capture inflation which varies equally for all individuals from year to year. Similarly, including state fixed effects controls for trends and events that occur within states, e.g. local accidents or events that harm the environment and may influence individual level of environmental concern.

The final econometric concern is regarding assumptions of the error term. Observing the same variables repeatedly for one individual can mean that the error term correlates with itself over time (Stock & Watson, 2015), which violates the OLS assumption of no autocorrelation: $E[\varepsilon_i\varepsilon_j|X_i] = 0 \; for \; i \neq j$. Although it does not cause bias to the fixed effect point estimates, it can affect the standard error of estimations. This is corrected by

estimating with clustered standard errors which is a type of heteroscedasticity- and autocorrelation-consistent (HAC) standard errors. Clustered standard errors let the error correlate within clusters, i.e. the error terms of an individual are allowed to correlate with itself between years, however, it is assumed that errors do not correlate between clusters. In an attempt to keep the analysis simple, main result models are estimated using standard robust errors. I instead provide results of estimating the interaction model while employing standard errors clustered over the reference group in the robustness section. In the robustness test, error terms are allowed to correlate within reference groups since it is assumed that individuals compare their income to the income of people within the same group.

5. Results
5.1. Main Results

In this section, main results are presented and discussed. The section includes three tables covering our four hypotheses: *H1a*, income is positively related to SWB, whereas there is a negative association between SWB and reference income; *H1b*, the SWB effect from household and reference income is larger for relatively deprived individuals, compared to non-deprived people; *H1c*, the income to reference income distance affect SWB in a positive direction; *H2*, environmental concern is significantly associated with SWB; *H3*, environmentally concerned individuals derive less SWB from household income compared to non-concerned individuals; *H4*, the effect of reference income on SWB is smaller among people who are very concerned about the environment.

Table 2 presents the results that are reproduced in line with previous literature on relative concerns, covering *Hypothesis 1a-c*. As expected, absolute income and SWB are positively related, conditional on other standard determinants of SWB, both when looking at the complete sample (column 1) and when dividing the sample between deprived and non-deprived people (column 2). The magnitude of the correlation, close to 0.24 unit increase in SWB for one percentage point increase in income, also lies in line with previous research (e.g. Luttmer, 2005). The magnitude of the relationship is smaller among people whose household income exceeds the average in the reference group, which could be explained in the light of the standard assumption of decreasing marginal

Table 2: Baseline Specifications

Dependent variable: Life-Satisfaction	(1) Full Sample	(2) Deprived and Non-deprived	(3) Relative Distance
Log HH. Income	0.237*** (0.012)		
Log HH. Income*Deprived		0.242*** (0.015)	
Log HH. Income*Non-deprived		0.179*** (0.022)	
Log Ref. Income	-0.334*** (0.038)		
Log Ref. Income*Deprived		-0.342*** (0.040)	
Log Ref. Income*Non-deprived		-0.277*** (0.042)	
Relative Distance			0.244*** (0.012)
Years of Education	-0.005 (0.006)	-0.005 (0.006)	-0.006 (0.006)
Above Median Health	0.551*** (0.008)	0.551*** (0.008)	0.552*** (0.008)
Individual is Disabled	-0.243*** (0.021)	-0.244*** (0.021)	-0.242*** (0.021)
Number of Persons in HH.	-0.077*** (0.008)	-0.077*** (0.008)	-0.082*** (0.008)
Log of Annual Hours of Work	-0.006*** (0.002)	-0.006*** (0.002)	-0.007*** (0.002)
Constant	7.804*** (0.412)	7.840*** (0.414)	6.835*** (0.118)
N	295825	295825	295825
adj. R^2	0.056	0.056	0.056

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. Full estimation result in appendix B. [+] $p < 0.15$, [*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$

utility for income. Since the average income in the non-deprived group is higher, they benefit less from their income increasing[3]. In specifications including reference income (column 1 and 2), the coefficient of reference income is negative, reflecting that SWB decreases as the average income in the reference group increase. Like for absolute income, changes in reference income are associated with smaller changes in SWB among people whose income exceeds the average income in the reference group (difference significant on the 5% level), suggesting that comparisons are asymmetrical. This is in line with previous research; however, the coefficient on reference income is slightly larger compared to what has previously been found. It is common to find an correlation close to the magnitude of absolute income, in the opposite direction. Then, SWB remains constant

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[3] Average yearly household income deprived group: €22 790, average yearly household income in non-deprived group: €50 278.

as household and reference group increase simultaneously with an equal amount. Results in the present study rather suggest that simultaneous and equal increases in income of the individual and reference group is associated with decreases in SWB. One possible reason for this finding is that migrants are excluded from the sample so that the average level of relative concern is higher compared to previous studies. Further, the distance between own and reference income also follows expectations being positively related to SWB (column 3). A percentage point increase in positive (negative) distance from the reference group income is associated with a 0.244-unit increase (decrease) in life-satisfaction implying that the longer the distance between own and others' income is, the happier (less happy) the individual is.

The relation between control variables and SWB are consistent with previous literature (for a review, see Dolan, et al., 2008). Good health is positively related to SWB, while being disabled is associated with a significant decrease in SWB. The association between years of education and SWB is negative but insignificant. As suggested by Meier and Stutzer (2008), the reason for the insignificant relationship may be that education seldom changes over time for adult respondents, which could cause issues in a fixed effects estimation and result in an insignificant coefficient for years of education. Regarding annual hours worked, previous literature finds that while being employed affect SWB in a positive direction, there is a point after which additional hours of work is negative for SWB. This suggests a turned-over U-shape to the relation between SWB and hours worked. Thus, the negative relationship between annual hours of work and SWB found in the present study could possibly be explained by individual work hours exceeding the point where SWB is positively affected. Finally[4], I, in accordance with earlier work, find that single, widowed, divorced and separated people all have lower SWB compared to married individuals. The fact that separated individuals have the lowest SWB is found also by Helliwell (2003). The overall fit of the models (adj. R^2) is 5,6%, which is similar to previous studies estimating life-satisfaction equations (e.g. Luttmer , 2005; Ferrer-i-Carbonell & Gowdy, 2007).

Next, a dummy indicating whether the individual is very concerned about the environment is included in baseline specifications (Table 3), to test the relationship

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[4] See appendix B, Table B1 for full estimation results.

Table 3: Environmental Baseline

Dependent variable: Life-Satisfaction	(1) Full Sample	(2) Full Sample	(3) Deprived and Non-deprived	(4) Relative Distance
Log HH. Income	0.236***	0.288***		
	(0.012)	(0.019)		
Log HH. Income*Deprived			0.297***	
			(0.025)	
Log HH. Income*Non-dep.			0.234***	
			(0.031)	
Log Ref. Income	-0.331***	-0.257***		
	(0.038)	(0.049)		
Log Ref. Income*Deprived			-0.269***	
			(0.053)	
Log Ref. Income*Non-dep.			-0.205***	
			(0.054)	
Relative Distance				0.286***
				(0.018)
Dummy=1 if High Concern	0.016**	0.026**	0.025**	0.026**
	(0.007)	(0.011)	(0.011)	(0.011)
Volunteering, base: Never				
Less Frequently		-0.005	-0.005	-0.005
		(0.014)	(0.014)	(0.014)
Every Month		0.045**	0.045**	0.045**
		(0.018)	(0.018)	(0.018)
Every Week		0.087***	0.087***	0.087***
		(0.020)	(0.020)	(0.020)
Years of Education	-0.005	-0.007	-0.007	-0.007
	(0.006)	(0.007)	(0.007)	(0.007)
Above Median Health	0.550***	0.567***	0.567***	0.567***
	(0.008)	(0.011)	(0.011)	(0.011)
Individual is Disabled	-0.242***	-0.236***	-0.236***	-0.236***
	(0.021)	(0.030)	(0.030)	(0.029)
Number of Persons in HH.	-0.076***	-0.099***	-0.098***	-0.097***
	(0.008)	(0.011)	(0.011)	(0.011)
Log of Annual Hours of Work	-0.006***	-0.011***	-0.011***	-0.011***
	(0.002)	(0.003)	(0.003)	(0.003)
Constant	7.766***	6.538***	6.585***	6.852***
	(0.411)	(0.524)	(0.526)	(0.154)
N	294697	130062	130062	130062
adj. R^2	0.056	0.061	0.061	0.061

