

Grasping the effect of having too little: Poverty as predictor of Cognitive Depletion

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Summary

Why do the poor often seem unable to make rational decisions? By means of statistical tests and World Values Survey data we attempt to discover what the impact is of poverty on people's cognitive abilities. We identify three different types of poverty: Absolute, perceived and relative poverty. The results of this study show that each of these types of poverty may predict cognitive depletion. We conclude that it appears both poverty itself and the identity of poverty as grounded in society correspond to detrimental effects on people's cognitive abilities. If poverty is a cause of cognitive depletion, this would have strong implications for policies targeting the poor aiming to eradicate poverty. To identify this causal link further study is required.

Keywords: Poverty; Cognitive Depletion; Economics; Self-control; Behaviour; Scarcity; Behavioural Economics; World Values Survey.



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Introduction

Why do the poor often seem unable to make rational decisions? The poor tend to make decisions or act in ways which have negative consequences for their personal situations as these decisions or actions tend to perpetuate their impoverishment (Mani, Mullainathan, Shafir, & Zhao, 2013). Therefore, understanding why the poor are involved in poverty perpetuating decision making will hopefully help people understand how to prevent this phenomenon. This should prevent poverty perpetuation.

The municipality of Breda, a city in the south of the Netherlands, observed a similar problem. It offers a special health insurance package for citizens with low incomes to help people cover their high health care costs (M. van Heugten, personal communication, February 6, 2017). While the municipality worked hard to spread information about the insurance package, many poor people did not sign up for it and continue to struggle with (unnecessarily) high health care costs. Policy makers of the municipality of Breda are puzzled about why these low income residents do not succeed in lowering their health care costs (M. van Heugten, personal communication, February 6, 2017). By means of this research, we aim to provide the municipality with an explanation for why these low income residents of Breda appear unable to make rational decisions.

Literature suggests that people are subject to behavioural biases (Ambler et al., 2011), such as being too focused on the present whereas it would be rational to also be investing in your future. This would cause ‘present-bias’ which, for example, may make people borrow excessively (Shah, Mullainathan, & Shafir, 2012). Behavioural biases keep people from making rationally optimal decisions (Ambler et al., 2011). Additionally, literature suggests that people who experience stress (such as financial stress due to impoverishment) are more subject to behavioural biases than those who experience little to no stress: The ‘Scarcity Hypothesis’ states that having less money or time makes one focus more on aspects of life which deal with scarcity (Mullainathan & Shafir, 2013). This implies the poor focus too much on their financial troubles and too little on other (albeit important) aspects of life.

When one is poor, one may experience all kinds of stress which someone who is not poor does not. Examples of such (additional) financial worries are whether one will have enough food

to live on or whether one has enough money to send their children to school. It is therefore important to know whether stress indeed inhibits the rationality of behaviour. Recent literature argues that experiencing stress over lack of money is correlated with cognitive depletion (Mullainathan & Shafir, 2013). In turn, cognitive depletion is argued to correlate with a lack of rational behaviour. That is, if people are cognitively depleted, people fail to perform their intended actions. In order to create effective policies, an institution like the municipality of Breda would benefit from knowing whether the poor are indeed more cognitively depleted than the non-poor. Consequently, such institutions would benefit from knowing whether they should account for poor people's additional depletion in policies on poverty.

Therefore, this thesis aims to answer the question: What is the impact of financial stress as caused by poverty on people's cognitive function? There is an inherent question asking: Does the decision making behavior of the poor as caused by poverty differ from decision making behavior of the non-poor? The mechanism which is suggested to be at play is captured by the hypotheses and figure below (which will be discussed in more detail in the chapter *Review of Relevant Literature*).

1. Rational behavior allows for poverty alleviating actions;
2. Cognitive depletion has a negative effect on people's ability to make rational decisions;
3. Financial stress caused by poverty causes cognitive depletion.



Figure 1 Graphical display of the hypothesized mechanism

In this thesis I thus state that financial stress as created by poverty has a negative effect on one's ability to make rational decisions. To answer the research question, hypothesis 3 is tested in this thesis using multiple statistical tests. We aim to discover whether poverty indeed impacts cognitive function negatively which may explain the lack of rational behavior among the poor which is keeping these people impoverished. In this study, the dependent variable is people's cognitive depletion. The independent variable is poverty. To answer the research question, this study requires 1) a poverty measure which assesses subjects' financial situation; 2) a measure of

the subject's cognitive function; and, 3) a control measure for cognitive function to account for subjects' 'normal' cognitive function or stress level.

In the next chapter, relevant literature will be discussed to derive at the before mentioned hypotheses. Consequently, the variables in these hypotheses and their respective operationalization are discussed. The steps involved in the statistical method to testing the hypotheses are then elaborated on. After performing the statistical tests, the results of these tests are presented and their findings are discussed in the chapter *Results*. An elaboration on these findings, possible reversed causality between poverty and cognitive depletion, alternative explanations to the previously discussed findings, policy recommendations and implications for the case of the municipality of Breda will follow in the chapter *Discussion*. Lastly, we conclude poverty indeed shows significance correspondence to the likelihood of being cognitively depleted. It appears both poverty itself and the identity of poverty as grounded in society have detrimental effects on people's cognitive abilities.

I. Review of Relevant Literature

Following the research question, this literature review aims to discuss the relevant literature surrounding poverty and cognitive depletion. The literature review firstly looks at poverty and the differences between behavior of the poor and the non-poor as to identify poverty problems and to identify the connection between poverty and rational behavior. Secondly, it discusses cognitive depletion and its connections with rational behavior and financial stress.

i. Studying Poverty

In 1959, the famous concept 'culture of poverty' was introduced which described a bundle of values people living in poverty have which is on the one hand adaptive to their economic situation but on the other hand limits them (Senior & Lewis, 1959). This 'culture of poverty' perspective leads to the conclusion that people living in poverty need to be changed (Mullainathan & Shafir, 2009) as to account for their limiting culture. Moreover, it suggests there is a fundamental difference between the poor and the non-poor.

Indeed, Deaton (1991) finds that based on people's discount rates (regarding consumption choices over time) there is a clear distinction between people. One can divide people into two

categories: ‘one of which lives a little better than hand to mouth but never has more than enough to meet emergencies, while the other, as a group, saves and steadily accumulates assets’ (Deaton, 1991). Furthermore, several studies find the poor face different situational factors and conditions than the non-poor (Bertrand, Mullainathan, & Shafir, 2006; Ghatak, 2015; Mullainathan & Shafir, 2009). However, Wicherts and Scholten argue the divide may not be so clear-cut. The poor are not the only ones who face troublesome (financial) conditions since the non-poor do too (Wicherts & Scholten, 2013).

The distinction needs to be made that while indeed both poor and non-poor people may face certain stressful conditions and both act subject to behavioral biases, the poor experience ‘narrow margins of error’ such that behavioral biases can lead to worse outcomes than they would for the non-poor (Bertrand, Mullainathan, & Shafir, 2004). In their study, Bertrand, Mullainathan and Shafir discuss the position of the poor from a behavioral point of view. They argue that, in line with the findings of various studies, the poor appear to be more subject to biases than the non-poor. Moreover, they argue policy makers underestimate the impact or importance of ‘minor’ actions such as committing to an action (Bertrand et al., 2004). In conclusion, people currently fail to properly understand the poor.

Simultaneously, it is to be stressed that the poor face (worsened) behavioral biases due to conditions of scarcity (Shah, Shafir, & Mullainathan, 2015). Whereas the non-poor may also experience stressful conditions and behavioral biases, the financial stress they experience will – by definition- not be as severe as that of the poor, creating a distinction between the two groups. Shah, Mullainathan and Shafir discuss the impact of scarcity on one’s attention and find that when having less (when there is ‘resource scarcity’), the problems revolving this scarcity require relatively substantial amounts of attention (Shah et al., 2012). Accordingly, people are found to be ‘more engaged with problems where scarcity is salient’. In turn, this engagement ‘consumes attentional resources and leaves less for elsewhere’ (Shah et al., 2012, p. 684). So if one is poor (thus, faces a scarcity in financial resources), one is inclined to focus relatively lots of its attention on one’s financial struggles leaving little attention for everyday issues (like regular house maintenance).

