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Re-investigating the effects of income and GDP on personal happiness; is it different when you're post-materialistic?

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“Living in a material world, and I am a material girl” – Madonna

“Happiness resides not in possessions and not in gold, the feeling of happiness dwells in the soul” – Democritus

Summary

This research tried to find an answer to the question *do income and GDP affect people's personal happiness, and, if so, do these effects depend on people's (post)materialistic values?* To answer this question, data from the European Values Study of 2008 regarding 30 European countries were utilized. Furthermore, two different measurements of post-materialism were used, to test if the traditional scale, as proposed by Ronald Inglehart, could still be justified, or that an alternative measure was a better indicator for people's post-materialistic values. The outcomes of this study showed that income and GDP positively affected people's life satisfaction, but that the way in which these effects differed for people with materialistic or more post-materialistic value patterns depended on what measurement for post-materialism was used; the traditional measure signified that the effect of income was weaker for post-materialistic people, but the alternative measure indicated that this effect was equal for people with different (post-)materialistic values and that the GDP-effect on happiness was strongest for post-materialistic people.

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1. Introduction

Happiness has always been a much-discussed topic, and is seen as a state of mind everyone tries to achieve. Although this latter might be the case, life satisfaction is also considered to be different for every individual. What makes a person happy depends on themselves; people can gain happiness from their social relations, knowledge, helping others or from their surroundings. Moreover, the general idea is that life satisfaction tends to be related to the social acts people perform within a society (e.g. if people perform delinquent behavior, others feel unhappy), and that societies benefit from happy people. Satisfied individuals are more likely to refrain from performing negative social acts; therefore, happiness could lead to more positive behavior, which in turn could lead to more overall happiness.

This paper examines the potential influences of household income and a country's wealth on an individual's life satisfaction. Does money make people happy? And what about living in a rich nation? The main focus of this study, however, is a possible moderating role of post-materialism regarding the potential effects of income and a country's wealth on personal happiness. 30 European countries will be compared and analyzed with regard to the happiness of their citizens, and the possible effects of household income, GDP and potential interaction-effects between these factors and post-materialism, on life satisfaction.

§ 1.1 Previous research, and relevance of this study

The relationship between income and personal happiness has been studied for over countless times during the past decades, and numerous studies found that income positively affects one's life satisfaction (e.g. McBride, 2001; Graham, Eggers & Sukhtankar, 2004; Stutzer, 2004; Zavisca & Hout, 2005; Howell, Howell & Schwabe, 2006; Rojas, 2007; Vendrik & Woltjer, 2007; Headey, Muffels & Wooden, 2008). Other studies literally took these findings to another level and showed that Gross Domestic Product per capita (GDP) also positively affects individual life satisfaction (Myers & Diener, 1995; Helliwell, 2003). All of these studies have used the terms *happiness* and *life satisfaction* as synonyms, and in this paper, it is likewise.

The differences and improvements within these studies can generally be traced back to the way income has been operationalized (weekly, monthly, annually, relative versus absolute, pre- or post-tax household income), and to the addition of contextual-level effects (such as GDP). However, a question that remains unanswered is whether the income effect on personal happiness is equal for everyone within a society. This depends on what people

themselves find important in their lives; if they are fixated on material matters, income might play a vital role regarding their happiness. On the other hand, if people are focused on immaterial objectives, income might be less of interest with regard to their life satisfaction.

In this research, a distinction is made between materialistic and post-materialistic people, in which materialists are considered to be more focused on materialistic objectives, such as having a high income or owning luxury items, and post-materialists are seen as those who have immaterialistic aspirations, such as self-development and expression. This distinction is generally based on the assumption proposed by Inglehart (1997), who argues that modern societies have experienced a shift from materialistic to post-materialistic values.

Many of the European countries studied here are considered to be post-modern, within which a shift from materialistic to post-materialistic values is believed to have occurred. This means that if there is a growing group of post-materialistic people, and the results of this study would indicate that money is not that important for their happiness, this could mean we would be moving toward a society that is less focused on material items. It is thus interesting to investigate whether the possible effects of income and GDP on personal happiness are different for (post)materialistic people.

Scientifically, this paper finds its relevance in the fact that, although the effect of income on happiness has been studied countless times, not many researchers have investigated a possible interaction effect with post-materialism. Thus, this study could be able to shed new light onto the mechanisms of income and GDP, regarding their effect on happiness. Furthermore, two different constructs of post-materialism will be used, to investigate if the 'traditional' scale, as proposed by Ronald Inglehart, can still be justified, or whether another gauge would be a better indicator (see chapter 3 for further information on the construction of these measures). Critics have already remarked that this 'traditional' post-materialism scale can be highly influenced by external factors (e.g. economic crises), since it is based upon what political priorities people think their governments should have. Hence, it is interesting to detach people's personal beliefs from their political preferences, and use these to create a new gauge for post-materialism. Finally, the assumptions of this paper will be tested by using recent data from the European Values Study (EVS, 2008), making the outcomes of this study contemporary and up-to-date.

§ 1.2 Aim of this study and research questions

This paper focuses on retesting the possible influences of income and GDP on personal happiness. To give a more meaningful insight into the potential effect of GDP, this research

will compare European countries (to detect whether or not 'rich' countries indeed have happier citizens than 'poor' countries). Moreover, this study will investigate possible interactions between income, GDP and post-materialism, to find out whether the potential income and GDP effects on happiness are equal for everyone, or differ according to one's (post)materialistic values.

In short, the main goal of this research is to retest the assumptions about the positive relation between income and GDP with personal happiness, taking into account a possible moderating role of post-materialism. The principal research question of this paper is the following:

Do income and GDP affect people's personal happiness, and, if so, do these effects depend on people's (post)materialistic values?

Furthermore, the sub questions of this paper are:

1 *To what extent are richer people happier than poorer people?*
2 *To what extent are people living in richer countries happier than people living in poorer countries?*
3 *To what extent are the potential effects of income and GDP on happiness different for people with materialistic and post-materialistic value patterns?*

The next chapter discusses the theoretical framework and the hypotheses of this study. It will also more extensively explain the distinction that is made between materialism and post-materialism. Chapter 3 explains what data and variables were used to execute the analyses, of which the outcomes are presented in chapter 4. Finally, chapter 5 offers a brief summary of the results, an answer to the research question and a succinct discussion of this study in general.

2. Theoretical framework and hypotheses

In explaining the relationships between income and GDP regarding happiness, social as well as economic theories are used. This distinction between theories is based on the assumption that social theories are used to explain social behavior by referring to people's personal beliefs, actions, and values, and that economic theories try to explain the same behavior by focusing on economic factors, such as wages, wealth and material assets. The use of both types of theories justifies the fact that happiness is a social theme and income and GDP are economic matters.

The *absolute theory* (Fuentes & Rojas, 2001) and the *need / utility theory* (Headey et al., 2008) will be discussed in order to explain the possible influence of individual income on life satisfaction. The *livability theory* (Veenhoven, 1995) and the *economic growth approach* as elucidated by Kenny (1999), are used to clarify the potential effect of GDP on personal happiness. Finally, the *conceptual-referent theory* (Rojas, 2007), *Maslow's hierarchy of needs* (Maslow, 1943; Poston, 2009), and the *modernization theory* (Inglehart, 1997) are discussed to illuminate the potential role of post-materialism regarding the effects of income and GDP on happiness.

First the hypotheses at the individual level are proposed, after which the contextual level assumptions will be discussed. Finally, the hypotheses regarding the interactions between income and GDP with post-materialism will be elucidated.

§ 2.1 Income and happiness

As has already been explained, the relationship between income and happiness can be approached by social as well as economic theories. Of the former, the *absolute theory* is related to the association between income and happiness, and states that people with higher incomes experience more life satisfaction (Fuentes & Rojas, 2001). The basic reasoning behind this theory is that all people have certain basic needs, such as victuals, housing and having a good health, and income is a way to satisfy these needs. Higher earnings then indicate a person can more easily fulfill these wants, which leads to more happiness (Fuentes & Rojas, 2001). Other studies have also found evidence that supports this theory (e.g. Diener, Sandvik, Seidlitz & Diener, 1993 ; Seghieri, Desantis & Tanturri, 2006).

The most commonly used economic premise to explain this association is the *need theory* (also known as the *utility theory*). This supposition argues that happiness is the outcome of a trade-off between work and leisure. Work implies increasing one's earnings, and

leisure time implies taking time for yourself, spending your earnings and gaining utility by doing so. The trade-off lies in the fact that time spent on a paid job cannot be spend on leisure time, and vice versa, and that people need both in order to maintain a happy living. More meaningfully, people need money to sustain their living and free time activities, and they need leisure time to relax from work (Headey et al., 2008; Howell et al.,2006; Moghaddam, 2008).

The general assumption is that every individual aspires to maximize their utility, and does this in finding equilibrium between time spent on work, and time spent on leisure activities. Those who earn more are in the position where they can afford to take more time off work than those who earn less; even if the former decide to spend more time on leisure instead of work, this is compensated by their higher salary, meaning that although they are working less than before, people with higher incomes can sustain in their living and free time activities more easily than those with lower incomes, earning them utility more rapidly. In other words, people with higher incomes have a so-called 'luxury position', which implies that they can more easily maximize their utility than people with lower incomes. According to the need theory, a higher utility rate is related to more feelings of life satisfaction (Headey et al., 2008). From this point of view, it is expected that people with higher incomes, who can more easily increase their utility, are happier than people with lower incomes.

Another argument is that people with a high hourly wage gain utility from working, because they earn more. However, this study focuses on household income rather than hourly wage; therefore, it is expected that people with a higher household income can afford to spend more time on leisure than those with a lower household income, earning them more utility.

Economists often found support for the need theory (e.g. Headey et al., 2008; Moghaddam, 2008), indicating its importance in explaining the relationship between income and happiness.

Although the absolute and the need theory fundamentally differ, for they have emerged from different perspectives, both imply a positive effect of income on personal happiness. Hence, the first hypothesis of this paper is: *Respondents with higher incomes are happier than respondents with lower incomes* (**H1**).

§ 2.2 GDP and happiness

The second social theory which is discussed here is the *livability theory*, as explained by Veenhoven (1995). This supposition states that "*subjective appreciation of life depends in the first place on the objective quality of life; the better the living conditions in a country, the happier its inhabitants will be."* (Veenhoven, 1995, p.2). According to this theoretical

approach, people's life satisfaction is enhanced when the livability of their country is good; this is considered to be the case when the living conditions fit human needs and desires.

Veenhoven (1995) states that this theory is closely related to the idea that universal human needs exist; the general view is that human societies are collective arrangements, trying to gratify these universal needs, and that societies can be more or less successful in doing so. He also remarks that when a society changes, people's wishes and needs change accordingly. A wealthy nation will have more ways to adapt to these wishes and to fulfill them; therefore, it is assumed that a country's richness influences a person's life satisfaction in a positive way.

Hagerty (1999) notes that the livability theory implies people base their judgments regarding their life satisfaction on absolute standards. More meaningfully, they base these judgments on the extent to which universal human needs are satisfied (Hagerty, 1999). Veenhoven (1995) adds that this conjunction assumes people to be happy as long as the living conditions in their country are good, even if they know others in their surroundings might enjoy living in better conditions. Thus, people are expected to be happy with what they have, despite any possible better situations other people in other nations might be in.

To conclude, if a nation is a wealthy one, it is easier to provide a better livability for its inhabitants, enhancing their life satisfaction. Thus, it is likely to assume that people who live in wealthy countries are happier than people living in poorer countries, for they will have better living conditions.

Just like income, GDP has an economic background and its association with happiness can also be explained by using an economic approach. Kenny (1999) argues that GDP is an indicator of a nation's wealth, and if economy expands due to an increase in GDP, this larger economy will improve people's utilities and their happiness. Namely, a grown economy will produce more, new, and better goods, giving people more options where to assign their utility. Basically, these new and better goods increase people's chances to gain utility, which is believed to increase their personal happiness.