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. Full estimation result in appendix B. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

between concern for environment and SWB (*H2*). Regarding absolute and reference group income as well as relative distance, the size, sign and significance is qualitatively equal to results in Table 2. The model specification in the first and second column are identical, except for that a variable for the frequency of volunteering has been included in model 2 to control for the issue of environmental concern "picking up" on prosocial tendencies. In both models, the environmental concern dummy is significantly associated with an increase in SWB. The direction of the relationship between SWB and

environmental concern in line with expectations, however, the result is somewhat surprising since environmental concern was expected to be insignificant when controlling for volunteering (Binder & Blankenberg, 2016). Results presented here suggests that being very concerned for environmental degradation impact positively on SWB, and that the effect is not particularly and articfact of a higher likelihood of volunteering. Considering volunteering, volunteering every month or week has a positive impact on SWB, compared to never volunteering. People who volunteer every week has the biggest positive impact on SWB, however, volunteering less frequently than once a month has no impact on well-being. Finally, we observe a slight increase in model fit when including environmental concern and volunteering frequency (adj. R^2=0.061).

The final table in the main results section (Table 4) presents results from specifications including environmental interactions that correspond to *Hypothesis 3 and 4*. Here, the dummy for environmental concern is interacted with the measures for absolute and relative income and is also included as a control. Examining the results from regression using the complete sample (column 1), we can accept our third and fourth hypothesis. People who are very concerned about environmental degradation derive less SWB from absolute level of income, compared to those who report a low level of concern. The difference is statistically significant on the 1 % level and suggest that the association between absolute level of income and SWB differ between the groups. Likewise, the relationship between SWB and reference income is weaker if the individual is very concerned about the environment. The difference is significant on the 1 % level.

Next, we analyse whether SWB effects from household and reference income differs among deprived and non-deprived people depending on environmental concern. Among the people whose household income is lower than the reference group average, i.e. the deprived people, individuals who are very concerned have a significantly weaker relation between SWB and both household and reference income (difference significant on 1% level). In the non-deprived group, there is no significant difference between people with high and low level of concern for either of the income measures, suggesting that environmental concern does not mediate the SWB-income relationship among non-deprived individuals. As previously discussed, deprived people are expected to be more concerned about own and others' income, why it is interesting to observe higher sensitivity to environmental concern in this group. One explanation could be that deprived

Table 4: Environmental Interactions

Dependent variable: Life-Satisfaction	(1) Full Sample	(2) Deprived and Non-deprived	(3) Relative Distance
Log HH. Income*High Concern	0.250***		
	(0.024)		
Log HH. Income*Low Concern	0.310***		
	(0.019)		
Log HH. Income*High Concern*Deprived		0.212***	
		(0.035)	
Log HH. Income*Low Concern*Deprived		0.350***	
		(0.027)	
Log HH. Income*High Concern*Non-deprived		0.262***	
		(0.045)	
Log HH. Income*Low Concern*Non-deprived		0.221***	
		(0.034)	
Log Ref. Income*High Concern	-0.163***		
	(0.057)		
Log Ref. Income*Low Concern	-0.311***		
	(0.052)		
Log Ref. Income*High Concern*Deprived		-0.133**	
		(0.063)	
Log Ref. Income*Low Concern*Deprived		-0.353***	
		(0.056)	
Log Ref. Income*High Concern*Non-deprived		-0.179***	
		(0.068)	
Log Ref. Income*Low Concern*Non-deprived		-0.224***	
		(0.058)	
Relative distance*High Concern			0.247***
			(0.023)
Relative distance*Low Concern			0.308***
			(0.019)
Dummy=1 if High Concern	-0.906**	-0.880**	0.017+
	(0.432)	(0.432)	(0.011)
Volunteering, base: Never			
Less Frequently	-0.004	-0.004	-0.004
	(0.014)	(0.014)	(0.014)
Every Month	0.045**	0.045**	0.045**
	(0.018)	(0.018)	(0.018)
Every Week	0.087***	0.087***	0.087***
	(0.020)	(0.020)	(0.020)
Years of Education	-0.008	-0.008	-0.008
	(0.007)	(0.007)	(0.007)
Above Median Health	0.569***	0.569***	0.569***
	(0.011)	(0.011)	(0.011)
Individual is Disabled	-0.235***	-0.236***	-0.236***
	(0.029)	(0.029)	(0.029)
Number of Persons in HH.	-0.100***	-0.099***	-0.098***
	(0.011)	(0.011)	(0.011)
Log of Annual Hours of Work	-0.011***	-0.011***	-0.011***
	(0.003)	(0.003)	(0.003)
Constant	6.902***	6.937***	6.867***
	(0.550)	(0.552)	(0.154)
N	130519	130519	130519
adj. R^2	0.062	0.062	0.062

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. Full estimation result in appendix B. + $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

individuals think and worry more about income in general, which makes their evaluation of household and reference income more sensitive to moral issues such as the environment. Another possibility is that, among the deprived individuals, the high and low-concerned groups are made up of people with distinctively different characteristics that could explain the disparities in the SWB-income relationship. Later in the thesis we will discuss and examine heterogeneity in a number of characteristics that could explain the observed differences between people with high and low levels of concern for the environment. Regarding the distance between household and reference income (column 3), both high and low-concerned individuals experience an increase in SWB when the distance from own to reference group increase. In line with earlier models, the magnitude of the correlation between the distance measure and SWB is significantly smaller among the highly concerned individuals. Observing significant differences between the two groups confirms the overall notion that own income and income comparisons are less important for SWB if the individual is very concerned about environmental degradation.

5.2. Robustness

In this section we test the robustness of assumptions regarding income measures and provide a test of the model robustness. To streamline the analysis I will, from now on, focus on the simple interaction model that include interactions between environmental concern, household and reference income for the full sample (see column 1 of Table 4). The first thing examined is whether altering the characteristics that defines the reference group has an impact on results. Until now, average income in the reference group has been calculated based on a reference group including people within the same age group and sex living in the same region (West or East Germany), called reference group 1. To test whether results are robust to changes in the spatial dimension, the second definition creates reference groups with people of the same age group and sex, living in the same state. In total, there are 16 states in Germany, meaning that reference group 2 reduces the geographical proximity of people in the reference group. Our third way of constructing reference groups adds education as a selection criterion, resulting in reference groups that include people with similar education level, of the same age and sex living in the same state. Reference group criterion with several levels result in many groups with few individuals within each group, which in turn could cause estimations of average income