So far there has been a lot of talk on ‘the poor’ and ‘the non-poor’ but how does one define poverty? What makes ‘the poor’ poor? Academics appears to require the definition of poverty to be set in stone (Spicker, 2007). One clear definition allows for poverty to not be

subject to interpretation and for research on poverty to be comparable across schools and countries. However, there is not one definition of poverty. In the words of Spicker, poverty ‘has a series of meanings, linked through a series of resemblances’ (Spicker, 2007, p. 229). Thus, there are multiple definitions of poverty. This thesis will now discuss those used in this study.

One way of looking at poverty is as it being a material concept. This implies ‘people are poor because they do not have something they need, or because they lack the resources to get the things they need’ (Spicker, 2007, p. 230). Related to this, and mostly used in academia as it makes poverty easier to measure, is looking at poverty in economics terms. This second method implies one looks at whether one’s income is low or not, meaning that one is poor or not. Examples of measurement tools used for this definition are Standard of Living and Income Inequality (as some argue people are poor when too much disadvantaged compared to others in their society) (Spicker, 2007).

A third way in which poverty may be understood is as a social issue. This means poverty may be measured through social classes, dependency (on –for example- social benefits), lack of basic security or rights, or exclusion. Lastly, whether one is poor may be a moral judgement. This implies poverty is defined by whether one’s material circumstances are seen as unacceptable in a moral sense (Spicker, 2007). People who find themselves in poverty according to these different definitions may have many things in common with one another as these definitions are quite arbitrary and hardly mutually exclusive. For example, one’s morally unacceptable circumstances may also be considered poverty according to the World Bank’s poverty line, which is an economic way of looking at poverty.

Subsequently, there is the ambiguity of what countries understand to be poverty. The World Bank poverty line, today estimated to be at \$1.90/day (World Bank Group, 2015) is a ‘deep poverty’ threshold. People who have incomes below this threshold are said to be living in ‘extreme poverty’ (World Bank Group, 2015). However, countries also have their national poverty thresholds or measures of a minimum income as it is difficult to uphold a general poverty line which works for all costs of living around the world (World Bank Group, 2015).

This thesis uses World Values Survey (WVS) (World Values Survey Association, 2016) data which in a way solves some of these issues for us: In part, the thesis looks at poverty as a material concept, looking at whether one has enough food or not. Therefore, it needs not know or make a comparison with a(n) (inter)national poverty threshold which solves that ambiguity.

While this solves the issue of how to compare income levels across countries, this approach is dependent on people to identify the same threshold of what having too little food to eat means. Survey questions allow for people to assess their personal situation, given their background or given what is a ‘normal’ standard of living for them. This is important for this study as it looks at poverty in general, not just at extreme poverty, and it aims to look at the financial stress flowing from this poverty. Therefore, one who has an income of \$500/month but lives in a relatively expensive neighbourhood may be just as poor as someone who lives on only \$50/month who lives in a relatively cheap area. A more detailed description of poverty and the questions used to measure this variable will follow in the chapter *Methodology*.

ii. Rational Behaviour for Poverty Alleviation

*“Resource scarcity creates its own mindset,
changing how people look at problems and make decisions”*

(Shah et al., 2012)

Now that it is known that poverty is a complex phenomenon, this subchapter will focus on why poverty perpetuates. Poverty has been found to negatively affect health behaviour (Aue, Roosen, & Jensen, 2016) and lead to short-sighted and risk-averse decision-making (Haushofer & Fehr, 2014) which are all identified as forms of a lack of rational behavior. This subchapter will explain why lack of such rational behavior allows for poverty perpetuation.

Rational behavior (or: when one acts fully rational) implies one makes decisions which have been well-thought through, for which the costs and benefits have been weighed, and which optimize the benefit to the individual. The optimal decision may be a decision through which an individual suffers but which benefits another individual, if the decision maker values the other’s benefit more than its own suffering. Rational behavior allows one to make decisions which are in one’s best interest. If individuals (can) act rationally, they can make decisions which are in their best interest.

In 1976, Becker introduced the fundamentals of rational choice theory. A main assumption of this theory is that people are rational beings which have stable preferences and act in such a way that maximizes their utility (Becker, 1976). Therefore, in line with rational choice theory, the poor who prefer to get out of poverty will simply make rational decisions which

maximize their utility and will help them move out of poverty. However, in reality the poor are found to behave in poverty perpetuating ways (Shah et al., 2012).

At the time, this assumption of *homo economicus* (or rational being) was already being questioned but it was not until the introduction of prospect theory (Kahneman & Tversky, 1979) that the *homo economicus* assumption was undermined. In their work, Tversky and Kahneman (1979) found that people's choices are framed, or dependent on the context in which they are posed. More specifically, they found people prefer avoiding losses over receiving equivalent gains (Kahneman & Tversky, 1979). Prospect theory helps to understand why predictions made by traditional economic theory are not always accurate.

Kahneman (2011) argues there are two systems in our psychological system: System 1 includes automatic, intuitive and relatively unconscious thinking processes whereas system 2 consists of thinking processes which are reflective, analytical and deliberative. The first system is what causes people to be subject to behavioural biases. The second system is supposed to check mental operations occurring in the first system to avoid these biases but is not always successful at doing so (for example, when a person is subject to time pressure). Therefore, people remain subject to behavioural biases. Thus, if one's system 2 cannot function optimally, one may not act rationally.

To illustrate, Acquaye (2011) found that homeowners with low incomes often do not address maintenance of their homes as their attention is drawn to more pressing expenses such that small maintenance issues turn into large (expensive) problems. If people had reflected on their behaviour and made deliberate decisions, they would have tended to the maintenance regularly. As they did not, the overall cost of maintenance has become unnecessarily large.

Additionally, Shah et al. (2012) run economic experiments to show that scarcity of resources makes people inclined to overborrow. They conclude that 'scarcity elicits greater engagement' and that, simultaneously, people who face scarcity (of –for example- resources) will neglect other problems (Shah et al., 2012). These studies imply Mullainathan and Shafir's (2013) finding that scarcity inhibits one's ability to think straight. Therefore, facing scarcity, people may not be able to display enough rational behaviour to consider both the short- and long-term consequences of their actions. This, in turn, leads to poverty perpetuation. Simultaneously, being able to act rationally therefore allows for poverty alleviating actions (*hypothesis 1*).

iii. Studies on Cognitive Depletion

Poverty may thus have negative effects on one's behavior. It is therefore relevant to understand how this mechanism works. Some argue the mechanism works through cognitive depletion (for example, Dalton, Ghosal, & Mani, 2016; Hall, Zhao, & Shafir, 2014; Mani et al., 2013; Spears, 2011). The current literature on cognitive depletion and poverty (see, for example, Dalton, Ghosal, & Mani, 2016; Hall, Zhao, & Shafir, 2014; Job, Dweck, & Walton, 2010; Mani, Mullainathan, Shafir, & Zhao, 2013; Spears, 2011) uses different definitions and methods of operationalization for the concept 'cognitive depletion'. According to UK Behavioral Insights Team, cognitive resources –working memory and executive control- allow us to reason, to focus, to learn new ideas, to make creative leaps and to resist our immediate impulses (Gandy, King, Hurle, Bustin, & Glazebrook, 2016). Cognitive depletion therefore represents the limiting of such skills.

Given the definitions of cognitive depletion used in the other literature, the working definition of cognitive depletion used for this paper will be: *A restrain on willpower – or the capacity to exert self-control – and a constrain of the pursuit of intentional behavioural goals, potentially despite automatic alternative behaviours or impulses.* Such constraints imply one has difficulty making trade-offs regarding decisions, paying attention, planning, and remembering. Therefore, when one's cognitive function lowers, one is less able to pay attention, plan or remember as to pursue one's intentional goals. Thus, cognitive depletion negatively affects people's ability to make rational decisions (*hypothesis 2*).

Some behavioral scientists are convinced poverty causes cognitive depletion. For example, while studying the behavior of people in India, Spears (2011) found 'economic decision-making diminished behavioral control when participants were poorer'. His work identifies the causal link between behavioral control and poverty to run from poverty to behavioral control (Spears, 2011), implying that poverty depletes control.