Critics could append that such an increase in utility-options might lead to a so-called 'ceiling effect'; when the ceiling is low, or when the options regarding utility are limited, people might feel they could accomplish everything that is possible in their society, which will increase their feelings of happiness. But if the ceiling is high, that is, when the options where to assign utility are expanded, people might feel the opposite; that the options are limitless and they will never be able to achieve all there is to achieve, which would lead to a decline in their personal happiness.

However, Kenny's (2009) approach is based on the assumption that, because of these new and almost infinite utility-options, people believe their possibilities are endless, and that they can keep on developing new goals and aspirations because of these alternatives. This is then expected to lead to an increase in their life satisfaction.

The economic growth approach has also been used in other studies, representing its relevance to contemporary assumptions. For instance, Stevenson and Wolfers (2008) found a positive effect of economic growth on personal happiness, and they say that economic expansion enhances people's material standard of living, which causes people to feel more satisfied. This reasoning is basically the same as Kenny's (1999), because the authors note that wealthier nations provide a better level of affluence to its citizens, which increases their life satisfaction. Reaching basic material standards is then like fulfilling basic needs; once these standards are met, which is accompanied by feelings of satisfaction, new and higher standards emerge, and so on. Hence, richer countries can more easily meet these material standards, and the people living in these nations will feel happier (Stevenson & Wolfers, 2008).

Although Kenny (1999) finds no support for his own assumption, Helliwell (2003) found a weak, yet statistically significant positive effect of GDP on personal happiness, as did Myers & Diener (1995). Stevenson and Wolfers (2008) even found a strong positive effect. Because these results are so different, it remains fascinating and important to retest this hypothesis and see whose results are supported by the outcomes of this research. Moreover, because this study contains information on 30 European countries, the variance in GDP is relatively large, which allows for an interesting re-test of this assumption.

So, in the light of the livability theory and Kenny's theoretical approach about economic growth, it is assumed that GDP has a positive effect on people's happiness, in the sense that people living in rich countries with a higher GDP are more satisfied than people living in poor countries with a lower GDP. Henceforward, the second hypothesis is: *Respondents living in countries with a higher GDP are happier than respondents living in countries with a lower GDP* (**H2**).

§ 2.3 Interactions with post-materialism

The *conceptual-referent-theory* was proposed by Rojas (2005), who said that *"the Conceptual-Referent-Theory states that a person's conceptual referent for a happy life plays a role in the judgment of her life and in the appraisal of her happiness"* (p. 261). In other words, this supposition states that people have different definitions of happiness, and diverse

criteria as to what causes it. These criteria are based on an individual's social background, and are influenced by aspects such as upbringing, values, culture, environment and education (Rojas, 2007). This perspective indicates that the personal values people have are of influence regarding the determinants of their happiness. In this paper, a distinction is made between materialistic and post-materialistic values. The next four paragraphs will explain this division and its relation to the first hypothesis.

§ 2.3.1 Materialism and post-materialism

The absolute theory refers to the fulfillment of basic needs. Another theoretical approach about satisfying desires is *Maslow's hierarchy of needs*, which states that there are three kinds of needs, knowing basic (acquiring food, water, security, safety etc.), psychological (acquiring intimate relationships, friends, prestige etc.) and self-fulfillment needs (achieving one's full potential) (Maslow, 1943; Poston, 2009). The reasoning behind this hierarchy is that once people have fulfilled their basic wants, new ones based on psychological well-being arise, and once these are satisfied, self-fulfillment needs emerge (Maslow, 1943; Poston, 2009).

Based on this hierarchical view, Inglehart (1997) created a division between materialistic and post-materialistic values, in which he defines the former as being more focused on material objectives, such as having a high income, and the latter as being more focused on immaterial objectives, such as individual development. In order to make this distinction, Inglehart created a post-materialism scale based on which two out of four goals a person believes their government should aim for. He aggregated individual values to country level, and then argued that modernized societies have post-materialistic instead of materialistic value patterns, because financial security enables people to fulfill their basic wants and to strive for higher order needs. Inglehart calls this the shift from materialistic to post-materialistic values.

Although Inglehart's theory about post-materialism is directed at societies, it is possible to distinguish the so-called materialistic and post-materialistic values at the individual level as well when reconsidering the hierarchy of Maslow. The needs Maslow describes as 'basic' can be viewed as materialistic because they depend on matters which can be obtained directly by investing money or time. The psychological and self-fulfillment needs, on the other hand, require mental over material efforts in order to be fulfilled, and are thus strongly related to the individual development idea behind Inglehart's (1997) post-materialistic values. This is no surprise as Inglehart based his assumptions on Maslow's hierarchy.

In this paper, terms related to (post)materialism are also used to directly indicate an individual's personal beliefs, rather than their thoughts on what (political) goals their country should aim for.

§ 2.3.2 Interaction between income and post-materialism

The basic reasoning, derived from the assumptions regarding post-materialism, is that materialists have materialistic goals and needs. If they satisfy these needs, they will experience happiness, according to the absolute theory (Fuentes & Rojas, 2001). A higher income leads to a faster fulfillment of basic wants, and thus more feelings of life satisfaction (Fuentes & Rojas, 2001). Therefore, it is expected that the effect of income on happiness, as stated by **H1**, is stronger for people with materialistic values, for they have more basic and acquisitive needs which can be satisfied sooner by means of a higher income. Post-materialists have post-materialistic needs, based on individual development, and therefore the proposed effect of income is expected to be weaker for them. After all, money alone is not enough to fulfill their goals in life. The third hypothesis states the following: *The effect of income on personal happiness, as assumed by* **H1**, *is weaker for respondents with post-materialistic values* (**H3**).

§ 2.3.3 Interaction between GDP and post-materialism

The effect of GDP could also differ for (post)materialistic people. Again referring to the conjectures proposed by Maslow (Maslow, 1943; Poston, 2009) and Inglehart (1997), it is possible that the effect of living in a rich country is more important to those who have materialistic views, goals and values, since they are more focused on materialistic topics such as income and wealth. Their country's richness would enhance their feelings of happiness, for they know that, even if they themselves are not rich, their country is.

The GDP effect could be of less importance to post-materialistic people, because their values are centered around post-materialistic ideas, such as aspiring self-respect and expression (Maslow, 1943; Poston, 2009; Inglehart, 1997). Thus, the meaning of a country's wealth would be of less interest to them with regard to their happiness. Materialists, on the other hand, are believed to gain happiness from satisfying materialistic needs, and as Kenny (1999) already stated, a high GDP indicates a large economy that offers more ways to gain utility. In other words, the effect of living in a country with a high GDP might be stronger for materialistic people, because they have goals that are more strongly affected by a country's

GDP, and weaker for post-materialists, because they have goals that are less affected by a country's wealth.

To recapitulate, the central reasoning here is similar to that of the third hypothesis; materialists have materialistic needs and goals, and satisfying these leads to a gain of utility and thus more happiness. A high GDP is associated with a wealthier and larger economy, which is in turn related to new, better and more means to gain utility and happiness (Kenny, 1999). Hence, the effect of GDP on happiness is expected to be stronger for materialistic people, for they gain utility from materialistic objectives, and more ways to gain utility would lead to a boost in gaining happiness for them. Post-materialists, on the other hand, have other needs and values and the effect of GDP on happiness is expected to be weaker for them, because they care less about the improved options for gaining utility that rich countries offer them, as they have other objectives in life which require less material effort. Hence, the assumption that living in a rich country positively affects one's happiness might be weaker for post-materialistic people, for they have goals and values they do not link to a country's wealth. In the light of this reasoning, it is likely to assume that the potential positive GDP effect on personal happiness is weaker for post-materialistic people. Eventually, the fourth hypothesis is the following: *The effect of GDP on personal happiness, as assumed by* **H2**, *is weaker for respondents with post-materialistic values* (**H4**).

Note that critics could argue that if GDP is an indicator for a larger economy and a faster fulfillment of basic needs, it could be of more importance to post-materialistic people, because as Maslow (1943) stated, once people's basic needs are satisfied, they develop other needs which require less materialistic effort to fulfill. The question thus remains whether GDP is a pure indicator for a country's wealth, or that it might also indicate possibilities for post-materialistic people to express themselves.

If the first scenario is the case, then one can expect a possible interaction effect, such as proposed by **H4**. If the latter situation is correct, either a positive interaction between GDP and post-materialism will prevail, indicating GDP would then be no pure indicator for a nation's richness, or no interaction at all will be found, signifying the GDP- and social security-effects on happiness dissolve each other. So, in order to rule out the second option as much as possible, another contextual construct will be added to the analyses, namely social security. The general idea is that social security will purify the potential GDP effect, as it is believed that more generous social security programs will provide more possibilities for post-materialists to express themselves. After all, people in such countries would know that even if they become, for example, unemployed, their country's munificent social protection will

shield them from not being able to fulfill their basic needs. And since these needs can still be satisfied, this leaves more opportunity for them to express themselves as post-materialists. Consequently, social security is added to the analyses of this study as a control variable, mainly to purify the possible GDP effect on happiness.

§ 2.4 Control variables and conceptual model

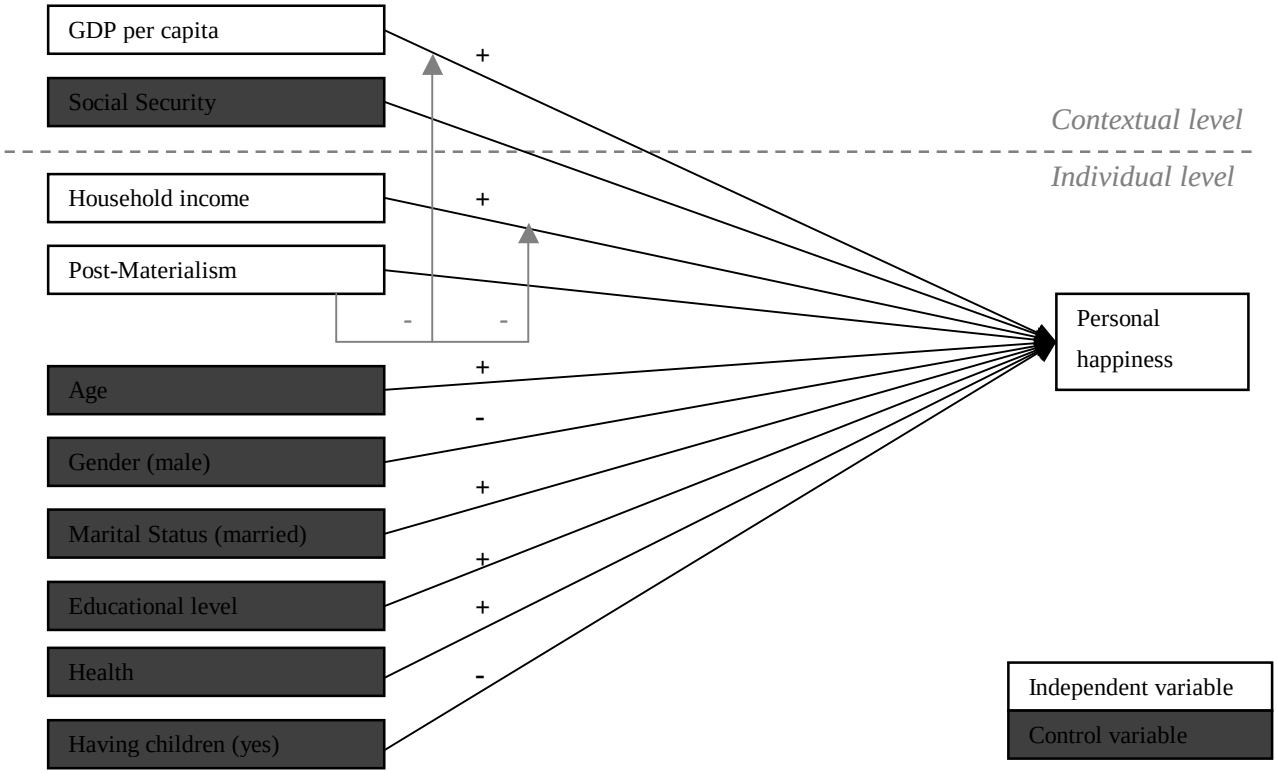
The analyses of this research will also contain some control variables, knowing: age, age squared, gender, marital status, educational level, health and whether or not the respondent has children. These variables are included because their effects regarding personal happiness have often been studied in previous research (e.g. Horley & Lavery, 1995; Gerdtham & Johannesson, 1997; Georgellis, Tsitsianis & Yin, 2009), and they could possibly influence income as well (e.g. older / higher educated people earn more, less healthy people cannot work as much / hard as healthy people and so earn less, men tend to earn more than women, people with children often have to work more because their household has grown and they need more earnings to sustain their level of living, etc.). In order to control for potential spurious effects regarding income and happiness, it seems logical to include these variables in this study as well.