Table 5: Reference Group and Equivalence Scale Robustness

Dependent variable: Life-Satisfaction	(1) Reference Group 2	(2) Reference Group 3	(3) Modified Scale	(4) Square Root Scale
Log HH. Income*High Concern	0.257***	0.280***	0.291***	0.288***
	(0.025)	(0.024)	(0.025)	(0.025)
Log HH. Income*Low Concern	0.314***	0.324***	0.320***	0.319***
	(0.020)	(0.021)	(0.021)	(0.021)
Log Ref. Income*High Concern	-0.145***	-0.064	-0.041	-0.087
	(0.052)	(0.050)	(0.080)	(0.074)
Log Ref. Income*Low Concern	-0.279***	-0.140***	-0.145*	-0.196***
	(0.046)	(0.044)	(0.076)	(0.069)
Dummy=1 if High Concern	-0.779*	-0.310	-0.723+	-0.756*
	(0.414)	(0.377)	(0.444)	(0.446)
Volunteering, base: Never				
Less Frequently	-0.003	-0.000	-0.001	-0.001
	(0.014)	(0.015)	(0.015)	(0.015)
Every Month	0.047***	0.051***	0.050***	0.050***
	(0.018)	(0.019)	(0.019)	(0.019)
Every Week	0.086***	0.093***	0.091***	0.091***
	(0.020)	(0.021)	(0.021)	(0.021)
Years of Education	-0.006	-0.003	-0.006	-0.006
	(0.008)	(0.008)	(0.008)	(0.008)
Above Median Health	0.566***	0.566***	0.565***	0.565***
	(0.012)	(0.012)	(0.012)	(0.012)
Individual is Disabled	-0.241***	-0.234***	-0.233***	-0.233***
	(0.029)	(0.031)	(0.031)	(0.031)
Number of Persons in HH.	-0.101***	-0.102***	-0.020**	-0.043***
	(0.011)	(0.012)	(0.010)	(0.010)
Log of Annual Hours of Work	-0.011***	-0.013***	-0.013***	-0.013***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	6.443***	4.784***	4.830***	5.361***
	(0.493)	(0.512)	(0.769)	(0.715)
N	128287	117718	117718	117718
adj. R^2	0.062	0.062	0.062	0.062

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. $^+ p < 0.15$, $^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$

in reference groups to be imprecise. Therefore, the education criterion has only two levels, based on whether the person has below or above median of years of education (11.5 years within the whole sample).

As can be seen in Table 5, results are very similar to those from the main specification for both reference group definitions, with the exception for the estimated association between SWB and reference income calculated with the third group definition (column 2). Including education as a criterion for the reference group reduces the size of the correlation and makes reference income insignificant among very concerned individuals. Note, however, that the difference in the size of the coefficient between high and low-

concerned individuals is still significant (p=0.0745), suggesting that the effect size is smaller in the very concerned group. The reason for the overall smaller coefficients for reference income in this specification is still somewhat puzzling. On the one hand, one may expect people with similar length of education to be more competitive with each other since it is reasonable that people evaluate their own success considering peers with similar education. On the other hand, and more in line with results, some people may view high income among people with similar education as a sign that their own income will increase in the future, leading to a smaller average effect of reference income on SWB. Table 5 also include results from the basic interaction specification estimated with income equivalized according to the OECD modified- and square root-scale[5]. When adjusting household income according to the size and composition of the household, the relationship between SWB and household income no longer significantly differs depending on environmental concern. Further, reference income does not appear to have an impact on SWB for very concerned individuals, although the test of difference is still significant in both specifications. Concluding the discussion on reference group and income-adjusting robustness, it is worth noting that despite the insignificance of reference income coefficients, the trend of the smaller effect size among people who are very concerned, and a significant difference between the groups remain.

In Table 6, robustness with respect to assumptions of standard errors and the model is tested. In the first column, the basic interaction model is estimated with standard errors clustered over the reference group. This does not alter the significance of results and compared to previous models and only reduces the size of the standard errors marginally. In the second column of Table 6, marginal effects after estimating the interaction specification using an Ordered Probit model with random individual effects is presented. The marginal probabilities predict how a change in variables of interest impact the probability of observing the highest outcome (completely satisfied) of the dependent variable life-satisfaction and are calculated with covariates set to their mean. The Ordered Probit coefficients are not directly comparable to OLS-coefficients, however, the differences in effect sizes between people with high and low level of concern are in line

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[5] Using the modified scale, household income is divided by the sum of household member weights. The first adult hh. member is given a weight of 1, each additional adult is given a weight of 0.5 and each child is given a weight of 0.3. Using the square root scale, household income is divided by the square root of the total number of household members. (OECD, n.d.)

Table 6: Standard Error and Estimator Robustness

Dependent variable: Life-Satisfaction	(1) Clustered Errors	(2) Ordered Probit
Log HH. Income*High Concern	0.250***	0.014***
	(0.023)	(0.001)
Log HH. Income*Low Concern	0.310***	0.016***
	(0.019)	(0.001)
Log Ref. Income*High Concern	-0.163**	-0.014***
	(0.079)	(0.002)
Log Ref. Income*Low Concern	-0.311***	-0.019***
	(0.066)	(0.002)
Dummy=1 if High Concern	-0.906**	-0.032**
	(0.433)	(0.015)
Volunteering, base: Never		
Less Frequently	-0.004	0.000
	(0.012)	(0.000)
Every Month	0.045***	0.004***
	(0.015)	(0.001)
Every Week	0.087***	0.008***
	(0.017)	(0.001)
Years of Education	-0.008	0.001***
	(0.006)	(0.000)
Above Median Health	0.569***	0.033***
	(0.011)	(0.001)
Individual is Disabled	-0.235***	-0.014***
	(0.026)	(0.001)
Number of Persons in HH.	-0.100***	-0.005***
	(0.011)	(0.000)
Log of Annual Hours of Work	-0.011***	-0.001***
	(0.003)	(0.000)
Constant	6.902***	
	(0.713)	
N	130519	130519
adj. R^2	0.062	

In model 1, errors clustered over reference groups in parentheses. Model 2 presents Ordered Probit marginal effects predicting life-satisfaction equal to 10, calculated with covariates set to mean value. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

with main result. A percentage point increase in household income results in a 1.4 % and 1.6 % increase in the probability that life-satisfaction is equal to 10, for people with high and low concern, respectively. Regarding reference income, the probability of reporting life-satisfaction of 10 decrease less for highly concerned individuals, when reference income increases with one percentage point. Thus, the probability of having a life-satisfaction of 10 is less impacted by both household and reference income, if the individual is very concerned about the environment.

5.3. Discussion

In this section, I discuss potential explanations to the main result showing that the SWB of people who are very concerned is less affected by household and reference income. The issue is to examine whether observed differences between the groups can be fully accredited to a difference in environmental concern, or if any particular characteristics within the two groups are impacting results. To do so, four sub-hypotheses are created.

Sub-Hypothesis 1. The first sub-hypothesis is that results are driven by older people not being environmentally concerned. Previous research show that the level of positionality increases with age (Akay & Martinsson, 2019; FitzRoy, et al., 2014). Thus, a possible explanation for finding lower level of positionality among highly concerned individuals could simply be that older individuals are overrepresented in the not so concerned group. This would, however, not explain why the SWB of highly concerned people also is less affected by household income. We test this hypothesis by running the basic interaction model while separating the sample into groups of younger and older, and to add another dimension, also between men and women (Table 7).

There are clear differences between older (>40) and younger (<40) individuals. An increase in household income have a larger, positive effect on SWB for older individuals, and interestingly, the overall effect is smallest for young males. As expected, the SWB of people over 40 is negatively affected by reference income, especially older males, whereas there is a positive relationship between reference income and life-satisfaction for younger individuals. When looking at the differences between the groups with high and low concern, results are mixed. For younger males, SWB derived by household income significantly differs between the groups (p=0.0726), whereas there is no difference in SWB derived by reference income. Among younger females, we instead find a significant difference (p=0.0608) between people of high and low concern when it comes to the well-being derived by reference income. Interestingly, young females who are very concerned have a larger positive SWB-effect from reference income, compared to the not so concerned, which is opposite to what is expected. If concentrating on the older individuals, environmental concern does not mediate the relationship between SWB, household and reference income in the male-only regression (column 3). For older