Complementary, Mani et al. (2013) find people living in poverty –as opposed to those who are well-off- experience more reduced cognitive performance. In an experiment with farmers, Mani et al. (2013) found the farmers' poverty-related concerns consumed their 'mental resources' such that their cognitive capacity was reduced during times of poverty (before harvest) whereas the farmers did not experience such reduced cognitive capacity when they were

significantly richer (after harvest). For the poor, such behaviors can further perpetuate poverty (Mani et al., 2013).

Concerns and distractions may reduce the mental, or cognitive, capacity which is available to a person at a given point in time (Mullainathan & Shafir, 2013). Therefore, Mullainathan and Shafir (2013) argue that if person A and person B were to perform the same cognitive task with person A faces concerns such as having an ill child at home, having a deadline for an essay coming up, and having numerous bills waiting to be paid and person B facing none of such concerns, person B will do a better job on the cognitive tasks than person A. Furthermore, when one is poor, this form of scarcity will reduce the person's ability to perform cognitive tasks. Therefore, financial stress –as caused by poverty- increases cognitive depletion (*hypothesis 3*).

Others, however, are less convinced that poverty causes cognitive depletion or argue there are factors which may outweigh the effects of poverty on cognitive depletion. Job et al. (2010) argue willpower –or the capacity to exert self-control- is indeed a resource which may be depleted. However, they argue such depletion depends on whether one believes willpower is limited: people's measured self-control while doing depleting tasks reflects their beliefs regarding the amount of willpower they possess rather than the actual depletion of this resource (Job et al., 2010).

These findings imply a complex mechanism which requires further study. It is clear that it is not merely being poor itself that may cause the poor to be cognitively depleted. The stigma of poverty causes for people to perceive those living in poverty differently which in turn may cause these people to experience diminished cognitive performance. According to Hall, Zhao and Shafir (2014) 'the stigma of poverty includes being perceived as incompetent and feeling shunned and disrespected'. The poverty stigma may bring about 'cognitive distancing, diminish cognitive performance, and cause the poor to forego beneficial programs. Self-affirmation (or people being motivated to sustain a sense of self-worth and integrity) can improve the cognitive performance and decisions of the poor' (Hall et al., 2014).

Consequently, poverty is not merely a financial dilemma. It involves many more societal issues. This again stresses the importance of fully understanding a poverty situation before designing policies to tackle it. Complementary, policies regarding poverty have to be consistent with individual decision-making processes in order for such policies to be effective (Pennings &

Garcia, 2005). Policy advisors should not see poverty merely as a state of lacking financial resources. Being poor also implies one may question their self-worth and integrity, foundations which cause for people's cognitive performance to diminish further and for the poverty trap to continue.

II. Methodology

The problem we focus on is the lack of rational behavior among the poor and its relationship with persisting poverty. In line with the hypotheses introduced earlier, the mechanism through which poverty lowers the level of rational behavior is through people's cognitive function. Therefore, this research aims to find out whether being poor corresponds to being more likely to be cognitively depleted than when someone is not poor.

The current thesis makes use of WVS data. The latest data wave contains data from the years 2010-2014. The survey data is collected in 183 countries (which makes up over 93% of all countries worldwide) (World Values Survey Association, 2016). The relevant survey questions can be found in Appendix A. Whereas WVS data reflects all kinds of aspects of life, ranging from views on religion to trust levels in a country, we have isolated the data which measure poverty and cognitive function. Additionally, we have isolated control variables to account for subjects' normal cognitive function or stress levels and demographic factors.

This methodology allows for a comparative study of people experiencing poverty problems by country, gender, age and education level. We make use of two distinct dependent cognitive function variables, each with its own dataset, a subset of the WVS dataset. To maximize external validity, as many countries as possible are included in the subsets. This study requires three variables to be identified in the WVS data:

1. A poverty measure which assesses subjects' financial situation;
2. A measure of the subject's cognitive function, or how much stress it experiences;
3. A control measure for cognitive function to account for subjects' 'normal' cognitive function or stress level.

All the WVS questions which enable measurement of one of these three variables will be discussed in the following sections, in chronological order as mentioned above. In addition, data

on respondents' personal characteristics are used. Figure 2 presents an overview of all the variables.

i. Absolute, Perceived and Relative Poverty

The independent variable of this study is poverty. As read in the *Review of Relevant Literature*, there are different definitions of and meanings to poverty (Spicker, 2007). Ultimately, given the nature of the data used in this study, all the measures are perceived values. However, in some questions, respondents are specifically asked for relative or absolute values of income or poverty. For example, the question on *enough food* (V188 in Appendix A) inquires how often the respondent (or his/her family) has gone without enough food to eat in the last 12 months. This identifies an absolute poverty measure. In the World Values Survey, poverty is measured by the variables *enough food* (V188), *enough health* (V190), *enough income* (V191), *financial satisfaction* (V59) and *income inequality* (V239).

The questions on *enough food* (V188), *enough health* (V190), and *enough income* (V191) measure absolute poverty. They look at whether one has enough food, health care and income. When needed and not available to a person, the person is poor, in 'absolute' terms. This represents absolute poverty since there is an unambiguous threshold for having enough to live on. Thus, the more often enough food, health care or income are not available to someone, the more poor this person is. Simultaneously, the use of apostrophes is there since this is still survey data which deals with subjective answers and has no objective measurement tool to check whether people indeed had 'enough'.

The next measure is one of perceived poverty: The question on *financial satisfaction* (V59) asks how satisfied the respondent is with the financial situation of his/her household. Even if one –in absolute terms, according to (inter)national poverty lines- lives in poverty, one's personal interpretation of his or her situation may be that he/she is not poor at all. Therefore, this person will be likely not experience financial stress, or the corresponding cognitive depletion. The reverse might also be true: A person may be very dissatisfied with his or her financial situation while the (inter)national poverty indicators state this person's financial situation does not place him or her in poverty. In such a case, using the absolute poverty measure would make one expect regular cognitive function whereas the dissatisfied person may be experiencing financial stress due to its perceived poverty and may therefore in fact be cognitively depleted.

	NAME	CODE	RANGE	TYPE
INDEPENDENT VARIABLES				
ABSOLUTE POVERTY MEASURES	“Enough food”	V188	1= Often without enough, 2= Sometimes without enough, 3= Rarely without enough, 4= Never without enough	Ordinal
	“Enough health”	V190	“	Ordinal
	“Enough income”	V191	“	Ordinal
	RELATIVE POVERTY MEASURE	“Income inequality”	V239	1= Lowest income group, up to 10= Highest income group
PERCEIVED POVERTY MEASURE	“Financial satisfaction”	V59	1= Completely dissatisfied, up to 10= Completely satisfied	Ordinal
DEPENDENT VARIABLES				
‘INTENTIONACTION GAEMPLOYMENT’	“IntentionActionGapEmployment”	MN_229A, B	1= Depleted 0= Not depleted	Binary
‘DEPLETED LIFE’	“Depleted Life”		1= Depleted 0= Not depleted	Binary
	Components of Depleted Life: “Freedom choice”, “Confidence in authorities”, “Perceived neighborhood security”, and “External worries”	V55, V109, V113, V115-V118, V170, V183-V186		Ordinal
CONTROL VARIABLES				
	“Country”	V2, country	Dummies: country*	Nominal , Binary
	“Gender”	V240	1= Male, 2=Female	Nominal
	“Age”	V242	Runs from 16-99	Ratio
	“Education”	V248	1= No formal education, up to 9= University-level education with degree	Ordinal
	“Laziness”	V160C	1= Do not see yourself as lazy, up to 5= Do see yourself as lazy	Ordinal
	“Prone to stress”	V160D	1= Do not see yourself as prone to stress, up to 5= Do see yourself as prone to stress	Ordinal

Figure 2 Overview of Variables

Finally, *income inequality* (V239) looks at income inequality in a country and asks the respondent in which income decile or group their household is. In addition to measuring income inequality, this is a measure of relative poverty. Perhaps, given a certain amount of income (in absolute terms) a person receives less financial stress in a situation where his or her income is closer to that of others than when others are much richer. Therefore it is important to include a measure of relative poverty.

The reason for making a clear distinction between the measures of absolute, perceived and relative poverty is that there may be different implications depending on the outcomes of the regressions ran with these variables. For example, if the absolute measures of poverty show a strong correlation with cognitive depletion but the other measures of poverty do not (with people being poor corresponding to people being cognitively depleted) then one can argue the depletion is indeed due to the fact that people are impoverished.