No hypotheses have been formulated for the control variables; however, prior research makes it possible to globally estimate the direction of their potential effects on happiness. First of all, Horley and Lavery (1995) found a positive effect of age on subjective well-being, indicating that when individuals get older, their feelings of happiness increase. Gerdtham & Johannesson (1997) researched the effects of several socioeconomic factors, including age, gender, marital status and education. They found that the effect of age on happiness is U-shaped (meaning happiness first decreases then increases when people get older, which is also why age squared is added here), that men are less happy than women, that married people are happier than non-married people, and that happiness and education are positively associated with one another (Gerdtham & Johannesson, 1997). This study, however, also investigated a possible effect of health on happiness, and its results showed that a better health leads to more feelings of life satisfaction (Gerdtham & Johannesson, 1997). Georgellis et al. (2009) found similar results regarding age, gender, and marital status, but also found a negative effect of having children on life satisfaction.

Based on these findings, it is expected that age has a positive effect on happiness, as well as marital status (being married), educational level and health. Negative effects are

anticipated for gender (being male) and having children. Finally, all the hypotheses and expectations are combined into one conceptual model, which is depicted in figure 1.

Figure 1: Conceptual model



3. Data and Measurements

§ 3.1 Data

In order to test the hypotheses and to find an answer to the research questions of this paper, data from the European Values Study (EVS) have been utilized. The EVS is a longitudinal and cross-national research, conducted in an ever growing number of European countries. Its goal is to gain information about people's values and social perceptions about four main themes (religion and morality, politics, work and leisure, and primary relations), and to compare similarities and differences between them (http://www.europeanvaluesstudy.eu). The data are collected by interviewing respondents from several European countries, who are at least eighteen years of age. The study is repeated every nine years, and started in 1981. Because the EVS provides clear information on topics such as income, happiness and post-materialism, of which all three are highly important in this paper, and allows for cross-country comparisons, its data were chosen to be used for this study.

For this paper, the most recent data from the EVS, dating from 2008 / 2009, will be used. This fourth wave currently contains information on 30 (mostly Eastern) European countries with at least 100,000 inhabitants and 45,637 respondents in total. The Turkish Republic of Northern Cyprus, however, has been combined with Cyprus, and Kosovo has been left out of the analyses, because no information on GDP was available for them (separately). Furthermore, a selection was made regarding the respondents; some respondents appeared to be seventeen years of age at the time of the interview, most probably because they were interviewed in the year they would turn eighteen. These few respondents (N = 4) were omitted from further analyses, because the age minimum of the EVS is officially set at eighteen. Additionally, the respondents with complete information on all variables (only for income, the missing values have been imputed), were selected for the analyses. The eventual number of respondents was 35,948 (98.5% of total) in 28 countries.

§ 3.2 Measurements

§ 3.2.1 Dependent variable – personal happiness

The dependent variable of this study is ***happiness***, which was operationalized by means of the question *All things considered, how satisfied are you with your life as a whole these days?* Respondents could indicate on a ten-point scale whether they were very dissatisfied (1), very satisfied (10), or anything in between.

Critics might argue that a single-item gauge for happiness could be invalid in the sense that it would not effectively measure happiness. However, Veenhoven (1984) argued that a good measurement of happiness should consist of a general clear question, and should at least provide a 'no answer' and / or 'don't know' category. The life-satisfaction scale as provided by the EVS meets both of these requirements. Furthermore, Veenhoven & Timmermans (1998) indicated that the best way to measure life satisfaction is to directly ask respondents how happy or satisfied they are. These authors have also pointed out that this gauge is just as reliable as the indirect questioning methods used in the past (Veenhoven & Timmermans, 1998). Moreover, Krueger & Schkade (2007) tested the reliability of several happiness measures, and concluded that although the reliability of a single-item life satisfaction scale is lower than that of other single-item scales (such as those used to measure income), it is high enough to use these scales to measure happiness (correlations were about .60).

The EVS also contains a question on how happy respondents feel, and answer categories on this question were *very happy*, *quite happy*, *not very happy* and *not at all happy*. Because this scale contained only four answer categories and the life satisfaction scale had ten, it was decided to use the latter. Mostly because respondents could more specifically state how satisfied they felt, and also because prior research has shown that life satisfaction and happiness can be used as synonyms, as they measure the same feelings (e.g. Veenhoven, 1984; Veenhoven & Timmermans, 1998). It was therefore decided to construct the dependent variable *happiness* by utilizing the life satisfaction scale provided by the EVS, as mentioned above.

§ 3.2.2 Independent variable – income

The first main independent variable, *income*, was measured by asking the respondents what monthly net household income category they belonged to. The answer categories were country-specific, and several comparability problems needed to be overcome. First of all, not all countries share the same currency and purchasing power (meaning that the value of, for example, the euro is dissimilar in different European nations). Second, another reason why this variable had to be reorganized was the need to obtain an absolute measure for household income. If this paper were to compare between rich and poor people, the use of categories would have been appropriate. However, this study involves the questions whether or not happiness increases when personal income and a country's GDP do, and not if people's happiness increases when they compare themselves to others.

This lead to another problem, namely that the range of the categories within a single country were not the same. For instance, category 2 sometimes ranged from €150 to under €300 euro (difference of €150), while category 11 would range from €7,500 to under 10,000 (difference of €2,500,-). So, the differences within the categories increased as the categories increased. To compare countries as well as obtain an absolute measure for income, and to solve all problems mentioned above, it was necessary to reconstruct the income variable.

The incomes of the respondents of all the countries within the analyses were controlled for Purchasing Power Parity (PPP), all sums were converted to U.S. dollars (USD)[1], and, finally, each respondent was assigned the center income value of the category they belonged to. To obtain a starting value for the first category, a step equal to that of creating the center value for the second category was taken (e.g. category 1 is less than €150 and category 2 is €150 to under €300, that makes the starting value for the first category €150-((€300-€150)/2)= €75). The closing value for the last category was created likewise, by using the same step as the eleventh category.

It appeared that a lot of respondents did not have a score on income (N = 8,435). In order to prevent losing a lot of data, it was decided to impute these missing values by replacing them with the mean score of income. A dummy variable was also created to indicate whether a respondent had a missing value on income or not. Moreover, 8 respondents had an extreme score on the income variable. These outlying cases were omitted from the analyses.

PPP is a currency alteration rate, which converts different money values into a common one, enabling making comparisons. The goods one can buy with a certain amount of money can differ over diverse countries (e.g. due to availability of goods, demand and price for goods etc.). It is thus important to control incomes for PPP, and in order to do so, a PPP rate was obtained by dividing the 2009 GDP PPP per capita by the 2009 nominal GDP per capita information. These date were retrieved from the CIA World Factbook, 2009 (https://www.cia.gov). Data used to convert all sums to USD were obtained from the European Bank 2009 (http://www.ecb.int) and the CIA World Factbook 2008 (https://www.cia.gov).

In recapitulation, all incomes for all respondents in all the different European countries used in the analyses of this study were controlled for PPP and converted to USD, obtaining a new, continuous variable. Furthermore, all scores were divided by 1,000 for easier

[1] It was decided to convert everything to USD and not Euros, since most information (GDP, social security) was already available in USD, and results are not affected by the currency used.

interpretations. The final income variable ranged from $0.02 ($20) to $21.65 ($21,650) a month.

§ 3.2.3 Independent variable – GDP

Information on the European countries' GDP was taken from the CIA World Factbook 2008 (https://www.cia.gov), which provided information on GDP per capita on a PPP basis. As is already explained before, using GDP based on PPP is essential because the amount of goods a currency can purchase within different nations can vary, and PPP enables comparing these currencies by eliminating the differences in price levels between countries.

Table 1 presents an oversight of all these countries, with the number of their respondents and their GDP (in USD). Finally, GDP was also divided by 1,000 in order to make interpretations clearer.

Table 1: All countries used in the analyses, with their N and their GDP per capita, on a PPP basis (in USD)

	N	*GDP*
Albania	1,168	6.1
Armenia	1,324	6.4
Austria	1,338	40.8
Bosnia Herzegovina	1,322	6.6
Bulgaria	1,087	13.1
Cyprus	1,276	21.6
Estonia	1,325	21.7
France	2,969	33.7
Georgia	1,109	4.7
Germany	1,786	35.9
Greece	1,378	32.4
Ireland	779	46
Latvia	1,132	17.6
Lithuania	1,079	18
Malta	1,152	24.9
Moldavia	1,172	2.5
Montenegro	1,170	10.2
Poland	1,286	17.6
Portugal	1,426	22.5
Romania	1,106	12.4
Russia	1,120	16.3
Serbia	1,197	10.9
Slovakia	1,052	22.2
Spain	1,287	35
Switzerland	1,085	42.5
The Czech Republic	1,393	26.2
The Netherlands	1,414	40.9
Ukraine	1,022	7.5

SOURCE: European Values Study, 2008 (N) ; CIA World Factbook, 2008 (GDP)

§ 3.2.4 Independent variable - post-materialism ('traditional' scale)

This is the 'traditional' post-materialism scale, as Ronald Inglehart once proposed, which has a strong emphasis on political goals. This scale was created by using respondents' answers to the questions on which two out of four actions (two materialistic and two post-materialistic) they thought their country should take first, and second. The respondents could choose between the following: 1) *maintaining order in the nation (M)*, 2) *giving people more say in important government decisions (PM)*, 3) *fighting rising prices (M)*, and 4) *protecting freedom of speech (PM)*, where M indicates a materialistic and PM a post-materialistic value. If a respondent chose two materialistic views, they were coded as *very materialistic* (0), and if they first chose a materialistic goal followed by a post-materialistic one, they were coded as *materialistic* (1), and vice versa for being *post-materialistic* (2) and *very post-materialistic* (3). The higher a score on this variable, the more post-materialistic the respondent was considered to be.

§ 3.2.5 Independent variable - post-materialism (alternative measure)

A second construct for post-materialism was created by using two other items from the EVS that might indicate people's (post)materialistic values. Dummy indicators signified to which of the following three categories respondents belonged to: *materialistic*, *mixed / neutral*, or *post-materialistic*. These categories were created out of two items, on which respondents had to indicate whether they thought it was good, bad or ok if any of these changes happened. The first item was '*Less emphasis on money and material possessions*', and the second item was '*Greater respect for authority*' (EVS, 2008). Because the first item was considered to be post-materialistic and the second to be materialistic, the 'I don't mind' or 'It's ok' options were coded accordingly, meaning that if a respondent answered 'I don't mind' on the first item, they were considered to be a 'weak post-materialist', and vice versa for the second item. Table 2 shows how the final dummy variables for post-materialism were constructed[2].

[2] An alternative categorization was also tested, where every respondent who answered *ok / I don't mind* was immediately grouped as *mixed / neutral*. This classification, however, lead to an extreme large group of mixed / neutral respondents (N = 29,571), which caused the outcomes of this study to differ notably from how they are now. Because of the extremely skewed division among these groups, even more so than was the case among the eventual dummies, it was decided to not use this alternative categorization.