Table 7: Heterogeneity Based on Age and Sex

Dependent variable: Life-Satisfaction	(1) Male <40	(2) Female <40	(3) Male >40	(4) Female >40
Log HH. Income*High Concern	0.123***	0.229***	0.293***	0.255***
	(0.047)	(0.043)	(0.045)	(0.051)
Log HH. Income*Low Concern	0.207***	0.255***	0.328***	0.325***
	(0.042)	(0.042)	(0.036)	(0.038)
Log Ref. Income*High Concern	1.344***	0.724***	-0.342***	-0.114
	(0.288)	(0.245)	(0.114)	(0.094)
Log Ref. Income*Low Concern	1.190***	0.455*	-0.453***	-0.239***
	(0.294)	(0.240)	(0.101)	(0.085)
Dummy=1 if High Concern	-0.756	-2.492*	-0.770	-0.559
	(1.712)	(1.431)	(0.828)	(0.645)
Volunteering, base: Never				
Less frequently	-0.083**	-0.022	0.002	0.037+
	(0.035)	(0.032)	(0.025)	(0.025)
Every Month	0.017	0.072+	0.045+	0.092***
	(0.047)	(0.047)	(0.031)	(0.033)
Every Week	-0.007	0.078+	0.121***	0.153***
	(0.051)	(0.051)	(0.035)	(0.038)
Years of Education	-0.012	0.010	-0.011	0.014
	(0.013)	(0.012)	(0.023)	(0.027)
Above Median Health	0.611***	0.611***	0.506***	0.532***
	(0.030)	(0.029)	(0.020)	(0.020)
Individual is Disabled	-0.058	-0.062	-0.189***	-0.297***
	(0.131)	(0.145)	(0.042)	(0.046)
Number of Persons in HH.	-0.078***	-0.098***	-0.068***	-0.097***
	(0.026)	(0.027)	(0.021)	(0.021)
Log of Annual Hours of Work	-0.005	0.001	-0.021***	-0.009*
	(0.007)	(0.005)	(0.006)	(0.005)
Constant	-7.860***	-0.775	8.384***	5.455***
	(3.028)	(2.465)	(1.135)	(0.963)
N	21252	22874	40263	43405
adj. R^2	0.074	0.065	0.057	0.052

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. $^+ p < 0.15$, $^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

females, however, a change in household and reference income is associated with smaller changes in SWB if the individual is very concerned about the environment (test of difference for absolute income: p=0.0737, and reference income: p=0.0931), although there is no significant relation between SWB and reference income.

The result of dividing the sample between older and younger males and females implies that the SWB-reference income relationship is more sensitive to environmental concern among females. The regression only including older women are in line with our main results, however, among the younger females, the direction of the effect is opposite of what is expected. Thus, it seems like environmental concern both perpetuate the "tunnel-effect" (Hirschman, 1973), i.e. increase the positive SWB effect from future income

expectations, as well as diminish the negative implications of reference income for SWB. Arguably, these results suggest that the status-aspect of income comparison is lessened for females who are very concerned about environmental degradation.

Sub-Hypothesis 2. The second sub-hypothesis is that prosocial behaviour, in our case proxied by frequency in volunteering, is driving results. As previously discussed, concern for the environment has been suggested to pick up prosocial behaviour. Prosociality tends to be associated with a more intrinsic value structure (or less materialistic values) that could explain why SWB is less affected by both absolute and reference income among the highly concerned individuals. We therefore split the sample into frequent (above median frequency) and less frequent (below median frequency) volunteers[6] and examine the results of our interaction model. Results are presented in Table 8. The SWB of individuals who are very concerned is less affected by household income among the less frequent volunteers, whereas this is not true in the frequent volunteering group. Note that the effect size of household income is smaller for very concerned people also for the frequent volunteers, but the difference is not statistically significant. However, irrespective of volunteering frequency, the association between reference income and SWB is weaker among highly concerned individuals. Why we observe no difference between people with high and low concern in how household income affects SWB among the frequent volunteers is not clear and would require a more thorough look into the different characteristics between the groups to fully understand. Because results are otherwise similar to the main result the conclusion is that the observed differences individual with high and low concern is not driven by prosociality among individuals who are very concerned for the environment, but rather that the different outcomes for the two groups is driven by environmental concern, conditional on the all other characteristics taken into account to avoid bias in estimates.

Sub-Hypothesis 3. The third potential explanation to the findings is that level of education differs between the very concerned and not so concerned individuals, which could explain the differences in SWB-effect depending on environmental concern. The hypothesis is based on the reasonable suggestion that people with higher education are more knowledgeable and therefore more aware and concerned about environmental issues.

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[6] Median is calculated by first taking the mean frequency of volunteering for each individual, and subsequently calculating the median of the within means.

Table 8: Heterogeneity Based on Prosocial Behaviour and Education

Dependent variable: Life-Satisfaction	(1) Less frequent Volunteers	(2) Frequent Volunteers	(3) Low Education	(4) High Education
Log HH. Income*High Concern	0.245***	0.257***	0.318***	0.171***
	(0.032)	(0.036)	(0.038)	(0.030)
Log HH. Income*Low Concern	0.331***	0.288***	0.377***	0.215***
	(0.029)	(0.026)	(0.029)	(0.025)
Log Ref. Income*High Concern	-0.109	-0.214***	-0.233***	-0.102
	(0.085)	(0.078)	(0.074)	(0.091)
Log Ref. Income*Low Concern	-0.265***	-0.353***	-0.352***	-0.245***
	(0.077)	(0.069)	(0.067)	(0.082)
Dummy=1 if High Concern	-0.716	-1.113*	-0.597	-1.024+
	(0.629)	(0.597)	(0.557)	(0.694)
Volunteering, base: Never				
Less Frequently	-0.021	0.001	0.001	-0.011
	(0.030)	(0.015)	(0.019)	(0.020)
Every Month	0.111	0.046**	0.057**	0.029
	(0.124)	(0.018)	(0.025)	(0.025)
Every Week	0.276	0.087***	0.101***	0.070**
	(0.240)	(0.020)	(0.029)	(0.027)
Years of Education	-0.004	-0.010	0.017	-0.015+
	(0.012)	(0.009)	(0.021)	(0.010)
Above Median Health	0.578***	0.561***	0.554***	0.574***
	(0.017)	(0.015)	(0.015)	(0.018)
Individual is Disabled	-0.242***	-0.232***	-0.240***	-0.201***
	(0.043)	(0.040)	(0.035)	(0.054)
Number of Persons in HH.	-0.120***	-0.082***	-0.093***	-0.098***
	(0.017)	(0.014)	(0.015)	(0.015)
Log of Annual Hours of Work	-0.012***	-0.010**	-0.013***	-0.009**
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	6.051***	7.694***	6.375***	7.141***
	(0.817)	(0.738)	(0.748)	(0.877)
N	65520	64999	80070	50449
adj. R^2	0.060	0.065	0.062	0.061

Robust standard errors in parentheses. All models are estimated using within, state and year fixed effects. $^+ p < 0.15$, $^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

Results in Table 8 suggest some heterogeneity between the more and less educated groups in regard to the size of the effect. Overall, the SWB of people who have shorter education than the median (11.5 years) is more affected by both absolute and reference income, compared to people with more education. This could potentially reflect that the less educated people have lower incomes, resulting in larger marginal effects of changes in own and others income. Among the group with less years of education, there are clear differences in the SWB effect depending on individual level of concern, both for absolute and reference income. The same trends are observed for the more educated people, where environmentally concerned individuals have smaller changes in SWB for a given change in household and reference income. The difference in effect is significant for reference

income, however, not significant for household income (p=0.1242). As there is a smaller magnitude on SWB, both for household and reference income, among people with a high level of concern irrespective of education level, results suggest the observed differences between people of high and low concern are not driven by an unknown relation between education and environmental concern.

Sub-Hypothesis 4. The fourth and last sub-hypothesis is more experimental, suggesting that the individual level of environmental concern may be predicted by industry of occupation. People employed in industries that damage the environment may have self-sorted into these industries because of low environmental concern, and also benefit from an environmentally degrading business. Another possibility is that environmental concern is higher in such industries, since knowledge of damaging activities may be higher. Having a look at the result of regressions using a sample that is split by industry of occupation (Table 9), the answer to the hypothesis does not appear clearer. Differences between people with high and low concern are highly insignificant in all industries, with the exception of the mining industry where the difference is close to significant for both household (p=0.1310) and reference income (p=0.1221). The direction of the relationships between SWB and both absolute and reference income are in line with expectations, note, however, that the coefficients for household and reference income cannot be differentiated from zero for people who are very concerned. A possible explanation to the over-all insignificant result could be that the number of observations in each group has decreased significantly, making small effects difficult to pick up.