However, imagine the absolute measures of poverty do not show any significant relationship with cognitive depletion whereas the relative poverty measure does (such that being in a low income decile is correlated with being cognitively depleted) then perhaps being impoverished itself does not cause cognitive depletion: Rather, depletion may be a cause of one being more poor than others. This makes the cause of cognitive depletion a phenomenon occurring in group settings, involving the positions of others relative to one's own, as opposed to merely one's own absolute position.

Thus, to properly understand the relationship between poverty and cognitive depletion, the distinction between these different types of poverty measurements is relevant. When doing statistical tests in an attempt to answer the research question, we aim to see whether depletion is explained by the different measures of poverty.

ii. Cognitive Depletion

The second variable is the dependent variable: Cognitive Depletion. In the previous chapter, cognitive depletion was defined as a restraint on willpower (or the capacity to exert self-control) and a constrain of the pursuit of intentional behavioural goals, potentially despite automatic alternative behaviours or impulses. Such constraints imply one has difficulty making trade-offs regarding decisions, paying attention, planning, and remembering. Cognitive depletion therefore is defined as one's intentions to differ from one's actions. Cognitive Depletion is operationalized

by two variables: *IntentionActionGapEmployment* and *Depleted Life*. These two variables are binary variables for which positive scores imply cognitive depletion (see Figure 2).

a. Intention-Action Gap for Employment

The first cognitive function variable is *IntentionActionGapEmployment*: It measures whether one actively goes out looking for a job when interested in employment. As mentioned earlier, the definition of cognitive depletion is ‘*a restrain on willpower – or the capacity to exert self-control – and a constrain of the pursuit of intentional behavioural goals, potentially despite automatic alternative behaviours or impulses*’. This implies that if one is depleted one fails to act in a way and does not pursue one’s intended actions.

When applying this notion to the variable *IntentionActionGapEmployment*, a person is depleted if he or she is unemployed and does not look for employment but does want to be employed. The rationale behind this measure is that if one is not looking for a job while desiring to be employed, one is experiencing a restrain on willpower and a constrain on the pursuit of intentional behavioural goals (where the intentional goal would be to go look for employment).

To operationalize *IntentionActionGapEmployment*, one is cognitively depleted when one does not follow up on one’s intended actions. This means one on the hand indicates to be interested in and able to start working if they were to receive the opportunity. Simultaneously, one has on the other hand not actively looked for work. In such a case, subjects are cognitively depleted.

The questions making up *IntentionActionGapEmployment* were not posed to most subjects. Therefore there is only limited data available on the *IntentionActionGapEmployment* variable. Whereas having limited data available for a statistical test is undesirable as it lowers the internal validity of the test, the variable *IntentionActionGapEmployment* is expected to be a clear indicator of cognitive depletion as the way the data making up this variable is well able to capture a situation in one which fails to act on one’s intended goals, the definition of cognitive depletion (as explained above).

Regarding the relationship between *IntentionActionGapEmployment* and poverty, the absolute measures of poverty (*enough food, enough health, and enough income*) are expected to be significantly related with *IntentionActionGapEmployment*. For the variables *enough food, enough health* and *enough income*, the higher one scores on these variables, the less poverty one

experiences (or the more often one has enough food, health care or income, respectively). Hypothesis 3 predicts that poverty implies cognitive depletion, demonstrating itself as a gap between one's intentions and realized actions. In line with hypothesis 3, we thus predict that lower scores on the poverty measures predict the likelihood of this gap.

The next poverty variable is one of perceived poverty: *financial satisfaction* (V59). The lower one's score on this variable, the lower one's satisfaction with his or her financial situation. Therefore someone is expected to perceive him- or herself to be poorer for lower scores on *financial satisfaction*. In line with hypothesis 3, we predict that lower scores on *financial satisfaction* predict the likelihood of the gap between one's intended actions and their actual actions.

The final poverty variable is the relative poverty variable: *income inequality* (V239). It presents a distribution of income groups and the income group in which subjects place themselves. The scores run from 1 to 10, with 1 being the lowest income decile and 10 the richest income group. Therefore, the higher one scores on *income inequality*, the less impoverished one reports to be. Hypothesis 3 predicts lower scores on *income inequality* predict the likelihood of the gap between one's intended actions and their actual actions.

To test hypothesis 3 using *IntentionActionGapEmployment* as cognitive function variable, we use conditional fixed-effects logistic regressions. A logistic regression is appropriate for testing a binary variable such as *IntentionActionGapEmployment*. Logistic regressions assume independency of error terms, linearity of independent variables and log odds, and large sample size. The *Poverty* variables are all ordinal (see Figure 2) such that there is indeed linearity of the independent variables.

The final assumption for the logit regressions is that there should be no (or little) multicollinearity such that the independent variables should be independent from each other. This was assessed by calculating the variance inflation factors (VIFs) of each independent variable on the other independent variables of interest. After obtaining the R^2 from these regressions, VIF is equal to $1/(1-R^2)$. Concern is to be raised at VIFs of 2.50 or greater (Allison, 2012) (which corresponds to an R^2 of 0.6 or greater). In this study, there are no cases raising concern.

b. Depleted Life

The second cognitive function variable is *Depleted Life*. It contains a variety of questions: *Freedom choice* (V55), *Confidence in authorities* (V109, V113, V115-V118), *External worries* (V183-V186) and *Perceived neighborhood security* (V170). Overall, the variable *Depleted Life* aims to capture whether one is experiencing a lack control over one's own life as caused by cognitive depletion. Lack of control over one's own life may be caused by external factors, which are eliminated from the findings using the questions mentioned above. Therefore, we assume that when one experiences little control or free choice over one's own life while one experiences no insecurity from external factors, one's internal lack of control is an indicator of cognitive depletion.

To illustrate, people may feel they do not have free choice over their lives when they live in a conflict area. When there is an armed conflict in a region, the people who live in this region are restricted in their personal freedom such that they may not be able to go out because it is unsafe for them to do so. The lack of free choice or control which these people experience is caused by external factors, factors which occur in their surroundings. *Depleted Life* aims to capture a different type of people's lack of free choice: The lack of free choice which is caused by oneself rather than one's direct surroundings. This is defined as lack of control or free choice on one's actions as caused by failure to exert self-control. *Depleted Life* therefore assesses how much free choice people experience over lives (using *Freedom choice*, V55) and then eliminates the share of lack of free choice as caused by external factors (such as armed conflict). It thus captures the lack of control people experience due to causes from within, thus, as caused by cognitive depletion.

This reported restraint on the capacity to exert self-control is in line with the definition used in this thesis of cognitive depletion. However, it is important to note that *Depleted Life* measures reported depletion (in the sense that for the variable *freedom choice*, subjects are asked to what extent they experience control, instead of looking at variables which look at the actual control which people experience). This as opposed to the variable *IntentionActionGapEmployment* which indeed measures people's actual depletion as displayed by their actions.

In comparison to the previous cognitive function variable *IntentionActionGapEmployment*, the variable *Depleted Life* contains many more observations

which is desirable for the internal validity of the tests ran with this variable. The reason for this is that the questions which compose *Depleted Life* were asked in many more countries such that there are many more countries, with their corresponding subjects, in this data subset. Like *IntentionActionGapEmployment*, *Depleted Life* is a binary variable. Similarly, conditional fixed-effects logistic regressions are used to test hypothesis 3 using *Depleted Life* as dependent variable.

Regarding the relationship between *Depleted Life* and poverty, the absolute measures of poverty (*enough food*, *enough health*, and *enough income*) are expected to be significantly related with *Depleted Life*: For the variables *enough food*, *enough health* and *enough income*, the higher one scores on these variables, the less poverty one experiences (or the more often one has enough food, health care and income). Hypothesis 3 predicts that poverty implies cognitive depletion. In line with hypothesis 3, we thus predict that lower scores on the poverty measures predict the likelihood of being depleted.

The next poverty variable is one of perceived poverty: *financial satisfaction* (V59). The lower one's score on this variable, the lower one's satisfaction with his or her financial situation. Therefore one is expected to perceive him- or herself to be poorer the lower one scores on *financial satisfaction*. In line with hypothesis 3, we predict that lower scores on *financial satisfaction* predict the likelihood of being depleted.