Table 2: Alternative measure of post-materialism (dummy indicators)

Item 1 (less emphasis on material possessions)	**Item 2** (greater respect for authority)	**Final dummy category respondent belonged to**
Good (PM)	**Good** (M)	Mixed / Neutral
	Bad (PM)	Post-Materialistic
	I don't care / It's ok (M)	Mixed / Neutral
Bad (M)	**Good** (M)	Materialistic
	Bad (PM)	Mixed / Neutral
	I don't care / It's ok (M)	Materialistic
I don't care / It's ok (PM)	**Good** (M)	Mixed / Neutral
	Bad (PM)	Post-Materialistic
	I don't care / It's ok (M)	Mixed / Neutral

PM = Post-Materialistic answer, M = Materialistic answer
SOURCE: European Values Study, 2008

§ 3.2.6 Control variables - age, age squared, gender, marital status, educational level, health, having children or not

The first control variable, *age*, was created by subtracting the respondent's year of birth from the year of interview. This term was also squared, to be able to investigate whether a potential age-effect on personal happiness is linear or not, and this squared term was divided by 1,000 to receive clearer interpretations about the size of its effect.

Gender was recoded into a binary variable, where females were the reference group.

Marital status indicated whether the respondent was either *married* (1), had a *registered partnership* (2), was *widowed* (3), *divorced* (4), *separated* (5), or *single* (never married/registered partnership) (6). Because not all countries in these analyses allow having a registered partnership, it was decided to combine categories 1 and 2 (*married / having a registered partnership*) and 4 and 5 (*divorced / separated*). Dummy variables were then created indicating whether the respondent belonged to the corresponding marital status category or not, and *single* was used as the reference group.

Educational level was taken directly from the EVS. The corresponding question was: *What is the highest level you have completed in your education?,* and answers ranged from 1 (pre-primary education or none education) to 6 (second stage of tertiary education) (EVS, 2008). In other words, a higher score on this variable indicated a higher educational level. The EVS provided this scale in which, for each country, the different educational levels were recoded according to the International Standard Classification of Education (ISCED) scheme, to enable comparison of the different educational systems and levels over different countries.

Health was measured by means of the following question: *All in all, how would you describe your state of health these days?* The respondent then had to specify whether they had

a *very good* (1), *good* (2), *fair* (3), *poor* (4), or a *very poor* (5) health. The scores on this item were reversed, meaning that a high score indicated the respondent had a very good health.

Finally, whether or not the respondent had *children* was derived from the question *Who, apart from you, is living in this household?*[3]. Respondents could indicate whether or not they lived with a *partner / husband / wife* (a), *children* (b), *parents* (c), *grandparents* (d), *other relatives* (brothers, sisters, etc.) (e) and *other non-relatives* (f) (EVS, 2008). A dummy variable was created specifying whether the respondent had children (lived with children) or not. Having no children was coded as the reference group.

§ 3.2.7 Additional control variable – social security

Finally, an important control variable on the country level is social security, which was added to purify the potential effect of GDP on personal happiness, and was measured as the percentage of GDP spent on social protection[4]. Unfortunately, the most recent data to be used to construct social security were from 2006, and were only available for 19 out of the 28 countries involved in this study. To be able to still test whether social security affects the possible GDP-effect on life satisfaction, extra analyses were performed, with a new selection of only the 19 countries for which social security information was obtainable. Table 3 shows these countries and their social security score.

[3] The EVS also provides a question on how many children the respondent has. However, the question whether the respondent lived with children was used instead, for this could affect income and happiness more directly than having children on its own, but not having to take care of them. In prior research described in chapter 2 (Georgellis et al., 2009), the researchers also used this particular question to indicate whether or not the respondents had children.

[4] Social protection is seen as a series of policies and programs to help reduce poverty, increase people's abilities to protect themselves, etc. (source: http://www.adb.org).

Table 3: Social security (percentage of GDP spent on social protection in 2006) per country

Country [a]	Social Security
Austria	28.5
Bulgaria	15.0
Cyprus	18.4
Estonia	12.4
France	31.1
Germany	28.7
Greece	24.2
Ireland	18.2
Latvia	12.2
Lithuania	13.2
Malta	18.1
Poland	19.2
Portugal	25.4
Romania	14.0
Slovak Republic	15.9
Spain	20.9
Switzerland	28.4
The Czech Republic	18.7
The Netherlands	29.3

[a] = Omitted countries: Albania, Armenia, Bosnia-Herzegovina, Georgia, Moldavia, Montenegro, Serbia, Russia, and Ukraine
SOURCE: Eurostat, 2009

§ 3.3 Descriptive table

In conclusion of this chapter, table 4 presents the descriptive information (minimum and maximum scores, mean, and standard deviation) of all variables that are included in the analyses.

Table 4: Descriptive statistics (minimum- and maximum score, mean, and standard deviation) of all the variables used in the analyses

	Min. score	Max. score	Mean / %	Std. Dev.
Dependent variable				
Happiness	1	10	6.90	2.28
Independent variables				
Income (in USD, *1,000)	0.02	26.24	1.77	1.71
GDP (in USD, *1,000)	2.50	46.00	22.21	12.43
Post-Materialism *(construct 1)*	0	3	1.09	0.97
Post-Materialism *(construct 2)*				
Materialistic (ref. group)	0	1	14.8	-
Mixed / Neutral	0	1	76.7	-
Post-Materialistic	0	1	8.5	-
Control variables				
Age	18	108	47.41	17.85
Age^2 (*1,000)	0.32	11.66	2.57	1.79
Male	0	1	44	-
Marital Status				
Single (ref. group)	0	1	23.8	-
Married / Registered Partnership	0	1	55.5	-
Widowed	0	1	11.5	-
Divorced/Separated	0	1	8.8	-
Educational level	0	6	3.07	1.346
Health	0	4	2.67	0.954
Having children (yes)	0	1	43.8	-
N (respondents)		35,948		
N (countries)		28		
Additional Analyses				
Social Security	12.2	31.1	21.80	6.51
N (respondents)		25,350		
N (countries)		19		

SOURCE: European Values Study, 2008

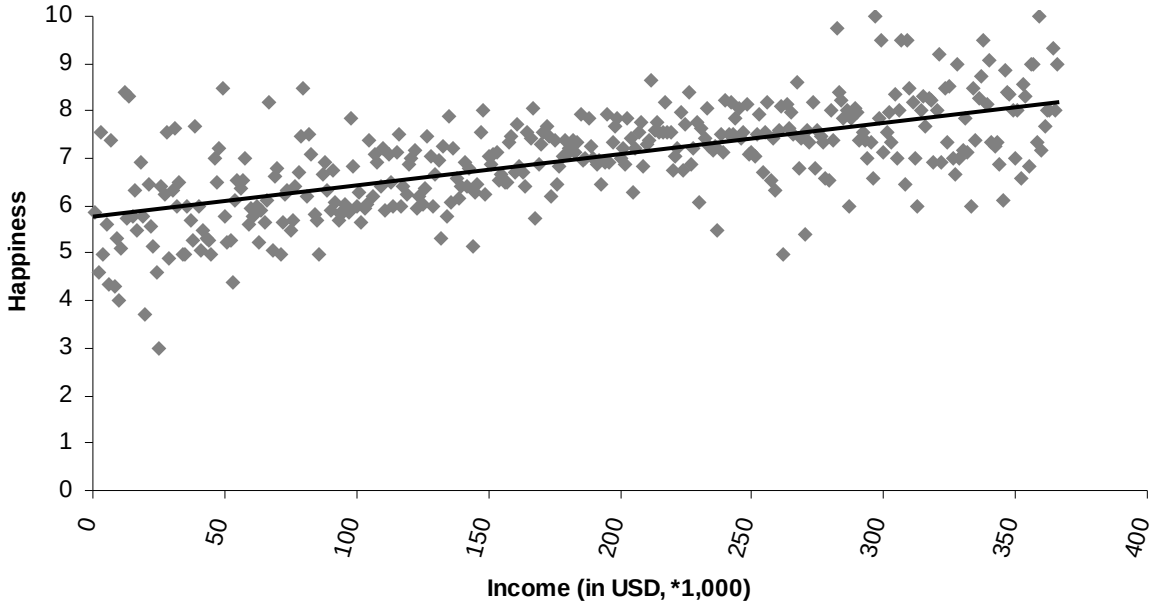
4. Analyses

This chapter includes both bivariate as well as multivariate analyses to test the hypotheses presented in chapter 2. The bivariate analyses present a global idea about the strength of the relationship between the various variables and happiness. However, these analyses do not take account of the relationship among the independent variables. So, in order to obtain the net effects of the variables, and to control for possible spurious effects, multivariate analyses are necessary. The results of these analyses will be used to test the hypotheses.

§4.1 Explorative / Bivariate analyses

The first sub-question of this paper is to what extent richer people feel happier than poorer people. Figure 1 contains a scatterplot of happiness by income[5] to obtain a general view as to what may be the answer to this question.

Figure 2: Scatterplot of happiness by income



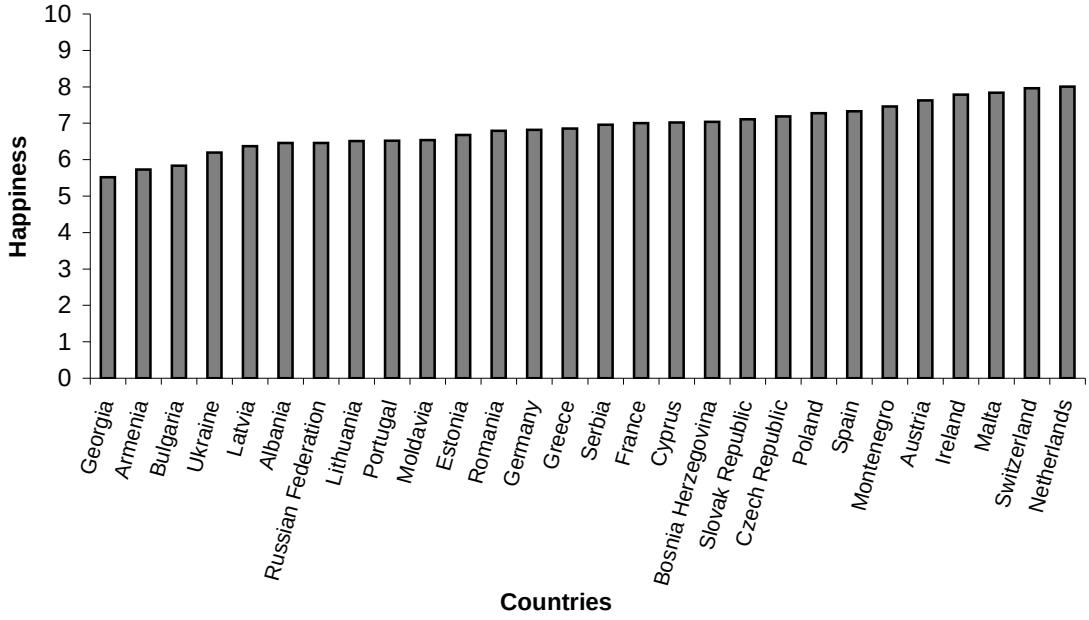
The common picture figure 2 reproduces is that of a slight ascending line of income, indicating that when household income increases, so too does one's happiness. However, a lot of variation exists, particularly among the lowest and the highest incomes. For example, the income of respondents who reported high feelings of happiness (10), varied from $5,230 to $16,170 a month.

[5] Because income is measured as absolute income, this variable has a wide range. Thus, the frequencies of the household incomes, with their average scores on happiness, were used to construct figure 2.

Overall, income affects happiness positively. However, the fact that the variation is sometimes quite large leaves room to believe that income is not equally important to everyone, regarding their happiness. Additionally, it indicates life satisfaction depends on more factors than income alone.

Another question this study wishes to answer, is to what extent people living in richer countries feel happier than those living in poorer countries. But first, without looking at a country's wealth, do countries differ at all regarding happiness? Figure 3 represents the mean score on happiness per country. The scores have been arranged from low to high levels of happiness.