Finally, I would like to note that although the result reveals no significant difference between people with high and low level of environmental concern, an interesting finding is that the coefficients for household income is particularly large in some industries, e.g. for people in the agricultural and mining sector. The result gives rise to new questions regarding the well-being of workers in different industries; perhaps working conditions or culture within some industries have impact on the relationship between income and well-being. Unfortunately, there is no way of exploring this finding within the scope of this thesis, thus, the topic is left for future research.

Table 9: Heterogeneity Based on Industry of Occupation

| | Log Household Income | | Log Reference Income | | |
Industry	High Concern	Low Concern	High Concern	Low Concern	N
Agriculture	0.7005**	0.6347***	0.0421	0.4158	1605
Energy	0.6891**	0.5901*	-1.4713*	-0.7581	969
Mining	0.7892	1.7413***	0.0069	-1.7336	299
Manufacturing	0.3670***	0.3610***	-0.4659**	-0.3386*	12 399
Construction	0.6128***	0.5624***	-0.0376	-0.1014	10 293
Trade	0.3000***	0.3634***	-0.1693	-0.2479	11 755
Transport	0.5028***	0.3143**	0.0002	0.0721	4151
Bank, Insurance	0.2575*	0.2645**	0.1463	-0.0812	3381
Services	0.2185***	0.2079***	-0.0487	-0.0590	32 323

Dependent variable: Life-Satisfaction. All models are estimated using within, state and year fixed effects. $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$.

6. Concluding Discussion

This thesis has examined how environmental concern mediates the association between absolute and reference household income and SWB, measured as life-satisfaction, using data from the German Socioeconomic Panel between years 1992 and 2017. The thesis contributes to the literature exploring correlates of positional behaviour by adding knowledge on how a moral issue, namely, environmental concern, affect positional behaviour. The thesis also improves on the small literature studying the relationship between environmental concern and SWB.

First, results from previous literature on positional concerns were reproduced with the purpose of acting as a foundation for the main analysis. The dataset used in the present thesis (SOEP) has been employed in earlier work on positionality, however, my work contributes by employing the longest and most recent panel to date. Results presented are in line with the body of literature examining positional concerns. I find evidence of a positive relationship between SWB and absolute income, and a negative relation between SWB and reference income. The second aim was to introduce individual concern for environmental degradation into the model measuring the association between absolute, relative income and SWB, while controlling for prosocial behaviour measured via "volunteering". When doing so, I found a positive and significant relationship between environmental concern and SWB, contrary to Binder and Blankenberg (2016), where environmental concern became insignificant when including a proxy for prosocial

behaviour into the model. Binder and Blankenberg's (2016) conclusion was that environmental concern increases the probability of prosocial behaviour which gives the individual altruistic satisfaction, however, conditional on the method and control variables used in this thesis, I find no evidence of their suggested relationship between concern for the environment and the proxy for prosocial behaviour.

The third and main interest of the thesis was to examine whether the relation between absolute and reference income and SWB differs depending on individuals' level of environmental concern. The hypothesis was that people reporting a high level of concern for the environment would have a smaller impact on SWB from absolute and relative income, implying a smaller marginal effect of income on well-being and lower degree of positional concern, measured with the magnitude of reference income on individuals' well-being. I find robust evidence supporting this hypothesis. Remarkably, the effect of environmental concern on the SWB-income relationship is not found for people whose income exceeds the reference income, a finding that is interesting since there is no a priori argument for why the effect should differ depending on relative income position. If anything, one could argue for that the SWB-income relationship of deprived people (those having income less than their reference income) should be less sensitive to environmental concern since own and others' income is expected to affect SWB more compared to non-deprived individuals.

I also present a detailed heterogeneity analysis with the aim of exploring whether results are driven by any group in the sample. The interaction model was run while splitting the sample based on sub-hypotheses that age and sex, prosociality, education and industry of occupation could help explain the main results. Evidence from this analysis suggest that the association between SWB and income of females, especially above 40 years of age, is more sensitive to environmental concern, while there are no observed differences between older males with high and low level of concern. Further, the analysis does not suggest that main results are driven by variation in prosocial behaviour, education or industry of occupation.

Staying on the topic of explaining the observed differences between people with high and low concern, it must be noted that estimations are conducted using individual fixed effects, meaning that results are not biased by time-invariant characteristics such as

personality. There may, however, be time-varying omitted variables that could explain the decreased importance of absolute and reference income for SWB among environmentally concerned individuals. A potential weakness to this study is that pro-environmental behaviours are not considered due to lack of data. As discussed, pro-environmental behaviour is positively related to SWB, and it is reasonable that pro-environmental behaviours are more common among people who are very concerned for the environment. Thus, research including both concern and behaviour is needed to validate and fully understand the findings of this thesis.

Finally, I briefly want to comment on how my result may have an impact on environmental policy. Positional concerns are associated with negative externalities in terms of well-being, as people become less happy when income of others increase. The excessive or conspicuous consumption associated with positionality also affect the environment, since the production of most goods emit CO2 or cause other types of pollution. The well-being aspect have implications for optimal taxation (e.g. Boskin & Sheshinski, 1978), and the environmental externalities calls for additional consumption taxes in order to minimize wasteful consumption (e.g. Howarth, 1996; Wendner, 2005). The step from being concerned about environmental degradation to taking action to become more sustainable is not straight forward (e.g. Lenzen & Cummins, 2011; Csutora, 2012), which implies that policy to raise awareness is ineffective for increasing pro-environmental behaviours. Although the relationship may not go straight from pro-environmental attitude to behaviour, finding a negative association between environmental concern and positionality suggest that awareness of environmental issues could decrease the individual's incentive to overconsume, at least more than the comparable others. Thus, spreading information and awareness could, in addition to taxation, be an important way to diminish negative externalities associated with status-consumption although it may not increase pro-environmental behaviours per se.

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Appendices

Appendix A. Definitions of Control Variables

Table A1: Definitions of Control Variables

Variable Name	*Description*
Above Median Health	Based on a self-reported measure of health-status with response alternatives ranging from "1 - very good" to "5 - bad". The scale was recoded such that "0 – bad" and "4 - very good". Median health was calculated with respect to the whole sample, and a dummy was constructed =1 if the individuals health-status was above the median.
Annual Hours of Work	The number of hours worked by the individual during the year before the year of survey. Used in logged form in all specifications.
Disabled	0 = Individual is not disabled 1 = Individual is disabled
Household Size	The total number of people living in the household during the survey year.
Labour Status	Indicates the labour status of the individual during the survey year.
Marital Status	Indicates if individual is married, divorced, single, widowed or separated during survey year.
No. of Kids in HH. Aged	A set of 7 variables in total. Each variable indicates the number of children in the household with age between: 0-1, 2-4, 5-7, 8-10, 11-12, 13-15, 16-18
State	Indicates which state the individual lived in during the survey year.
Survey Year	Indicates survey year.
Volunteering Frequency	Comprises the frequency of all kinds of volunteering. 0 = Never 1= Less frequently than once a month 2= Once a month 3= Once a week
Years of Education	The total number of years of education that the individual has attained until the survey year.