The final poverty variable is the relative poverty variable: *Income inequality* (V239). This variable presents a distribution of income groups. The data on *income inequality* shows where subjects place themselves on the income distribution of their country (counting all wages, salaries, pensions and other incomes). The scores run from 1 to 10, with 1 being the lowest 10 percent income group and 10 the richest 10 percent income group. Therefore, the higher one scores on *income inequality*, the less impoverished one reports to be. Hypothesis 3 predicts lower scores on *income inequality* predict the likelihood of being depleted.

For the regressions used to test hypothesis 3, the same conditions hold as for the previous dependent variable *IntentionActionGapEmployment*. These were investigated for the next chapter.

iii. Control variables

This section contains different kinds of control variables. Firstly, it focuses on control variables for cognitive function. Secondly, it discusses the demographic controls. Overall main influential factors for cognitive function are suggested to be nutrition (Leigh Gibson & Green, 2002), hormonal processes (Poromaa & Gingnell, 2014), physical activity (Gomez-Pinilla & Hillman, 2013), community or social support (Yeh & Liu, 2003) and sleep (Dahl, 1996). To check for variety in subjects' cognitive function due to effects other than that of poverty, several questions are used which may potentially influence one's cognitive function.

Laziness (V160C) asks whether the respondent sees him- or herself as someone who tends to be lazy. If the respondent agrees with this statement, perhaps any inaction observed in his or her behaviour is caused by laziness as opposed to cognitive depletion. Similarly, *prone to stress* (V160D) asks whether the respondent sees him-/herself as someone who is relaxed, handles stress well. This question will display whether someone is a stressed person by nature. If the respondent disagrees with the statement (thus, does not see him-/herself as someone who is relaxed or good at handling stress) perhaps any observed cognitive depletion is caused by this inherent stress as opposed to financial stress caused by poverty conditions. Our results show *laziness* and *prone to stress* are not significantly related to the cognitive function variables. Thus, the likelihood of being cognitively depleted is not correlated with people's stated levels of laziness or proneness to stress.

Furthermore, *country* (V2), *gender* (V240), *age* (V242) and *education* (V248) were used as control variables in the model. As observed earlier, the data is collected per country such that there may be country fixed effects in the data. Dummy variables for the countries are set up and used to check for country fixed effects in the dependent variables. Given that there are indeed significant country fixed effects, the pooling by country is accounted for in the final regressions. Allowing for such grouping by country ensures any cultural differences between countries which may influence people's cognitive depletion are accounted for.

Similarly, there may be gender effects in the poverty data: In general, men participate in the labor force more often than women (United Nations, 2015a). Additionally, in many countries, men have more access to household income than women (United Nations, 2015b). However, given the way the WVS questions are asked, there will not be gender effects in the poverty data: all the poverty questions inquire about the situation of one's family or household

rather than about one's individual situation. In the field of criminology, literature does suggest there are gender effects on self-control among those who have been involved in crime (Mason & Windle, 2002). The WVS data does not merely include people who are involved in crime. However, the literature in the field of criminology indicates there may be a gender effect in the cognitive function data. Therefore, the *gender* variable (V240) is included as control variable.

III. Results

To have a first glance at the data, the irrelevant variables were dropped while all relevant variables were summarized (see Appendix B for the complete DO-file). The summary statistics indicate the dataset contains 90,350 observations. Many of the variables contain negative values. When looking at the WVS questionnaire, negative values were mostly assigned to questions to which people did not answer or where people did not know how to answer a question. Therefore, these negative values are seen as missing data in the set, an issue which needs to be solved.

All but one variables are either nominal or ordinal (see Figure 2) such that there is no need to consider the differences between the maximum and minimum values of variables even though some show extremely large maxima (for example, the values of the country variable V2 range from 12 to 887). These numbers could have simply been 10 or any other number, they are not necessarily outliers, so the high value is nothing to worry about for these types of variables. The only exception is the variable *age* which is presented as ratio variable. There are people aged 16 to 99 in the WVS dataset.

However, the issue of missing data remains present. One may address the issue of missing data in multiple ways. The first method which we addressed is that of list-wise deletion which means one drops the observations which contain missing data. The major disadvantage of list-wise deletion is that often 'list-wise deletion can exclude a large fraction of the original sample' (Allison, 2001, p. 2). Merely using list-wise deletion to remove all missing values removes 86,759 (or about 96% of the) observations. The majority of this data is lost because some questions in the WVS were only asked in some countries. These questions therefore contain lots of missing data. Using list-wise deletion means all the data for a subject who has not been asked a question is removed from the dataset, resulting in a very limited number of observations. Specifications on what data is missing follows further on.

Accordingly, a different method of dealing with missing data was used. I decided to substitute missing data in independent and control variables by mean values of the other data points of the same variables. This substitution is performed for the overall dataset (as opposed to per country) since the independent (poverty) variables were found to not be statistically significantly related to the country measure. Had this relationship been significant then the country effects should have been taken into account for the substitution method. The substitution method entails is that, for example, when asked how satisfied one was with the financial situation of their household, the average score was 6 (on a scale of 1-10) for the majority of countries (a small minority of countries had an average of 5 or 7). Thus, those who did not answer the question or who were not asked the question, were assigned a score of 6¹. This way, all 90,350 observations are maintained. When checking how many observations would remain if the missing data in the cognitive function (thus, the dependent) variables were removed, it turned out this would remove 86,268 observations (or about 95.5 % of the dataset).

It is important to note that not all the questions in the WVS dataset are used for each of the regressions set up in this study. Therefore, variables which are not used for a certain regression need not be treated for missing values either. There are two variables which represent cognitive function (*IntentionActionGapEmployment* and *Depleted Life*, both will be elaborated on later on) which both use different dependent variables/WVS questions. In total, the regressions on *IntentionActionGapEmployment* contain 7,331 observations (since the questions used for this variable were only asked in seven countries², leading to lots of missing data) while the regressions on *Depleted Life* contain 42,711 observations.

Given that the two dependent variables use different data subsets (while both from the WVS dataset), the regressions ran on them are not comparable with one another. However, there are multiple regressions for each dependent variable, namely, one for each different poverty variable which are comparable given that they use the same dataset. Furthermore, we need to

¹ As a robustness check, the analysis as described later on was repeated using the list-wise deletion method to see whether we did not oversimplify the data by using the substitution method. It turns out using list-wise deletion gives us similar results as using the substitution method. However, using list-wise deletion brings about less externally valid conclusions as it uses a significantly smaller dataset which is why we prefer using the other method.

² The questions which constitute the dependent variable *IntentionActionGapEmployment* were included in the World Values Surveys of Algeria, Bahrain, Iraq, Kuwait, Lebanon, Tunisia and Yemen. These countries are all in the Middle East and Northern Africa (MENA) region which may influence the results. A brief discussion on such influence is included in the chapter *Discussion*.

check the data to see whether it fits the assumptions and conditions of the respective regressions. At this point, there are still 90,350 observations in the data with the independent and control variables' missing values being replaced by their average ones. The independent variable *Poverty* was first set up and checked. Each category of the variables contains over 600 observations, thus, plenty to do a valid analysis. As expected, most people have enough food to eat, medical care and income. Thus, most subjects are considered to not be poor.

In the next section, we continue by looking at the dependent variables. We start by looking at *IntentionActionGapEmployment*, scanning the data selected for this variable and checking the conditions for the regressions performed for *IntentionActionGapEmployment*. Subsequently, we do the same for *Depleted Life*. The outputs of the regressions are presented in Appendix C.

i. Intention-Action Gap for Employment

The dependent variable *IntentionActionGapEmployment* measures whether one actively goes out looking for a job when interested in employment. It is made up of two questions which are only posed in some countries. Thus, its dataset contains only a limited number of observations. Both questions contain a sufficient number of observations per category.

Relatively many people were not looking for a job (in the past four weeks) which is probably caused by many people already having a job (and being satisfied with it) or people not being interested in having a job. Simultaneously, the majority of people would not be interested in an employment opportunity if they came across it. For *IntentionActionGapEmployment*, a person is defined as cognitively depleted if the person is on the one hand interested in employment but fails to go looking for employment. The results show most people (about 87%) are not cognitively depleted.