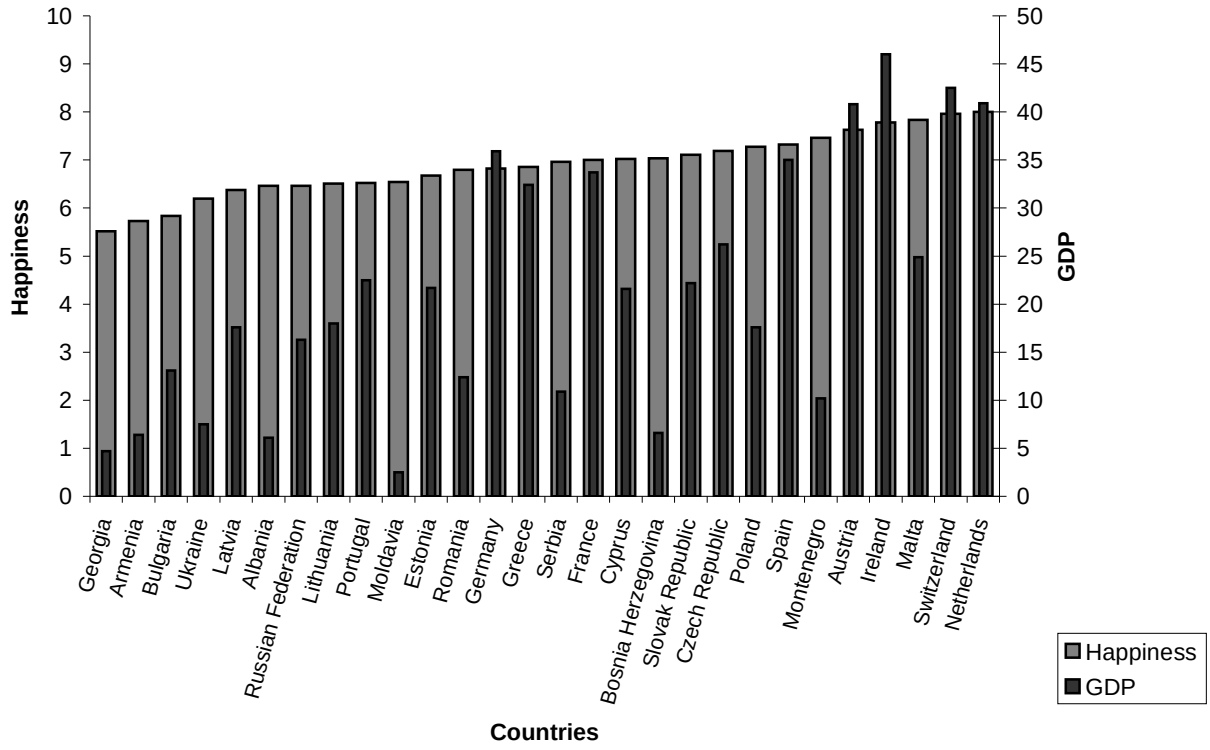
Figure 3: Mean scores of happiness per country



As becomes clear from figure 3, there are differences in personal happiness reported in the 28 countries of this study. People in Georgia reported the lowest (about 5.5), and Dutch people reported the highest personal happiness (8). These differences, on a scale from 1 to 10, are quite substantial.

But to what extent is personal happiness related to a country's wealth? Is it true that more wealthy nations produce more satisfied residents? Figure 4 adds the countries' GDP to give a general view regarding this matter. Again, the scores were arranged from low to high, based on the average happiness reported in the nations.

*Figure 4: Mean scores of happiness per country and GDP (in USD, *1,000)*



The correlation between GDP and personal happiness was 0.18 (p<.01), indicating a positive, but relatively weak association between these two variables. Because the correlation is not perfect (r = <1), this means exceptions regarding the positive relationship between GDP and happiness will exist.

Looking at the figure above, some intriguing observations can then be made, for instance the fact that Montenegro, one of the poorest countries within these analyses ($10,200), has one of the largest average scores on happiness (nearly 7.5). Almost more striking is the fact that Germany, the fifth richest country of these analyses ($35,900), reports an average of personal happiness that is less than that of poorer nations, such as Serbia, Bosnia-Herzegovina, Poland and Montenegro (<7). Indeed, a higher GDP does not automatically indicate a happier population, and vice versa.

To establish a general idea of the direction and the size of the separate effects of the control variables on happiness, bivariate regression analyses were carried out and are reported in table 5. Since the effects of income and GDP on happiness have already been discussed by figures 2 to 4, they will not be reviewed again when reporting the results in table 5.

Table 5: Bivariate regression analyses of happiness on all independent and control variables separately

	Est. [a]	Corr.	Means [b]	s.e.	R^2
Individual level					
Income (in USD, *1,000)	0.257 **	0.19 **	-	0.007	0.036
Post-Materialism (construct 1)	0.166 **	0.07 **	-	0.012	0.005
Post-Materialism (construct 2) c					
Materialistic (ref. group)	-	-	6.83 *	-	-
Mixed / Neutral	0.070 *	-	6.90	0.034	0.000
Post-Materialistic	0.139 **	-	6.90	0.052	
Contextual level					
GDP (in USD, *1,000)	0.033 **	0.18 **	-	0.001	0.032
Control variables					
Age	-0.036 **	-0.11 **	-	0.004	0.014
Age^2 (*1,000)	0.215 **	-0.11 **	-	0.037	
Educational level	0.133 **	0.08 **	-	0.009	0.006
Health	0.894 **	0.37 **	-	0.012	0.140
Gender					
Female (ref. group)	-	-	6.86 **	-	-
Male	0.079 **	-	6.94 **	0.024	0.000
Having children or not					
Having no children (ref. group)	-	-	6.88	-	-
Having children	0.034	-	6.92	0.024	0.000
Marital Status					
Single (ref. group)	-	-	7.10	-	-
Married / Registered Partnership	-0.021	-	7.07	0.029	0.024
Widowed	-0.986 **	-	6.10 **	0.043	
Divorced / Separated	-0.746 **	-	6.34 **	0.047	
N (respondents)			35,948		
N (countries – for GDP only)			28		

**=p<.01 ; *=p<.05

[a] unstandardized coefficients

[b] means' significance tested by t-tests

SOURCE: European Values Study, 2008

Although no direct effect of post-materialism on happiness was problematized, it is interesting to see that post-materialistic respondents appear to be happier than those who are materialistic, based on the results of table 5. More specifically, this means that when a respondent becomes more post-materialistic (meaning they move up one category on the post-materialism scale; e.g. from being materialistic to being post-materialistic), their life satisfaction increases by 0.166 ('traditional' scale). The alternative post-materialism measure shows that, compared to materialistic respondents, respondents who are mixed / neutral are slightly happier (0.07) and post-materialistic respondents are also more satisfied with their lives (0.139). So, both constructs reveal the same results.

The other control variables show that health appears to be of great importance for one's feelings of happiness, as the effect of this variable alone explains 14% of the variance in

happiness, not to mention the size of the effect itself. From these bivariate analyses, it appears that respondents who reported a very good health score 3.6 (4*0.894) higher on the happiness scale than do respondents with a very bad health. On a ten-point scale, this is quite substantial. Furthermore, an increase in age by one year reduces happiness by .036, but this effect is not linear (age^2 is significant). Moreover, men seem to be happier than women, a higher educational level seems to increase respondents' happiness, and widowed and divorced / separated respondents are less satisfied with their lives than single respondents.

Most effects presented in table 5 are significant at a 1% level. The only exceptions here are *mixed / neutral* (alternative post-materialism measure) ($p<.05$), *having children*, and *being married / having a registered partnership* (both not significant at all). More specifically, this means that happiness is equal for respondents with and without children, and for respondents who are either single or married / having a registered partnership.

These bivariate regression analyses only provide a general idea as to what may be the outcomes of this study, considering the hypotheses discussed in chapter 2. But to fully test these conjectures, it is necessary to create models in which all variables are tested simultaneously. The outcomes of the multivariate analyses are discussed next.

§4.2 Multivariate / Multilevel analyses

§4.2.1 Models

The analysis technique used here is the multilevel method, more specifically random intercept multilevel regression analysis, in which both individual and contextual factors can be tested simultaneously. The use of this technique is necessary, because the dependency of respondents within a country might bias the results, and multilevel analysis corrects this by regarding respondents as nested within these countries.

The hypotheses of this study are tested in five models, and are duplicated for the alternative post-materialism measure, to investigate whether the findings of the first models concur with those of the last. More specifically, Model 1 will test whether richer respondents are happier than poorer ones (**H1**), and Model 2 adds the GDP-effect on happiness to investigate whether or not respondents living in richer countries are happier than those living in poorer countries (**H2**). The third hypothesis (the income-effect on happiness as proposed by **H1** is weaker for post-materialistic respondents), is tested in Model 3, by adding the interaction between income and post-materialism. Model 4 tests the interaction-effect between GDP and post-materialism on happiness, to investigate whether or not the assumption that the GDP-effect on life satisfaction, as proposed by **H2**, is indeed weaker for post-materialistic

respondents. Model 5 is the model in which all variables are added, to find out if the possible interaction-effects of income / GDP with post-materialism on personal happiness change after including both in the same model. Finally, as stated before, these five models were reproduced, but with the alternative post-materialism measure, in order to find out if the same outcomes occur when using another indicator.

Furthermore, in a separate analysis, it is examined to what extent social security affects the potential effects of GDP. These models exclude nine countries (Albania, Armenia, Bosnia-Herzegovina, Georgia, Moldavia, Montenegro, Serbia, Russia, and Ukraine) for which no social security information was available. Table 9 will present the results of these analyses for which the alternative post-materialism measure was used[6]. These analyses were merely created to test how social security might affect GDP and not to test any hypothesis specifically.

Lastly, the analyses were all controlled for potential outliers and traces of heavily correlated variables (multicolinearity), but no evidence for either was found[7]. Evidently, all interpretations are made net of all other factors.

Please note that the so-called 'zero-model' is not reported in tables 6 and 7. This zero-model was merely executed to obtain the Intra-Class Correlation (ICC), and to review the amount of variance at both individual and contextual level. The ICC can be calculated by dividing the country-level estimate by the residual estimate summed with the country-level estimate[8]. The ICC indicates how much of the variance in happiness is due to differences between individuals and to differences between countries. It appeared that 7.7% of the variance in personal happiness can be ascribed to differences between countries.

§4.2.2 Results ('traditional' post-materialism scale)

Table 6 presents the results for the analyses in which the 'traditional' post-materialism scale was used. The models will first be discussed referring to the hypotheses tested, after which the effects of the control variables on happiness in all models will also be reviewed.