Appendix B. Full Estimation Results

Table B1: Full Estimation Result of Baseline

	(1) Full Sample		(2) Dep. and Non-dep.		(3) Relative Distance	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Log HH. Income	0.237***	(0.012)				
Log HH. Income *Deprived			0.242***	(0.015)		
Log HH. Income *Non-deprived			0.179***	(0.022)		
Log Reference Income	-0.334***	(0.038)				
Log Reference Income*Deprived			-0.342***	(0.040)		
Log Reference Income*Non-deprived			-0.277***	(0.042)		
Relative Distance					0.244***	(0.012)
Years of Education	-0.005	(0.006)	-0.005	(0.006)	-0.006	(0.006)
Above Median health	0.551***	(0.008)	0.551***	(0.008)	0.552***	(0.008)
Individual is Disabled	-0.243***	(0.021)	-0.244***	(0.021)	-0.242***	(0.021)
Number of Persons in HH.	-0.077***	(0.008)	-0.077***	(0.008)	-0.082***	(0.008)
Log of Annual Hours of Work	-0.006***	(0.002)	-0.006***	(0.002)	-0.007***	(0.002)
Number of Kids Aged 0-1	0.263***	(0.018)	0.262***	(0.018)	0.270***	(0.018)
Number of Kids Aged 2-4	0.064***	(0.014)	0.063***	(0.014)	0.070***	(0.014)
Number of Kids Aged 5-7	0.049***	(0.013)	0.049***	(0.013)	0.054***	(0.013)
Number of Kids Aged 8-10	0.042***	(0.012)	0.041***	(0.012)	0.045***	(0.012)
Number of Kids Aged 11-12	0.048***	(0.013)	0.048***	(0.013)	0.051***	(0.013)
Number of Kids Aged 13-15	0.045***	(0.012)	0.044***	(0.012)	0.047***	(0.012)
Number of Kids Aged 16-18	0.032***	(0.011)	0.031***	(0.011)	0.032***	(0.011)
Labour Status, base: Not Working (NW)						
NW, Over 65	-0.031*	(0.017)	-0.033*	(0.017)	-0.030*	(0.017)
NW, In Educ./Training	0.011	(0.031)	0.011	(0.031)	0.006	(0.031)
NW, Maternity Leave	0.033	(0.028)	0.034	(0.028)	0.027	(0.028)
NW, Military Service	-0.062	(0.084)	-0.064	(0.084)	-0.068	(0.084)
Unemployed	-0.574***	(0.023)	-0.573***	(0.023)	-0.581***	(0.023)
NW, but Sometimes	-0.126***	(0.029)	-0.126***	(0.029)	-0.130***	(0.029)
NW, but Worked Past 7 Days	-0.063+	(0.040)	-0.063+	(0.040)	-0.069*	(0.040)
NW, but Regular Second job	-0.060**	(0.030)	-0.060**	(0.030)	-0.064**	(0.030)
Working	0.082***	(0.018)	0.082***	(0.018)	0.074***	(0.018)
Working, but Not Past 7 Days	-0.021	(0.032)	-0.020	(0.032)	-0.021	(0.032)
Marital Status, base: Married						
Single	-0.065***	(0.022)	-0.063***	(0.022)	-0.058***	(0.022)
Widowed	-0.245***	(0.048)	-0.243***	(0.048)	-0.244***	(0.048)
Divorced	-0.026	(0.032)	-0.024	(0.032)	-0.028	(0.032)
Separated	-0.354***	(0.035)	-0.351***	(0.035)	-0.355***	(0.035)
State, base: Schleswig-Holstein						
Hamburg	-0.023	(0.100)	-0.027	(0.100)	-0.025	(0.100)
Lower Saxony	-0.009	(0.108)	-0.010	(0.107)	-0.010	(0.108)
Bremen	0.128	(0.234)	0.128	(0.234)	0.131	(0.234)
North-Rhine-Westfalia	-0.143	(0.103)	-0.145	(0.103)	-0.145	(0.103)
Hessen	-0.026	(0.109)	-0.027	(0.109)	-0.028	(0.110)
Rheinland-Pfalz	-0.163	(0.123)	-0.164	(0.123)	-0.165	(0.123)
Baden-Wuerttemberg	-0.202*	(0.112)	-0.203*	(0.112)	-0.203*	(0.112)
Bavaria	-0.075	(0.120)	-0.076	(0.120)	-0.077	(0.120)
Saarland	-0.083	(0.157)	-0.085	(0.156)	-0.084	(0.157)
Berlin	-0.449***	(0.117)	-0.450***	(0.117)	-0.440***	(0.117)
Brandenburg	-0.519***	(0.119)	-0.519***	(0.119)	-0.499***	(0.118)
Mecklenburg-Vorpommern	-0.395***	(0.129)	-0.396***	(0.129)	-0.372***	(0.129)
Saxony	-0.376***	(0.119)	-0.379***	(0.119)	-0.355***	(0.118)
Saxony-Anhalt	-0.541***	(0.118)	-0.541***	(0.118)	-0.520***	(0.118)
Thuringia	-0.265**	(0.129)	-0.265**	(0.129)	-0.244*	(0.129)
Survey Year, base: 1992						
1994	-0.021	(0.020)	-0.020	(0.020)	-0.033*	(0.019)
1995	0.016	(0.020)	0.017	(0.020)	0.003	(0.020)
1996	0.031+	(0.021)	0.032+	(0.021)	0.016	(0.020)
1997	-0.106***	(0.022)	-0.106***	(0.022)	-0.123***	(0.021)
1998	-0.001	(0.022)	0.000	(0.022)	-0.018	(0.021)
1999	0.063***	(0.023)	0.064***	(0.023)	0.044**	(0.021)
2000	0.059***	(0.022)	0.060***	(0.022)	0.037*	(0.021)
2001	0.065***	(0.023)	0.066***	(0.023)	0.041*	(0.021)
2002	-0.101***	(0.024)	-0.099***	(0.024)	-0.128***	(0.021)
2003	-0.159***	(0.025)	-0.157***	(0.025)	-0.188***	(0.022)
2004	-0.333***	(0.025)	-0.332***	(0.025)	-0.363***	(0.022)
2005	-0.173***	(0.026)	-0.171***	(0.026)	-0.204***	(0.023)
2006	-0.250***	(0.026)	-0.247***	(0.026)	-0.282***	(0.023)
2007	-0.214***	(0.027)	-0.211***	(0.027)	-0.247***	(0.023)
2008	-0.158***	(0.027)	-0.155***	(0.027)	-0.194***	(0.023)
2009	-0.248***	(0.028)	-0.245***	(0.028)	-0.285***	(0.024)
2010	-0.097***	(0.029)	-0.094***	(0.029)	-0.134***	(0.024)
2011	-0.192***	(0.029)	-0.189***	(0.029)	-0.229***	(0.024)
2012	-0.152***	(0.029)	-0.149***	(0.029)	-0.190***	(0.025)
2013	-0.067**	(0.030)	-0.063**	(0.030)	-0.107***	(0.025)
2014	-0.061**	(0.031)	-0.058*	(0.031)	-0.103***	(0.026)
2015	0.066**	(0.032)	0.069**	(0.032)	0.022	(0.026)
2016	0.041	(0.033)	0.044	(0.033)	-0.006	(0.027)
2017	-0.033	(0.033)	-0.030	(0.033)	-0.079***	(0.027)
Constant	7.804***	(0.412)	7.840***	(0.414)	6.835***	(0.118)
N	295825		295825		295825	
adj. *R²*	0.056		0.056		0.056	