The dataset of *IntentionActionGapEmployment* only contains observations for Algeria, Bahrain, Iraq, Kuwait, Lebanon, Tunisia and Yemen. For each country, there are at least 725 observations which is sufficient. To account for country effects in the independent variables, these were regressed with dummy variables for the countries in the dataset. In the final regressions of *IntentionActionGapEmployment* the data was grouped by country.

Finally, the *Poverty* variables were regressed with one another to check how correlated they were and to see whether there is multi-collinearity in the *IntentionActionGapEmployment*

dataset. There are statistically significant relationships between the *Poverty* variables (which is to be expected given that they are all used as poverty measures). The *Poverty* variables were also regressed with the control variables, the results of which show each *Poverty* variable shares a statistically significant relationship with *education*.³ However, these relationships were found to be very small such that interaction terms between the *Poverty* variables and *education* were not included in the final regressions.

Arriving at the regressions, firstly, the three distinct relationships between the absolute measures of poverty and *IntentionActionGapEmployment* are discussed (see Tables 1-5 in Appendix C for the results of the regressions). The relationship between *Enough food* and *IntentionActionGapEmployment* indicates that the less often people go without enough food to eat (thus, the less poor people are), the more likely people are to be depleted (see Figure 3). This opposes the prediction of hypothesis 3. However, the relationship between *Enough food* and *IntentionActionGapEmployment* is not statistically significant (P=0.907) such that the reliability of the relationship is questionable.

The relationships between *Enough health* and *IntentionActionGapEmployment* and between *Enough income* and *IntentionActionGapEmployment* support the prediction by hypothesis 3 (see Figures 4 and 5). The relationships of *Enough health* and *Enough income* with *IntentionActionGapEmployment* are statistically significant at the 90% and 95% confidence interval level, respectively. They thus indicate that people who are poorer are more likely to be cognitively depleted.

³ Originally, an OLS regression was performed to check for significant relationships among the *Poverty* variables and with the control variables. However, the *Poverty* variables (which were thus used as dependent variables) are not continuous variables but rather categorical variables such that ordered logistic regressions are more appropriate for such investigation. Complementary, studying the marginal effects of these ordered logistic regressions indicates there is little variance among the probabilities of belonging to a poverty category for the different education levels. For example, being highly education or only having obtained low education changes little about one's likelihood of sometimes going without enough food to eat (measured by *Enough food*, one of the *Poverty* variables).