[6] These analyses were also executed with the first post-materialism construct, but the results regarding GDP and social security were similar to those when using the second measurement.
[7] Note that outlying scores on income were already omitted.
[8] Here: ICC = 0.403 / (4.844 + 0.403) = 0.403 / 5.247 = 0.077 = Approximately 7.7%

Table 6: Multi-level regression analyses of happiness on individual-level and control variables (Model 1), contextual-level variables (Model 2), and interactions of income and GDP with post-materialism (Models 3 and 4) and full model (Model 5)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Est.	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**
Control variables										
Age	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004
Age^2 (*1,000)	0.512 **	0.039	0.512 **	0.039	0.511 **	0.039	0.512 **	0.039	0.512 **	0.039
Male (ref. group is female)	-0.142 **	0.022	-0.142 **	0.022	-0.142 **	0.022	-0.142 **	0.022	-0.142 **	0.022
Educational level	0.073 **	0.009	0.074 **	0.009	0.074 **	0.009	0.074 **	0.009	0.074 **	0.009
Health	0.814 **	0.013	0.813 **	0.013	0.813 **	0.013	0.813 **	0.013	0.813 **	0.013
Having children (yes)	-0.046	0.027	-0.045	0.027	-0.045	0.027	-0.045	0.027	-0.046	0.027
Marital Status (ref. group is single)										
Married / Registered partnership	0.461 **	0.037	0.462 **	0.037	0.462 **	0.037	0.462 **	0.037	0.463 **	0.037
Widowed	-0.141 **	0.052	-0.140 **	0.052	-0.138 **	0.052	-0.140 **	0.052	-0.138 **	0.052
Divorced / Separated	-0.223 **	0.049	-0.223 **	0.049	-0.224 **	0.049	-0.224 **	0.049	-0.224 **	0.049
Individual level variables										
Income (in USD, *1,000)	0.077 **	0.008	0.076 **	0.008	0.092 **	0.011	0.077 **	0.008	0.094 **	0.011
Income Missing (yes)	0.044	0.030	0.043	0.030	0.041	0.030	0.043	0.030	0.041	0.030
Post-Materialism (construct 1)	0.032 **	0.012	0.031 **	0.012	0.056 **	0.017	0.041	0.024	0.049 *	0.024
Contextual level variables										
GDP (in USD, *1,000)	-	-	0.018 **	0.006	0.018 **	0.006	0.018 **	0.006	0.017 **	0.006
Interactions										
Post-Materialism * Income	-	-	-	-	-0.013 *	0.006	-	-	-0.015 *	0.007
Post-Materialism * GDP	-	-	-	-	-	-	-0.000	0.001	0.000	0.001
Intercept	5.079 **	0.132	4.703 **	0.181	4.671 **	0.182	4.692 **	0.183	4.680 **	0.183
-2 Log Likelihood	*153,391.114*		*153,383.907*		*153,379.555*		*153,383.708*		*153,379.372*	
$X^{2\,a}$	-		*7.207* **		*4.352* *		*0.199*		*4.535*	
R^2 *Individual*	*0.141*		*0.141*		*0.141*		*0.141*		*0.141*	
R^2 *Contextual*	*0.451*		*0.576*		*0.576*		*0.576*		*0.576*	
N (respondents)					35,948					
N (countries)					28					

**=p<.01 ; *=p<.05

[a] = Model 2 compared to Model 1, Models 3 - 5 to Model 2

SOURCE: European Values Study, 2008

Model 1 shows that income has a positive and statistically significant effect on life satisfaction, meaning that an increase in household income of $1,000 a month is related to an increase of happiness of 0.077, net of all other factors. However, on a ten-point scale, this effect is not that substantial. Furthermore, the indicator for having a missing value on income appears to be statistically insignificant (p>.05), implying there are no differences between respondents who had their missing score replaced by the mean of income and those who had not. This model supports **H1,** which stated that richer respondents are happier than poorer respondents.

Model 2 adds the contextual effect of GDP to the analyses. This effect is slightly positive (b = 0.018) and statistically significant (p<.01), meaning that if a country's GDP increases by $1,000, the happiness of its citizens increases by .018, net of all other factors. This finding corresponds with what was expected based on **H2 (**respondents living in countries with a higher GDP are happier than respondents living in countries with a lower GDP), which is thus supported.

However, the effect of GDP on personal happiness in Model 2 of table 6 is smaller than its bivariate effect on happiness. Apparently, the other factors in this model diminish the GDP-effect on happiness, with income being the most likely, because GDP is partly based on people's income. Hence, adding income and GDP simultaneously could have lead to a decline in the effect of GDP on happiness. Nonetheless, this effect still is statistically significant, which indicates that respondents living in richer countries are indeed happier than those living in poorer countries, even if these differences are small.

The interaction between income and post-materialism is added in Model 3, and this term is statistically significant at a 5% level, indicating that the effect of income on happiness differs over one's (post)materialistic values. Furthermore, the income-effect on life satisfaction in Model 3 now shows that when a very materialistic respondent's monthly income increases by $1,000, their happiness increases by 0.092, net of all other factors. The same effect for very post-materialistic respondents is now 0.053 (0.092 minus 3*0.013), net of all other factors. This means that the effect of income on happiness decreases when respondents become materialistic, post-materialistic and eventually very post-materialistic. When looking at Model 5, which includes both interactions, this interaction-effect remains statistically significant, and even slightly increases when the interaction between GDP and post-materialism is included. These findings support **H3**, which stated that the income-effect on happiness, as proposed by **H1**, is weaker for post-materialistic respondents.

Model 4 adds the second interaction term between GDP and post-materialism, instead of the first interaction. This term does not appear to be statistically significant, meaning that the effect of GDP is equal for (very) materialistic and (very) post-materialistic respondents. If the interaction would have been significant, the GDP-effect would have indicated the effect of GDP on personal happiness for respondents who are very materialistic only, signifying that if a country's GDP increases by $1,000, life satisfaction for very materialistic citizens would increase by 0.018 ($p<.01$), net of all other factors. However, because the interaction term is not statistically significant, this effect of GDP on happiness applies to all (very) (post)materialistic respondents.

Further still, since the interaction-effect of GDP and post-materialism on happiness is so small (near 0), it is not possible to say to what extent this would influence the effects of GDP and post-materialism, although the direction of the interaction-effect indicates that the income-effect would diminish when respondents become materialistic, post-materialistic or very-post-materialistic, which is in line with what was expected by **H4**.

The interaction between GDP and post-materialism remains statistically insignificant in Model 5, and so neither of these two models show support for the fourth hypothesis, which stated that the effect of GDP on happiness, as proposed by **H2**, is weaker for post-materialistic respondents. **H4** is not supported.

Regarding the control variables in table 6, Model 1, the most remarkable of all effects represented here is that of *health*. It appears to have a large effect on personal happiness, similar to the outcomes of the bivariate regressions. Respondents who reported to have a very good health are more than 3 times happier than respondents who reported to have a very bad health (.814*4), net of all other factors. On a scale from one to ten, this is a very substantial difference.

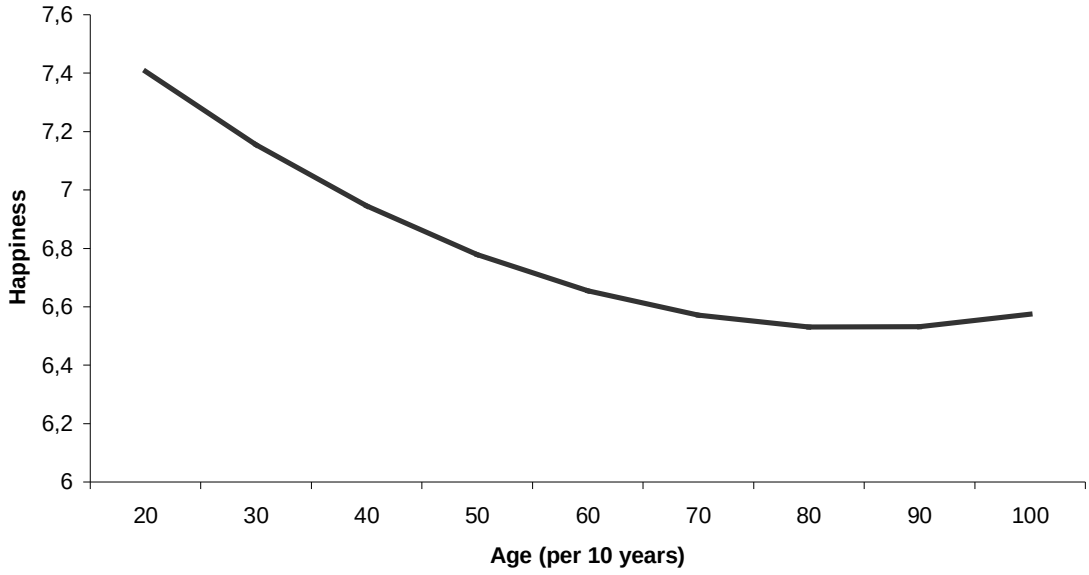
Furthermore, post-materialism has a positively, statistically significant effect on personal happiness ($b = 0.032$). This means that when a respondent moves up on the scale for post-materialism (becomes more post-materialistic, so to speak), they become happier. However, the difference between a very materialistic and a very post-materialistic respondent regarding their happiness is not that large (0.096), considering a ten-point scale.

Married respondents / respondents with a registered partnership are more satisfied with their lives than single respondents, and the latter are happier than those who are widowed or divorced / separated (with the divorcees / separated respondents being the least happy of all). In the bivariate regressions, married respondents appeared to be equally happy when compared to single respondents, but in the mutivariate analyses they seem to be the happiest

of all. It could be that married people, or those with a registered partnership, are less healthy than single people (maybe because they are often older as well), and that they have a lower educational level than singles. Only if one would observe married and single respondents with the same level of health or education, married respondents would be happier compared to their single counterparts[9].

With regard to the other control variables, age appears to have a negative effect on happiness (every year a respondent adds to their life decreases their life satisfaction by 0.046), and its square term indicates this effect is not linear, meaning that at some point in life, respondents no longer become unhappier every year. Figure 5 represents the effect of age on life satisfaction.

Figure 5: Non-linear effect of age on happiness



As can be observed from this figure, age indeed has a non-linear effect on personal happiness. More meaningfully, every ten years the decline in happiness becomes less steep, with a breaking point at about eighty-five / ninety years old, when respondents become more instead of less satisfied with their lives every year.

A possible reason for this finding is that respondents, in the beginning stages of becoming older, gain more responsibilities in life, such as having to find a job, creating a family of one's own, having to take care of children, etc., which could cause a decline in their

[9] Another set of multivariate regression analyses revealed that the effect of marital status, more specifically the effect of being married compared to being single, on personal happiness, turned positive after adding health to the model, and even more positive after adding education as well.

feelings of happiness. However, as they (and their family members) grow older, these responsibilities diminish, which means less worries and an increase in happiness.

The rest of the effects of the control variables in Model 1 of table 6 indicate that males are less satisfied with their lives than females (contrary to the bivariate analyses), that higher educated respondents are happier than lower educated respondents, and that there is no difference regarding happiness between respondents who do or do not have children.

A possible explanation for why male respondents are unhappier than female respondents is because of the addition of all the other effects, and most importantly the addition of health[10]. Perhaps that males have a better health than females, which leads to more feelings of happiness. The gender-effect on life satisfaction would then be indirect (as being male positively affects health, which in turn positively affects happiness), causing the direct effect of being male on life satisfaction to diminish and become negative.

The effects of these control variables hardly change over the other models, which is why they are only discussed once.

§4.2.3 Results (alternative post-materialism measurement)

To investigate whether the 'traditional' post-materialism scale, as proposed by Inglehart, provides the same outcomes as a new post-materialism construct, all the models in table 6 were duplicated for this new measurement. This second construct consisted of two dummy-indicators, specifying whether respondents had materialistic (reference group), mixed / neutral, or post-materialistic values. It differs from the traditional measurement, because the contents of the items used to construct this gauge were not based on political views, but on direct and personal (post)materialistic values. Thus, the question is whether the results using the second measure are similar to those using the traditional scale, since this alternative construct is a more direct measurement for post-materialistic values than the traditional one. Table 7 contains the outcomes of these analyses.

With regard to the first two hypotheses, the effects of income and GDP on personal happiness do not differ much compared to Models 1 and 2 of table 6. Both are positive and statistically significant, supporting **H1** and **H2**.

[10] This assumption was tested by separate multivariate regression analyses where health was added to a model with gender only. After the addition of health, the effect of gender (male) became negative.