Table B2: Full Estimation Result of Environmental Baseline

	(1) Full Sample Coeff.	S.E.	(2) Full Sample Coeff.	S.E.	(3) Dep. and Non-dep. Coeff.	S.E.	(4) Relative Distance Coeff.	S.E.
Log HH. Income	0.236***	(0.012)	0.288***	(0.019)				
Log HH. Income *Deprived					0.297***	(0.025)		
Log HH. Income *Non-deprived					0.234***	(0.031)		
Log Reference Income	-0.331***	(0.038)	-0.257***	(0.049)				
Log Reference Income*Deprived					-0.269***	(0.053)		
Log Reference Income*Non-deprived					-0.205***	(0.054)		
Relative Distance							0.286***	(0.018)
Dummy=1 if High Concern	0.016**	(0.007)	0.026**	(0.011)	0.025**	(0.011)	0.026**	(0.011)
Volunteering, base: Never								
Less Frequently			-0.005	(0.014)	-0.005	(0.014)	-0.005	(0.014)
Every Month			0.045**	(0.018)	0.045**	(0.018)	0.045**	(0.018)
Every Week			0.087***	(0.020)	0.087***	(0.020)	0.087***	(0.020)
Years of Education	-0.005	(0.006)	-0.007	(0.007)	-0.007	(0.007)	-0.007	(0.007)
Above Median health	0.550***	(0.008)	0.567***	(0.011)	0.567***	(0.011)	0.567***	(0.011)
Individual is Disabled	-0.242***	(0.021)	-0.236***	(0.030)	-0.236***	(0.030)	-0.236***	(0.029)
Number of Persons in HH.	-0.076***	(0.008)	-0.099***	(0.011)	-0.098***	(0.011)	-0.097***	(0.011)
Log of Annual Hours of Work	-0.006***	(0.002)	-0.011***	(0.003)	-0.011***	(0.003)	-0.011***	(0.003)
Number of Kids Aged 0-1	0.261***	(0.018)	0.269***	(0.027)	0.267***	(0.027)	0.267***	(0.027)
Number of Kids Aged 2-4	0.063***	(0.014)	0.071***	(0.019)	0.070***	(0.019)	0.069***	(0.019)
Number of Kids Aged 5-7	0.048***	(0.013)	0.051***	(0.018)	0.050***	(0.018)	0.050***	(0.017)
Number of Kids Aged 8-10	0.041***	(0.012)	0.043**	(0.017)	0.041**	(0.017)	0.042**	(0.017)
Number of Kids Aged 11-12	0.048***	(0.013)	0.044**	(0.018)	0.043**	(0.018)	0.043**	(0.018)
Number of Kids Aged 13-15	0.044***	(0.012)	0.050***	(0.016)	0.048***	(0.016)	0.049***	(0.016)
Number of Kids Aged 16-18	0.032***	(0.011)	0.035**	(0.016)	0.034**	(0.016)	0.035**	(0.016)
Labour Status, base: Not Working (NW)								
NW, Over 65	-0.029*	(0.017)	-0.022	(0.023)	-0.024	(0.023)	-0.023	(0.023)
NW, In Educ./Training	0.013	(0.031)	-0.014	(0.046)	-0.014	(0.046)	-0.012	(0.046)
NW, Maternity Leave	0.035	(0.028)	0.028	(0.042)	0.028	(0.042)	0.030	(0.042)
NW, Military Service	-0.058	(0.084)	-0.101	(0.125)	-0.103	(0.125)	-0.099	(0.125)
Unemployed	-0.572***	(0.023)	-0.585***	(0.033)	-0.584***	(0.033)	-0.583***	(0.033)
NW, but Sometimes	-0.124***	(0.029)	-0.201***	(0.045)	-0.201***	(0.045)	-0.200***	(0.044)
NW, but Worked Past 7 Days	-0.069*	(0.040)	-0.102†	(0.068)	-0.102†	(0.068)	-0.100†	(0.068)
NW, but Regular Second job	-0.059**	(0.030)	-0.115***	(0.043)	-0.115***	(0.043)	-0.114***	(0.043)
Working	0.083***	(0.018)	0.082***	(0.027)	0.083***	(0.027)	0.085***	(0.027)
Working, but Not Past 7 Days	-0.021	(0.033)	-0.011	(0.055)	-0.011	(0.055)	-0.012	(0.055)
Marital Status, base: Married								
Single	-0.068***	(0.022)	-0.064**	(0.029)	-0.062**	(0.029)	-0.066**	(0.029)
Widowed	-0.244***	(0.048)	-0.224***	(0.057)	-0.222***	(0.057)	-0.225***	(0.057)
Divorced	-0.026	(0.032)	0.008	(0.040)	0.010	(0.040)	0.009	(0.040)
Separated	-0.353***	(0.035)	-0.425***	(0.049)	-0.422***	(0.049)	-0.425***	(0.049)
State, base: Schleswig-Holstein								
Hamburg	-0.028	(0.100)	-0.147	(0.129)	-0.151	(0.130)	-0.146	(0.129)
Lower Saxony	-0.013	(0.108)	-0.049	(0.142)	-0.050	(0.142)	-0.048	(0.142)
Bremen	0.126	(0.235)	0.111	(0.261)	0.109	(0.261)	0.110	(0.261)
North-Rhine-Westfalia	-0.147	(0.104)	-0.167	(0.136)	-0.169	(0.136)	-0.167	(0.136)
Hessen	-0.031	(0.110)	-0.030	(0.144)	-0.031	(0.144)	-0.029	(0.144)
Rheinland-Pfalz	-0.167	(0.124)	-0.201	(0.174)	-0.201	(0.174)	-0.200	(0.174)
Baden-Wuerttemberg	-0.204*	(0.112)	-0.215†	(0.144)	-0.216†	(0.144)	-0.214†	(0.144)
Bavaria	-0.076	(0.120)	-0.112	(0.150)	-0.112	(0.150)	-0.111	(0.150)
Saarland	-0.095	(0.157)	-0.207	(0.207)	-0.209	(0.207)	-0.206	(0.207)
Berlin	-0.453***	(0.117)	-0.410***	(0.150)	-0.411***	(0.150)	-0.413***	(0.150)
Brandenburg	-0.525***	(0.119)	-0.471***	(0.153)	-0.471***	(0.153)	-0.477***	(0.153)
Mecklenburg-Vorpommern	-0.397***	(0.129)	-0.391**	(0.162)	-0.391**	(0.162)	-0.398**	(0.162)
Saxony	-0.369***	(0.119)	-0.395**	(0.154)	-0.397**	(0.154)	-0.402***	(0.154)
Saxony-Anhalt	-0.536***	(0.119)	-0.554***	(0.161)	-0.554***	(0.161)	-0.561***	(0.161)
Thuringia	-0.261**	(0.129)	-0.246†	(0.169)	-0.246†	(0.169)	-0.253†	(0.169)
Survey Year, base: 1992								
1994	-0.017	(0.020)	-0.033†	(0.021)	-0.032†	(0.021)	-0.029†	(0.020)
1995	0.017	(0.021)						
1996	0.034†	(0.021)	0.016	(0.022)	0.017	(0.022)	0.021	(0.021)
1997	-0.105***	(0.022)	-0.127***	(0.023)	-0.126***	(0.023)	-0.122***	(0.021)
1998	0.001	(0.022)						
1999	0.068***	(0.023)	0.048**	(0.024)	0.049**	(0.024)	0.054**	(0.022)
2000	0.061***	(0.023)						
2001	0.067***	(0.023)	0.050*	(0.026)	0.052**	(0.026)	0.058***	(0.023)
2002	-0.097***	(0.024)						
2003	-0.156***	(0.025)						
2004	-0.330***	(0.025)						
2005	-0.170***	(0.026)	-0.198***	(0.029)	-0.195***	(0.029)	-0.188***	(0.025)
2006	-0.246***	(0.026)						
2007	-0.214***	(0.027)	-0.255***	(0.031)	-0.252***	(0.031)	-0.244***	(0.025)
2008	-0.155***	(0.028)						
2009	-0.245***	(0.028)	-0.292***	(0.033)	-0.289***	(0.033)	-0.280***	(0.026)
2010	-0.094***	(0.029)						
2011	-0.190***	(0.029)	-0.245***	(0.034)	-0.242***	(0.034)	-0.233***	(0.027)
2012	-0.151***	(0.029)						
2013	-0.063**	(0.030)						
2014	-0.058*	(0.031)						
2015	0.068**	(0.032)	0.015	(0.038)	0.019	(0.038)	0.029	(0.030)
2016	0.044	(0.033)						
2017	-0.031	(0.033)	-0.096**	(0.040)	-0.092**	(0.040)	-0.081***	(0.031)
Constant	7.766***	(0.411)	6.538***	(0.524)	6.585***	(0.526)	6.852***	(0.154)
N	294697		130062		130062		130062	
adj. R^2	0.056		0.061		0.061		0.061	