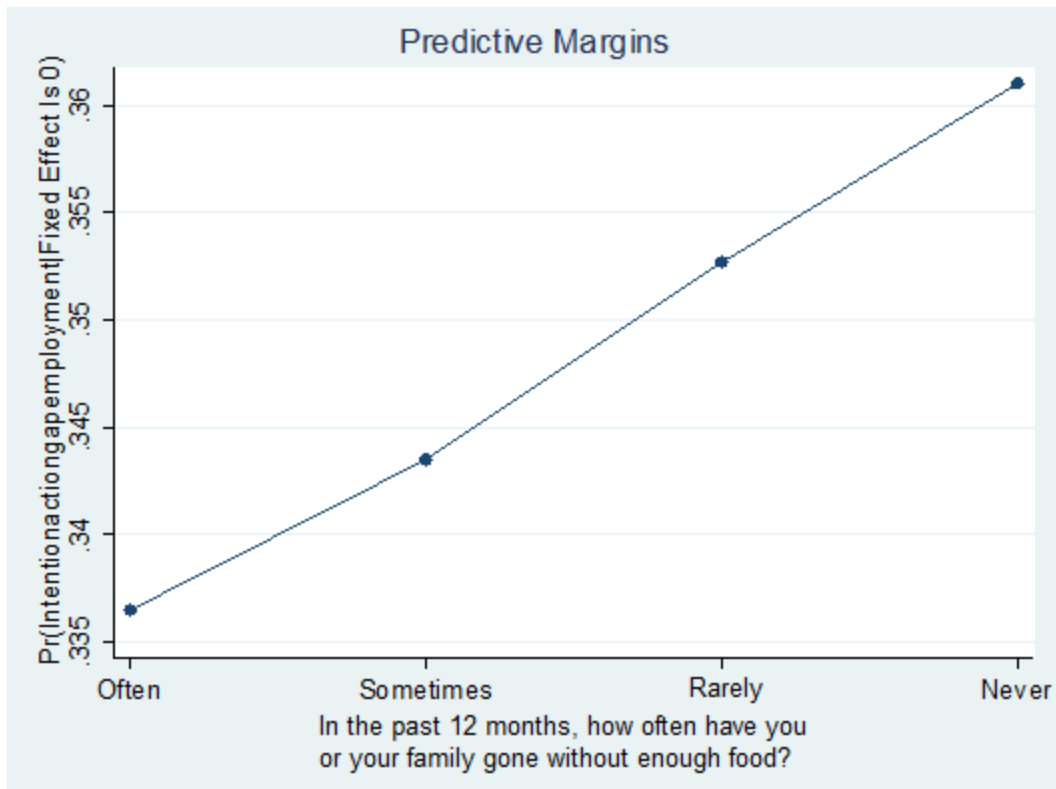


Figure 3 Probability of being cognitively depleted according to *Enough food*

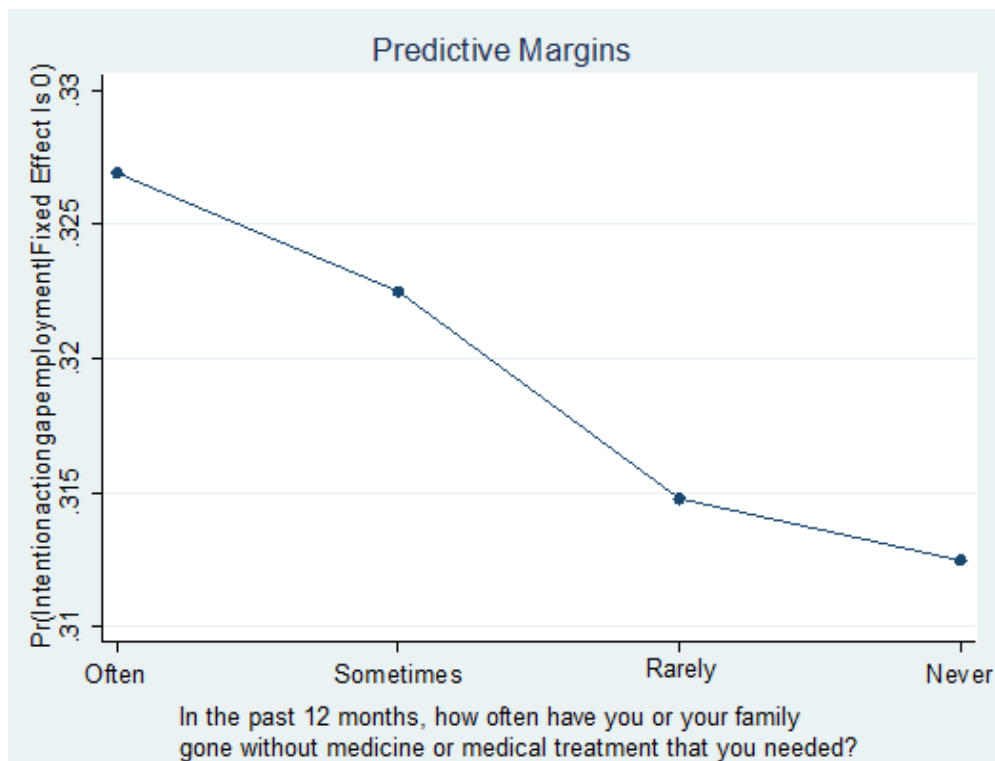


Figure 4 Probability of being cognitively depleted according to *Enough health*

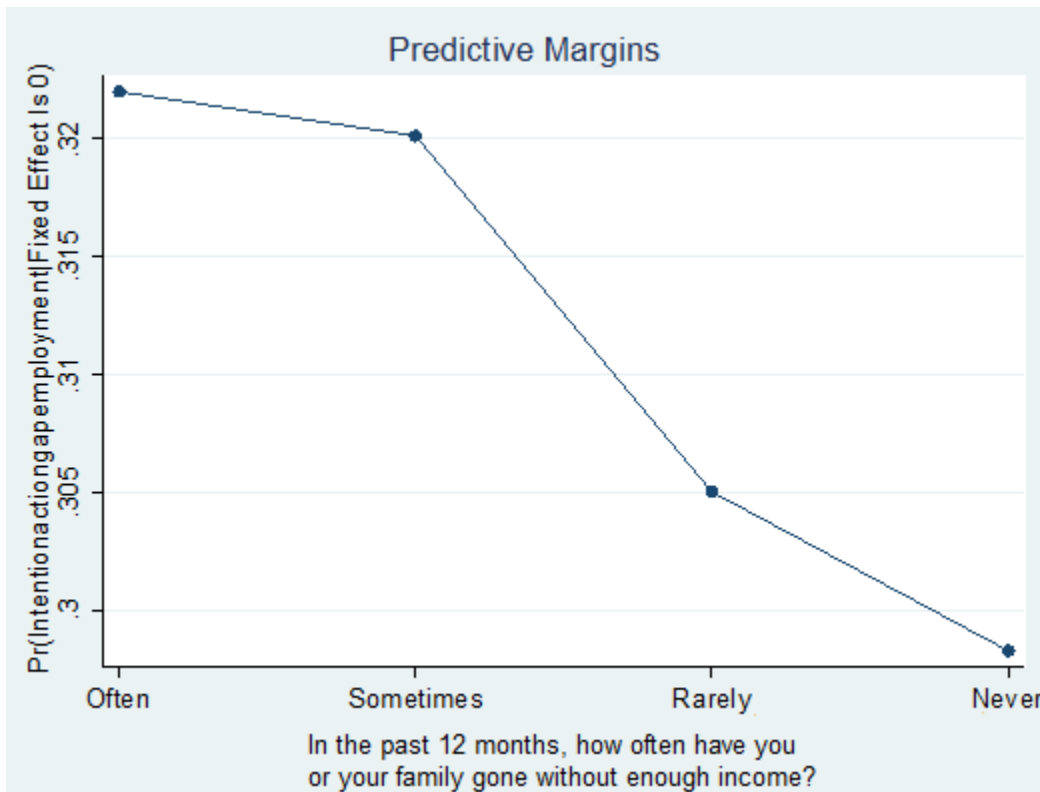


Figure 5 Probability of being cognitively depleted according to *Enough income*

Regarding the perceived poverty variable *Financial satisfaction*, a similar trend is observed. Its relationship with *IntentionActionGapEmployment* is significant at the 90% confidence interval level and supports hypothesis 3: The more satisfied one is with the financial situation of one's household, the less likely one is to be cognitively depleted (see Figure 6).

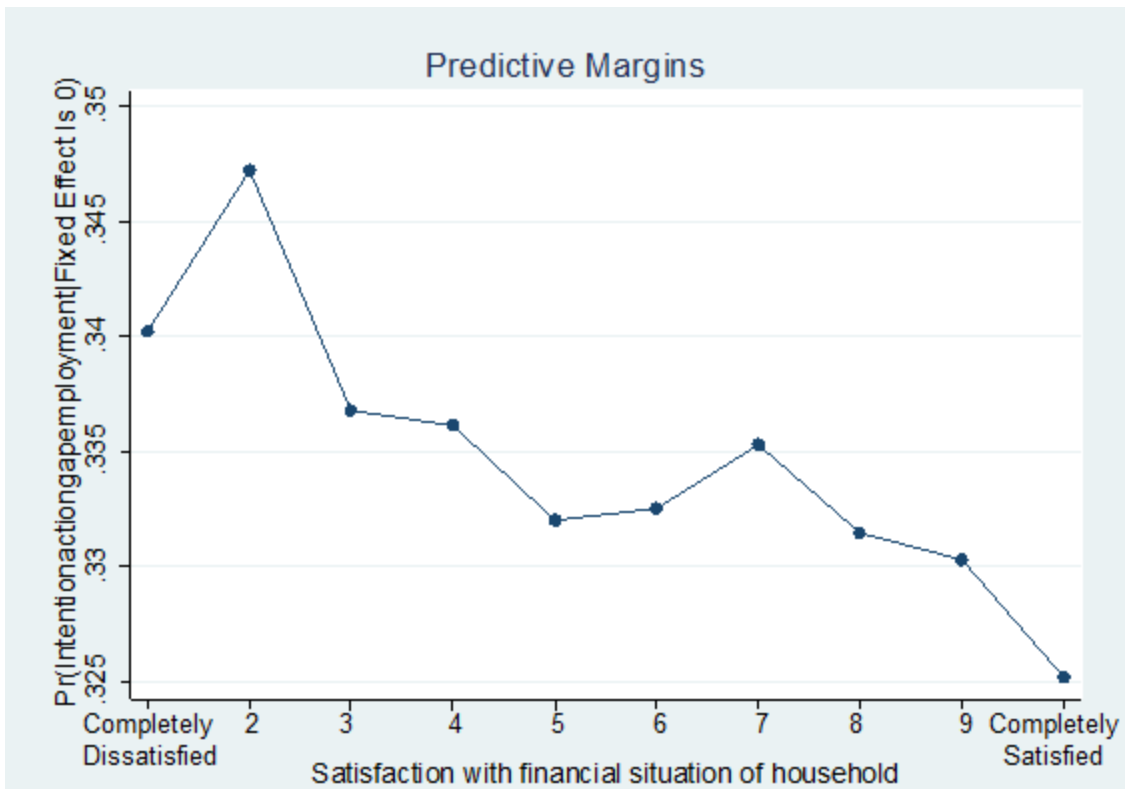


Figure 6 Probability of being cognitively depleted according to *Financial satisfaction*

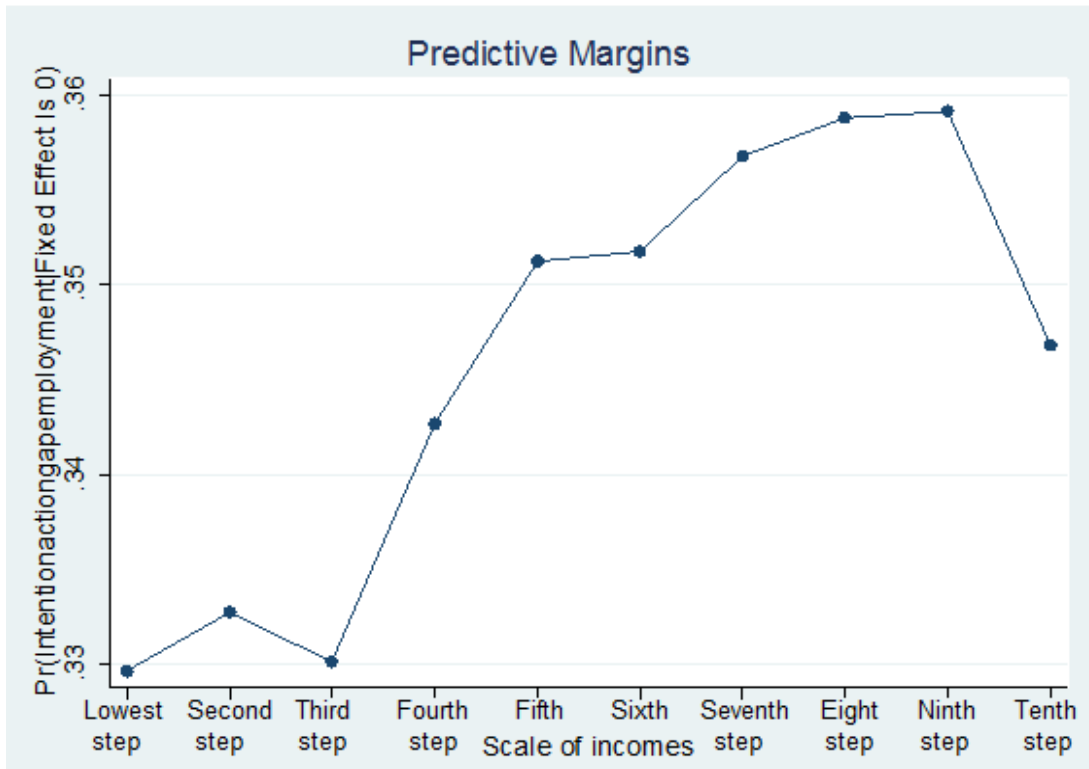


Figure 7 Probability of being cognitively depleted according to *Income inequality*

The relationship between *Income inequality* and *IntentionActionGapEmployment* indicates that overall the likelihood of depletion increases as the income group one is in increases (Figure 7). Nonetheless, this relationship is again found to not be statistically significant ($P=0.420$) such that its results are questionable.

ii. Depleted Life

We now turn to the second dependent variable: *Depleted Life*. The questions making up *Depleted Life* contain little missing data. In total, after list-wise deletion of the missing values in the dependent variables, over 70% of the original WVS data is still included in the dataset used for the regressions of *Depleted Life*. However, given that 12 of the countries in this subset contain no people with cognitive depletion, the data from these countries was removed as well. Eventually, 42,711 observations are left in the *Depleted Life* dataset. Of the remaining countries, each contained at least 600 observations which is a sufficient amount to run a test with.