Table 7: Multi-level regression analyses of happiness on individual-level and control variables (Model 1), contextual-level variables (Model 2), and interactions of income and GDP with post-materialism dummies (Models 3 and 4) and full model (Model 5)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Est.	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**
Control variables										
Age	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004	-0.046 **	0.004
Age$^{2\ (*1,000)}$	0.509 **	0.039	0.510 **	0.039	0.510 **	0.039	0.511 **	0.039	0.511 **	0.039
Gender $^{(male)}$	-0.141 **	0.022	-0.140 **	0.022	-0.141 **	0.022	-0.140 **	0.022	-0.140 **	0.022
Educational level	0.077 **	0.009	0.077 **	0.009	0.078 **	0.009	0.077 **	0.009	0.077 **	0.009
Health	0.815 **	0.013	0.814 **	0.013	0.814 **	0.013	0.815 **	0.013	0.814 **	0.013
Having children $^{(yes)}$	-0.047	0.027	-0.046	0.027	-0.046	0.027	-0.046	0.027	-0.046	0.027
Marital Status $^{(ref.\ group\ is\ single)}$										
Married / Registered partnership	0.456 **	0.037	0.457 **	0.037	0.457 **	0.037	0.458 **	0.037	0.459 **	0.037
Widowed	-0.148 **	0.052	-0.147 **	0.052	-0.147 **	0.052	-0.145 **	0.052	-0.145 **	0.052
Divorced / Separated	-0.225 **	0.049	-0.226 **	0.049	-0.226 **	0.049	-0.225 **	0.049	-0.225 **	0.049
Individual level variables										
Income $^{(in\ USD,\ *1,000)}$	0.077 **	0.008	0.076 **	0.008	0.091 **	0.017	0.076 **	0.008	0.110 **	0.019
Income Missing $^{(yes)}$	0.043	0.030	0.042	0.030	0.042	0.030	0.043	0.030	0.042	0.030
Post-Materialism $^{(construct\ 2\ ;\ ref.\ group\ =\ materialistic)}$										
Mixed / Neutral	-0.080 *	0.031	-0.081 **	0.031	-0.048	0.044	-0.181 **	0.061	-0.160 *	0.062
Post-Materialistic	-0.160 **	0.047	-0.161 **	0.047	-0.154 *	0.069	-0.363 **	0.101	-0.343 **	0.102
Contextual level variables										
GDP $^{(in\ USD,\ *1,000)}$	-	-	0.019 **	0.006	0.019 **	0.006	0.014 *	0.007	0.012	0.007
Interactions										
Mixed / Neutral * Income	-	-	-	-	-0.019	0.018	-	-	-0.040 *	0.020
Post-Materialistic * Income	-	-	-	-	-0.006	0.027	-	-	-0.038	0.029
Mixed / Neutral * GDP	-	-	-	-	-	-	0.005	0.003	0.007 *	0.003
Post-Materialistic * GDP	-	-	-	-	-	-	0.009 *	0.004	0.011 **	0.004
Intercept	5.172 **	0.135	4.782 **	0.183	4.756 **	0.185	4.878 **	0.189	4.860 **	0.189
-2 Log Likelihood	*153,386.527*		*153,378.869*		*153,377.535*		*153,372.885*		*153,368.781*	
$X^{2\ a}$	-		*7.658* **		*1.334*		*5.984*		*10.088* *	
R^2 *Individual*	*0.141*		*0.141*		*0.141*		*0.141*		*0.141*	
R^2 *Contextual*	*0.440*		*0.575*		*0.575*		*0.571*		*0.570*	
N $^{(respondents)}$					35,948					
N $^{(countries)}$					28					

**=p<.01 ; *=p<.05

[a] = Model 2 compared to Model 1, Models 3 - 5 to Model 2

SOURCE: European Values Study, 2008

However, more important are the effects of the post-materialism dummies on life satisfaction. These effects do not correspond with the effects of the traditional post-materialism scale found in table 6, nor with the results of the bivariate analyses. More specifically, the first model of table 7 indicates that respondents with mixed / neutral values are slightly unhappier than respondents with materialistic values ($b = -0.08$, $p<.05$) and that post-materialistic respondents are the least happy of all, compared to materialistic respondents ($b = -0.16$, $p<.01$). This pattern is the opposite from the results showed in table 6, and from the outcomes provided by the bivariate regression analyses, where mixed / neutral and post-materialistic respondents appeared to be happier than their materialistic counterparts. So, the conclusion is that other variables within these analyses must have influenced the effects of post-materialism on personal happiness in such a way, these effects have turned negative.

An extra set of multivariate regression analyses revealed that health and income manipulate the effect of post-materialism on life satisfaction[11]. But how can income and health affect the effect of post-materialism on happiness in such a way, that this effect turns negative? A possible explanation is that respondents with a higher income place a larger emphasis on material matters. In other words, these respondents could have materialistic values already, which causes them to appreciate a bigger emphasis on material assets more than they would if they had a lower income. For those with higher incomes, material possessions could be a way of distinguishing themselves from those with lower incomes, making them appreciate material objects more. Furthermore, because they have this mentality, people with higher incomes could have worked harder to become rich.

Regarding health, a potential explanation is that respondents with a bad health are more focused on material aspects, since these are often needed to become healthier. On the other hand, respondents who already have a good health, might be more interested in other aspects of life, such as self-development. This means that the positive effect of having post-materialistic values on happiness is affected by health in such a way, this effect turns negative (being post-materialistic positively affects health, which positively affects happiness, declining the direct effect of having a post-materialistic value pattern on life satisfaction). Post-materialistic respondents might also work harder at keeping a good health than their materialistic counterparts, since this is more important to them than material aspects in life.

[11] These analyses are not reported here. By constructing regression models which only included the dummy indicators for post-materialism, and adding the other variable to additive models (repeating this for all variables), it appeared that income slightly diminished the effect of being post-materialistic compared to materialistic on happiness, and that health turned it negative. A combination of health and income then lead to a very strong negative effect of being post-materialistic compared to materialistic on personal happiness.

To recapitulate, the effects of the alternative measure of post-materialism on happiness differ from those of the traditional post-materialism scale and the bivariate analyses. Reason for why these results vary, is because health and income both negatively affect the alternative post-materialism measure. This could be the case because richer respondents, and those with a bad health, might place more emphasis on material values than do respondents with a good health or lower income.

To further test these explanations, another set of multivariate regression analyses were executed, this time with the two items that were used to construct the dummy indicators for post-materialism. These items (*less emphasis on material aspects* and *greater respect for authority*) were tested to find out how income and health might influence them and their effects on happiness[12]. The most important results are presented in table 8.

Table 8: Additional regression analyses of less emphasis on material aspects, greater respect for authority, health, and income

	Model 1 (dep. = happiness)		**Model 2** (dep. = happiness)		**Model 3** (dep. = less emphasis material aspects)		**Model 4** (dep. = greater respect authority)	
	Est.	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**
Less emphasis on material aspects	0.042 **	0.015	0.004	0.014	-	-	-	-
Greater respect for authority	0.105 **	0.017	0.150 **	0.016	-	-	-	-
Income (in USD, *1,000)	-	-	0.144 **	0.007	0.006 *	0.003	0.000	0.002
Health	-	-	0.836 **	0.012	0.019 **	0.004	-0.024 **	0.004
R^2	0.001		0.152					
N	35,948							

**=p<.01 ; *=p<.05
SOURCE: European Values Study, 2008

Models 1 and 2 of table 8 reveal that adding income and health turns the effect of less emphasis on material items on happiness insignificant (p>.05), and increases the effect of greater respect for authority on life satisfaction. Furthermore, Models 3 and 4 show that both income and health positively affect respondent's post-materialistic values, and that health negatively affects respondent's materialistic values. In other words, if the monthly income or the health of a respondent increases, so too will their score on whether they think less emphasis on material aspects is a good thing, and if a respondent's health increases, their score on whether they think greater respect for authority is good, decreases.

These findings more or less support the explanations given as to why the effects of the alternative post-materialism measure on life satisfaction differ from the effects of the traditional scale, and the bivariate findings.

[12] Results are not fully reported here, but were tested by means of multivariate regression analyses. Post-materialism items were first tested in separate models, then together. The outcomes led to the same conclusions.

Returning to Model 3 of table 7, it seems as though the interactions between income and the post-materialism dummies are not statistically significant ($p>.05$), meaning that there are no differences among materialistic, mixed / neutral and post-materialistic respondents regarding the effect of household income on personal happiness.

The outcomes in Model 3 of table 7 also show that the effect of income for materialistic respondents is 0.091 ($p<.01$), and that this effect for mixed / neutral respondents would be 0.072, and for post-materialistic respondents would be 0.085 (if the interaction-effects would have been statistically significant). The direction of these effects show that, indeed, the effect of income on personal happiness is less strong for post-materialistic respondents, compared to materialistic respondents. The differences between these groups of respondents are so small, however, they can be regarded as non-existent. These findings do not correspond with the findings of Model 3 in table 6 (using the traditional post-materialism construct), that indicated that the effect of income on happiness is weaker when respondents are more post-materialistic.

Even after adding all interactions in Model 5, this effect of income on happiness appears to be equal for materialistic and post-materialistic respondents ($p>.05$), but weaker for respondents with a mixed / neutral value pattern ($b = -0.04$). Based on Models 3 and 5 of table 7, **H3** is not supported.

More striking are the interaction-effects of GDP with the post-materialism dummies on life satisfaction. While the findings in table 6 suggest no difference between (very) materialistic and (very) post-materialistic respondents regarding the effect of GDP on happiness, table 7 suggests otherwise. In Model 4 of table 7, the interaction between GDP and post-materialistic respondents is statistically significant, and positive ($b = 0.009$; $p<.05$), implying that the effect of GDP on life satisfaction is stronger for post-materialistic respondents compared to materialistic respondents. More specifically, the effect of GDP on life satisfaction is 0.014 for materialistic, and 0.023 for post-materialistic respondents.

When all interactions are added to Model 5, it appears that the GDP-effect is also stronger for respondents with a mixed / neutral value pattern, compared to those with a materialistic one ($b = 0.007$), and the interaction between post-materialistic respondents and GDP increases marginally, compared to Model 3 ($b = 0.011$). Moreover, the GDP-effect on happiness for materialistic respondents is no longer statistically significant in Model 5, indicating no GDP-effect on life satisfaction exists for these respondents.

According to Model 5 of table 7, the effect of a country's wealth on personal happiness is stronger for post-materialistic respondents, compared to materialistic

respondents. Again, this is not in line with the findings of Models 4 and 5 of table 6, and is the opposite of what was expected based on **H4**.

A possible explanation for this is that a country's GDP can also be an indicator for possibilities for post-materialists to express themselves. In other words, because richer countries offer their citizens a better financial basis, people living in these nations find their basic needs to be fulfilled more easily, after which they develop more abstract needs, such as post-materialistic ones. In that sense, living in a richer country would make post-materialistic people happier, because they know their basic needs can be taken care of more easily and so they can start fulfilling their self-expression needs.

Finally, the effects of the control variables on life satisfaction of table 7 hardly differ from those of table 6.

§4.3 Additional analyses – social security

To better understand the explanation given for the unexpected positive directions of the interaction-effects between GDP and the alternative measurement for post-materialism, these additional examinations were executed.

For these analyses, nine countries were omitted, because no social security information was available for them. Since the interaction effects between GDP and the post-materialism dummies of Model 5 of table 7 were found to be statistically significant, and in a direction that was not expected, the second post-materialism construct was utilized for these additional analyses. Furthermore, a new zero-model concluded that the ICC now was approximately 6.8%[13]. The correlation between social security and GDP was 0.753 ($p<.01$), indicating there is a very strong relationship between these two variables. This is not surprising, however, considering that wealthier countries can spend more on social security than countries with a lower GDP.

Model 1 is the baseline model for the GDP-effect on personal happiness, containing the effects of both individual and contextual level variables, but without social security, which is added in Model 2. Model 2 will be compared to Model 1, to find out if social security affects the GDP-effect on life satisfaction. Model 3 is another baseline Model, this time for the interaction between GDP and post-materialism. Model 4 again includes social security, and will be compared to Model 3 in order to find out if the interaction effect of GDP and post-materialism is affected by adding social security to the analyses.

[13] 0.320 / (4.393+ 0.320) = 0.320 / 4.713 = 0.068

Please note that these analyses were merely executed to find out if the GDP-effect on happiness is affected by social security, and not to test any hypothesis. Therefore, only the effects regarding GDP and social security on life satisfaction, and the interactions involving GDP, are discussed. The results of these additional analyses are presented in table 9.

Table 9: Additional multi-level regression analyses of happiness on individual-level, contextual-level, and control variables (Models 1 and 2), interactions of GDP with post-materialism (Models 3 and 4).