39

Table B3: Full Estimation Result of Environmental Interactions

	(1) Full Sample		(2) Dep. and Non-dep.		(3) Relative Distance	
	Coeff.	*S.E.*	*Coeff.*	*S.E.*	*Coeff.*	*S.E.*
Log HH. Income*High Concern	0.250***	(0.024)				
Log HH. Income*Low Concern	0.310***	(0.019)				
Log HH. Income*High Concern*Deprived			0.212***	(0.035)		
Log HH. Income*Low Concern*Deprived			0.350***	(0.027)		
Log HH. Income*High Concern*Non-deprived			0.262***	(0.045)		
Log HH. Income*Low Concern*Non-deprived			0.221***	(0.034)		
Log Reference Income*High Concern	-0.163***	(0.057)				
Log Reference Income *Low Concern	-0.311***	(0.052)				
Log Reference Income *High Concern*Deprived			-0.133**	(0.063)		
Log Reference Income *Low Concern*Deprived			-0.353***	(0.056)		
Log Reference Income *High Concern*Non-deprived			-0.179***	(0.068)		
Log Reference Income *Low Concern*Non-deprived			-0.224***	(0.058)		
Relative Distance*High Concern					0.247***	(0.023)
Relative Distance*Low Concern					0.308***	(0.019)
Dummy=1 if High Concern	-0.906**	(0.432)	-0.880**	(0.432)	0.017+	(0.011)
Volunteering, base: Never						
Less Frequently	-0.004	(0.014)	-0.004	(0.014)	-0.004	(0.014)
Every Month	0.045**	(0.018)	0.045**	(0.018)	0.045**	(0.018)
Every Week	0.087***	(0.020)	0.087***	(0.020)	0.087***	(0.020)
Years of Education	-0.008	(0.007)	-0.008	(0.007)	-0.008	(0.007)
Above Median health	0.569***	(0.011)	0.569***	(0.011)	0.569***	(0.011)
Individual is Disabled	-0.235***	(0.029)	-0.236***	(0.029)	-0.236***	(0.029)
Number of Persons in HH.	-0.100***	(0.011)	-0.099***	(0.011)	-0.098***	(0.011)
Log of Annual Hours of Work	-0.011***	(0.003)	-0.011***	(0.003)	-0.011***	(0.003)
Number of Kids Aged 0-1	0.275***	(0.027)	0.273***	(0.027)	0.273***	(0.027)
Number of Kids Aged 2-4	0.072***	(0.019)	0.071***	(0.019)	0.071***	(0.019)
Number of Kids Aged 5-7	0.053***	(0.018)	0.053***	(0.018)	0.052***	(0.017)
Number of Kids Aged 8-10	0.043***	(0.017)	0.042**	(0.017)	0.043***	(0.016)
Number of Kids Aged 11-12	0.045**	(0.018)	0.044**	(0.018)	0.044**	(0.018)
Number of Kids Aged 13-15	0.051***	(0.016)	0.049***	(0.016)	0.051***	(0.016)
Number of Kids Aged 16-18	0.035**	(0.016)	0.033**	(0.016)	0.034**	(0.016)
Labour Status, base: Not Working (NW)						
NW, Over 65	-0.025	(0.023)	-0.028	(0.023)	-0.025	(0.023)
NW, In Educ./Training	-0.015	(0.046)	-0.016	(0.046)	-0.013	(0.046)
NW, Maternity Leave	0.024	(0.042)	0.025	(0.042)	0.027	(0.042)
NW, Military Service	-0.103	(0.124)	-0.107	(0.124)	-0.100	(0.124)
Unemployed	-0.585***	(0.033)	-0.582***	(0.033)	-0.582***	(0.033)
NW, but Sometimes	-0.204***	(0.045)	-0.204***	(0.045)	-0.203***	(0.045)
NW, but Worked Past 7 Days	-0.077	(0.068)	-0.077	(0.068)	-0.075	(0.068)
NW, but Regular Second job	-0.116***	(0.043)	-0.116***	(0.043)	-0.114***	(0.043)
Working	0.082***	(0.027)	0.082***	(0.027)	0.084***	(0.027)
Working, but Not Past 7 Days	-0.008	(0.054)	-0.006	(0.054)	-0.007	(0.054)
Marital Status, base: Married						
Single	-0.060**	(0.029)	-0.057*	(0.029)	-0.062**	(0.029)
Widowed	-0.226***	(0.057)	-0.222***	(0.057)	-0.226***	(0.057)
Divorced	0.007	(0.040)	0.009	(0.040)	0.008	(0.040)
Separated	-0.424***	(0.049)	-0.421***	(0.049)	-0.424***	(0.049)
State, base: Schleswig-Holstein						
Hamburg	-0.148	(0.130)	-0.150	(0.129)	-0.147	(0.130)
Lower Saxony	-0.051	(0.142)	-0.051	(0.142)	-0.050	(0.142)
Bremen	0.112	(0.259)	0.110	(0.259)	0.113	(0.259)
North-Rhine-Westfalia	-0.171	(0.135)	-0.174	(0.135)	-0.168	(0.135)
Hessen	-0.030	(0.144)	-0.034	(0.144)	-0.027	(0.144)
Rheinland-Pfalz	-0.208	(0.173)	-0.209	(0.173)	-0.204	(0.174)
Baden-Wuerttemberg	-0.222+	(0.143)	-0.224+	(0.143)	-0.219+	(0.143)
Bavaria	-0.117	(0.149)	-0.118	(0.149)	-0.115	(0.149)
Saarland	-0.198	(0.207)	-0.202	(0.207)	-0.194	(0.207)
Berlin	-0.415***	(0.149)	-0.418***	(0.149)	-0.418***	(0.149)
Brandenburg	-0.475***	(0.152)	-0.473***	(0.152)	-0.479***	(0.152)
Mecklenburg-Vorpommern	-0.398***	(0.162)	-0.398***	(0.162)	-0.403**	(0.162)
Saxony	-0.419***	(0.154)	-0.419***	(0.154)	-0.423***	(0.154)
Saxony-Anhalt	-0.564***	(0.161)	-0.566***	(0.161)	-0.570***	(0.161)
Thuringia	-0.262+	(0.169)	-0.263+	(0.169)	-0.264+	(0.169)
Survey Year, base: 1992						
1994	-0.040*	(0.021)	-0.039*	(0.021)	-0.030+	(0.020)
1996	0.010	(0.022)	0.011	(0.022)	0.021	(0.021)
1997	-0.133***	(0.023)	-0.132***	(0.023)	-0.121***	(0.021)
1999	0.041*	(0.024)	0.042*	(0.024)	0.054**	(0.022)
2001	0.045*	(0.026)	0.047*	(0.026)	0.059***	(0.023)
2005	-0.202***	(0.029)	-0.199***	(0.029)	-0.187***	(0.025)
2007	-0.258***	(0.031)	-0.255***	(0.031)	-0.242***	(0.025)
2009	-0.297***	(0.033)	-0.294***	(0.033)	-0.281***	(0.026)
2011	-0.251***	(0.034)	-0.247***	(0.034)	-0.233***	(0.027)
2015	0.011	(0.038)	0.015	(0.038)	0.029	(0.030)
2017	-0.103***	(0.040)	-0.099**	(0.040)	-0.083***	(0.031)
Constant	6.902***	(0.550)	6.937***	(0.552)	6.867***	(0.154)
N	130519		130519		130519	
adj. *R*^{2}	0.062		0.062		0.062	