	Model 1		Model 2		Model 3		Model 4	
	Est.	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**	**Est.**	**s.e.**
Control variables								
Age	-0.035 **	0.004	-0.035 **	0.004	-0.035 **	0.004	-0.035 **	0.004
Age$^{2\ (*1,000)}$	0.422 **	0.042	0.422 **	0.042	0.425 **	0.042	0.425 **	0.042
Gender (male)	-0.171 **	0.025	-0.171 **	0.025	-0.170 **	0.025	-0.170 **	0.025
Educational level	0.072 **	0.010	0.072 **	0.010	0.072 **	0.010	0.072 **	0.010
Health	0.826 **	0.015	0.826 **	0.015	0.826 **	0.015	0.826 **	0.015
Having children (yes)	-0.067 *	0.030	-0.067 *	0.030	-0.067 *	0.030	-0.067 *	0.030
Marital Status (ref. group is single)								
Married / Registered partnership	0.397 **	0.041	0.397 **	0.041	0.400 **	0.041	0.400 **	0.041
Widowed	-0.192 **	0.057	-0.192 **	0.057	-0.191 **	0.057	-0.191 **	0.057
Divorced / Separated	-0.286 **	0.052	-0.286 **	0.052	-0.285 **	0.052	-0.285 **	0.052
Individual level variables								
Income (in USD, *1,000)	0.070 **	0.008	0.070 **	0.008	0.070 **	0.008	0.070 **	0.008
Income Missing (yes)	0.103 **	0.032	0.103 **	0.032	0.104 **	0.032	0.104 **	0.032
Post-Materialism (construct 2; ref. group is materialistic)								
Mixed / Neutral	-0.038	0.036	-0.038	0.036	-0.048	0.108	-0.047	0.108
Post-Materialistic	-0.122 *	0.052	-0.122 *	0.052	-0.443 **	0.167	-0.443 **	0.167
Contextual level variables								
GDP (in USD, *1,000)	0.020 *	0.008	0.025 *	0.011	0.018 *	0.009	0.024	0.012
Social Security	-	-	-0.013	0.019	-	-	-0.013	0.019
Interactions								
Mixed / Neutral * GDP					0.000	0.004	0.000	0.004
Post-Materialistic * GDP	-	-	-	-	0.011 *	0.005	0.011 *	0.005
Intercept	4.423 **	0.259	4.531 **	0.302	4.459 **	0.274	4.571 **	0.313
-2 Log Likelihood	*105,349,154*		*105,348.689*		*105,343.686*		*105,343.193*	
$X^{2\ b}$	-		*0.465*		-		*0.493*	
R^2 *Individual*	*0.151*		*0.151*		*0.152*		*0.152*	
R^2 *Contextual*	*0.622*		*0.631*		*0.622*		*0.631*	
N (respondents)	25,346							
N (countries)	19 [a]							

**=p<.01 ; *=p<.05

[a] = omitted countries: Albania, Armenia, Bosnia-Herzegovina, Georgia, Moldavia, Montenegro, Serbia, Russia, and Ukraine

[b] = Model 2 compared to Model 1, Model 4 compared to Model 3

SOURCE: European Values Study, 2008

The main question to be answered here is whether social security is a part of GDP, and, if added as a variable on its own, if it would change the GDP-effect on personal happiness. In Model 1 of table 9, the GDP-effect on life satisfaction is positively statistically significant, meaning that if a country's GDP increases by $1,000, the happiness of that country's inhabitants increases with 0.020, net of all other factors.

After adding social security to Model 2, of which the effect on happiness is not significant (p>.05), the effect of GDP on life satisfaction increases by one-fourth of its original effect (b = 0.025). Hence, social security seems to positively influence the GDP-effect on personal happiness.

The last two models show that the addition of social security in Model 4 turns the GDP-effect on happiness for materialistic respondents statistically insignificant (p>.05). Moreover, the effects of the interactions between respondents with mixed / neutral values and GDP, and respondents with post-materialistic and GDP on personal happiness, do not change at all compared to Model 3. So, social security does not alter the effects of GDP on life satisfaction for mixed / neutral and post-materialistic respondents. This means there must be a different explanation as to why the GDP-effect on happiness is not weaker, but stronger for post-materialistic respondents, compared to materialistic respondents. Perhaps that post-materialistic people are more focused on their surroundings than materialistic people, and so feel happier when their country is richer, and that materialistic people are more focused upon their own aspirations and material assets, which would make them care less about their nation's wealth.

Although social security does change the effect of GDP on personal happiness, this is only marginally and does not explain the remarkable results regarding the interactions between the alternative measure for post-materialism and GDP in table 7.

5. Conclusion and discussion

§5.1 Summary and conclusion

This paper tried to find an answer to the following research question: *do income and GDP affect people's personal happiness, and, if so, do these effects depend on people's (post)materialistic values?* Hypotheses, derived from existing theories such as the modernization theory (Inglehart, 1997) and the absolute theory (Fuentes & Rojas, 2001), were tested with data from the EVS (2008) in order to answer this principal research question. The following paragraphs will briefly answer the sub-questions, after which the main question will be answered and a succinct discussion of this study, and some possible recommendations for future research, will follow.

The first sub-question was: *to what extent are richer people happier than poorer people?* The outcomes of the analyses showed that a positive effect of household income on personal happiness exists, indicating that, indeed, richer people feel happier than poorer people, although it should be noted that this difference is not very substantial.

With regard to the second sub-question, which read *to what extent are people living in richer countries happier than people living in poorer countries,* the results of the examinations showed that a country's wealth, measured as GDP, has a small, but positive effect on personal life satisfaction. In other words, the higher a country's GDP, the happier the people living in that country are. Based on these findings, the answer to this question is: in general, people living in richer countries are happier than those living in poorer countries. The effects of GDP on personal happiness, however, were not that substantial.

Finally, the third sub-question was: *to what extent are the potential effects of income and GDP on personal happiness different for people with materialistic and post-materialistic value patterns?* There are two contrasting answers to this question, which depend on how post-materialism is constructed. Based on the traditional post-materialism scale, as proposed by Inglehart, the effect of income on happiness is weaker for people with more post-materialistic values, and the effect of GDP on life satisfaction does not differ at all between people with different (post)materialistic value patterns.

The alternative measure of post-materialism was based on whether people thought less emphasis on material aspects and greater respect for authority were good or not. The differences between this construct and the traditional scale are that this second measurement is more directly based on what people themselves would feel if any of these statements really happened, and not so much on what they think their government should try to achieve. Thus,

there is a less political setting involved, and people need to find their answers not in the actions their governments could take (external goals), but in how they themselves would feel (personal beliefs).

This second measure of post-materialism indicated that the effect of household income on life satisfaction is equal for people with a materialistic or post-materialistic value pattern, and that the effect of GDP on life satisfaction is strongest for people with post-materialistic values.

Since these findings were contrary to what was expected, it was argued that social security might influence the effect of GDP on happiness. However, additional analyses revealed this was not the case. Perhaps that people with post-materialistic values are more interested in their surroundings, which makes GDP more important for their happiness, and that materialistic people focus more on their private goals, making household income more important for their life satisfaction. These are just general explanations, however, and would need to be tested in order to be either supported or not.

With regard to the principal question, whether income and GDP affect people's personal happiness and, if so, if these effects depend on people's (post)materialistic values, the answer would be: people's happiness is indeed affected by income and GDP, both in a positive manner. The way these effects differ for (post)materialistic people depends on how post-materialism is constructed; Inglehart's scale indicates a weaker income-effect on happiness for post-materialists and no differences in the GDP-effect on life satisfaction, but dummy indicators show the income-effect on happiness is equal for materialistic and post-materialistic people, and the GDP-effect is strongest for post-materialists.

§5.2 Discussion and suggestion

The key independent variables in this study were household income and a country's GDP. It appeared that both influence someone's personal happiness positively, meaning that people with higher incomes are happier than those with lower incomes, and people living in richer countries are happier than those living in poorer countries. But although they both influence life satisfaction, their effects were not that substantial.

Beside these economic indicators, another important factor influencing life satisfaction is health. This estimate did not only have the largest effect of all the variables in the analyses regarding the dependent variable, but also played a major role in affecting other variables (e.g. age, gender, marital status, and post-materialism). It is important, and interesting, that future research investigates these influences more broadly and inspects whether other scales

indicating health (for instance a ten-point instead of a five-point scale) would result in other outcomes. If health affects so many other factors affecting happiness, it is fascinating to study how and why this is the case, more so than was done in this research. Moreover, another interesting question is whether the health-effect on life satisfaction is equal for people with different (post-materialistic) values, since health appeared to strongly affect the alternative measurement of post-materialism. Thus, it is possible that the effect of health on happiness is unequal for (post)materialists, and it would be interesting to find out if this is the case.

The key focus of this study was whether the effects of income and GDP on happiness differ for people with (post)materialistic values. This appeared to be the case to some extent, but is heavily dependent on what post-materialism construct is used. Hence, a clear, straight conclusion cannot be made, since this depends on the different measurements.

This leads to the most important and remarkable outcome of this paper, which is the fact that the alternative measure for post-materialism provides different results than the first. If the alternative gauge is a better predictor for having post-materialistic values, this could mean that Inglehart's traditional post-materialism scale no longer provides an adequate testing of his theses. However, more research needs to be conducted in order to find out what measurement is better. For now, there is no reason to defy Inglehart's post-materialism scale, since the results using his scale still support his thesis.

Regarding the two different measurements of post-materialism, both have some advantages and disadvantages. The pro of the first scale, the 'traditional' one, is that is has been tested many times, and it has been proved as a good indicator for post-materialism. However, criticism consists of the fact that this scale would be very influential by external factors, such as economic crises, because it revolves around questions based on political actions people prefer their governments to take.

The advantage of the alternative measure of post-materialism is that it directly measures one's own opinion of something that might or might not happen (e.g. less emphasis on material items), indicating their own values more directly than the traditional scale. Furthermore, the distinction between materialistic and post-materialistic values is clearer. The disadvantage of this construct, however, is that it merely consists of two items, one materialistic and one post-materialistic, and that the answer categories range from *bad* to *ok* to *good*. Regarding the categorization of respondents into a value-pattern group (materialistic, mixed / neutral, or post-materialistic), there are two combinations possible for being either materialistic or post-materialistic, and five combinations which result in someone being

considered mixed / neutral, meaning that this latter group is by far the largest of all, which could have affected the outcomes of this study.

Future research, therefore, should try to re-test this second measure, to investigate whether it is indeed an upgrade from the traditional one. In doing so, a better scale or more equal categorization should be made possible. For instance, it might be better to include more statements and ask respondents to what extent they agree or disagree with them (using either a seven- or ten-point scale). Summing the scores would then create an ordinal scale which could predict post-materialism better than the dummy indicators used here. Another option is to create different answer categories for the items, such as *very bad*, *bad*, *good*, and *very good*. In doing so, a post-materialism scale similar to that of Inglehart can be created, which would indicate whether a respondent is (very) materialistic or (very) post-materialistic. Respondents who are now considered to be mixed / neutral would then be found either materialistic or post-materialistic. This distinction, however subtle, can lead to more pronounced findings, which could differ from the results presented here. Thus, it is very interesting and important to investigate this in future research, as it could further test the measurement and theses regarding post-materialism presented by Inglehart, that have been supported so many times by other researchers.

Another topic for future studies could be the extent to which certain factors, such as social security, affect the GDP-effect on happiness. Here, social security was added to purify the effect of a country's wealth on life satisfaction, and its addition increased the effect of GDP on happiness, however marginally. But if GDP indeed is more than just an indicator for a country's wealth, this could mean that many researchers who tested the association between GDP and happiness might have wrongfully interpreted its effect. Adding to this are the sometimes contrasting conclusions made in prior research regarding this matter (e.g. Myers & Diener, 1995; Helliwell, 2003; Stevenson & Wolfers, 2008; Kenny, 2009). Hence, it is important to investigate how other factors might affect GDP's effect on personal happiness, and, mostly, to what extent.

All in all, this study has added knowledge of why some people are happier than others, especially regarding the effects of economic factors such as household income and GDP. The main question, though, whether these effects differ when people have (post)materialistic values, could not receive a clear answer, since the different gauges for post-materialism provide different outcomes. And so, this paper has lead to question the traditional post-materialism measurement, for it has proved that other measures can lead to other results.

Thus, this study can be seen as a first step towards more research regarding the measurement of post-materialism.

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