Each of the questions making up *Depleted Life* (see Figure 2) for an overview of the respective questions) still contain sufficient numbers of observations to run a test with. However, the majority (over 99%) of the subjects in the dataset are not cognitively depleted. This weakens the internal validity of tests using this dataset to test relationships with the cognitive depletion variable. When cross-referencing the variable *Depleted Life*, we found that there are only two people who often go without enough food to eat and are depleted according to *Depleted Life*. Whereas this is an extreme example, it is noted that the internal validity of conclusions based on only two observations is questionable.

Albeit there appear to be no country fixed effects in the dataset (as tested using dummy variables for the countries) this may be caused by the limited number of observations of cognitively depleted subjects. To be sure, we remain using the conditional logistic regression for investigating the effects on *Depleted Life* (conditional on subjects' country).

Lastly, the *Poverty* variables were regressed with one another and with the control variables to check for multi-collinearity. The same method was used as for *IntentionActionGapEmployment*. As expected, the *Poverty* variables have significant relationships with each other. This strengthens the idea that they capture a similar phenomenon (namely, poverty). Additionally, *age* is statistically significantly related to each *Poverty* variable.

Nonetheless, the coefficient of this relationship is very small for all *Poverty* variables. Moreover, the marginal effects of the ordered logistic regressions performed with the *Poverty* variables and *age* display that the probability of belonging to a poverty category across the different ages barely differs. Additionally, the VIF of *age* is never higher than 1.05 such that *age* only explains a small share of the variance in the *Poverty* variables. Therefore, no concern is raised and no interaction terms with *age* are added to the final model.

The conditional logistic regression of the first absolute poverty measure *Enough food* with *Depleted Life* shows there is a statistically significant relationship between the two at a 90% confidence interval level (see Tables 6-10 in Appendix C for the outputs of the regressions of *Depleted Life*). The relationship between *Enough food* and *Depleted Life* supports the prediction in line with hypothesis 3: The more often one goes without enough food to eat, the more likely one is to be cognitively depleted (see Figure 8). Similarly, the results of the regression of *Enough health* with *Depleted Life* support hypothesis 3 as well. The more often one goes without required medical treatment or medicines, the more likely one is to be cognitively depleted (see Figure 9). However, this relationship is not statistically significant which makes us question the reliability of these findings.

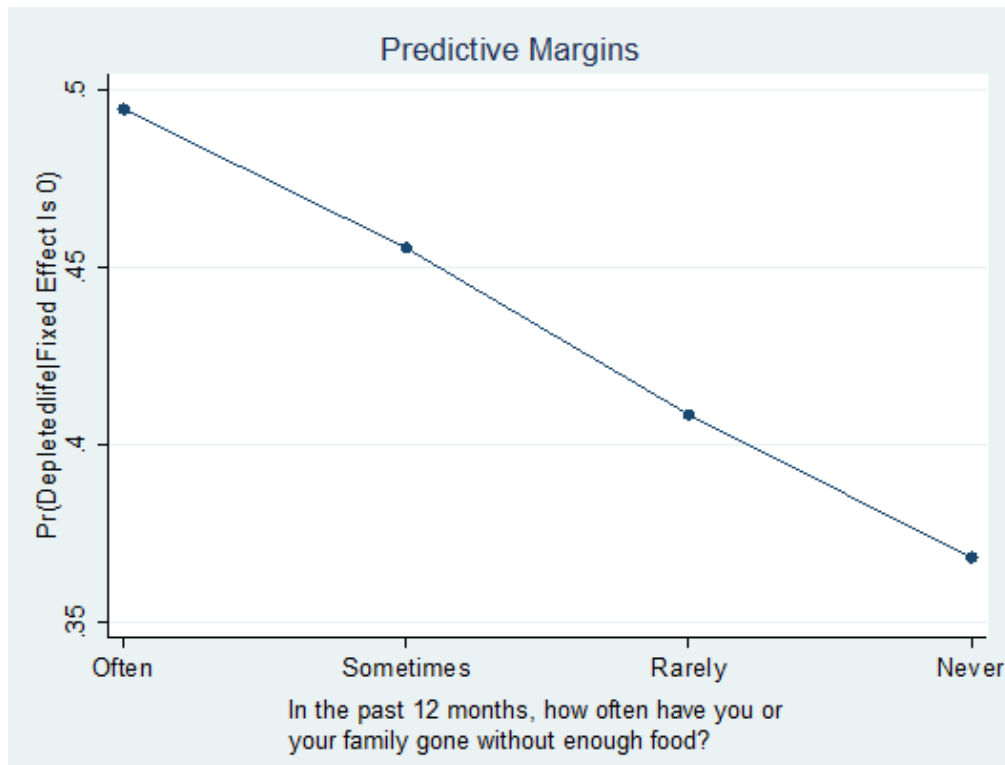


Figure 8 Probability of being cognitively depleted according to *Enough food*

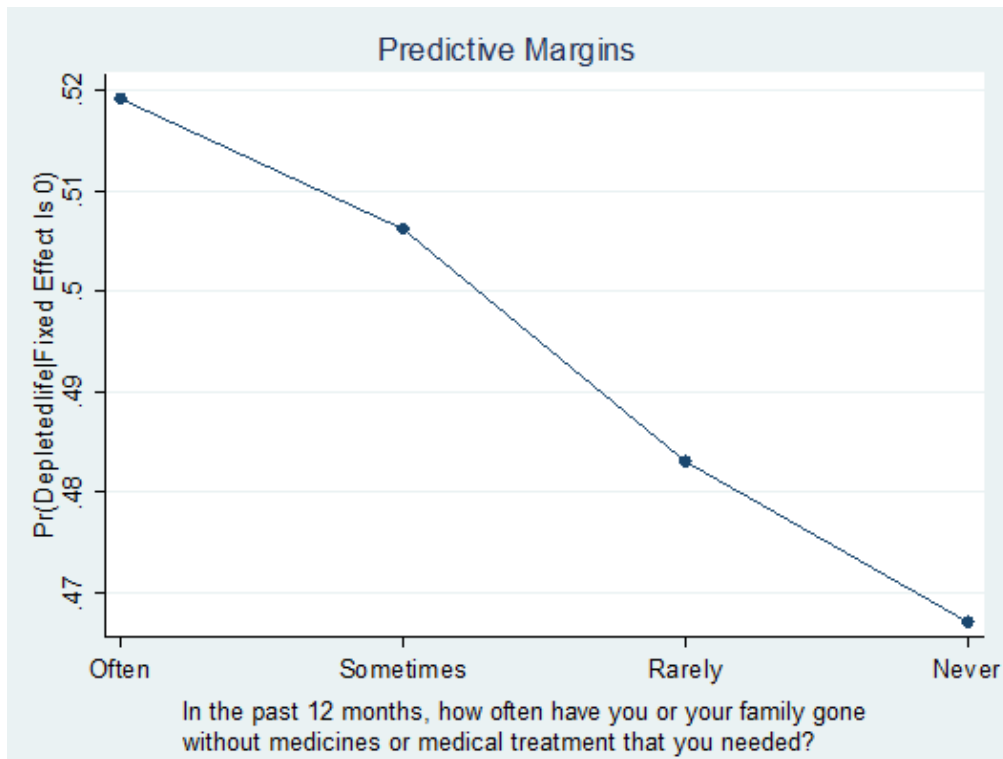


Figure 9 Probability of being cognitively depleted according to *Enough health*

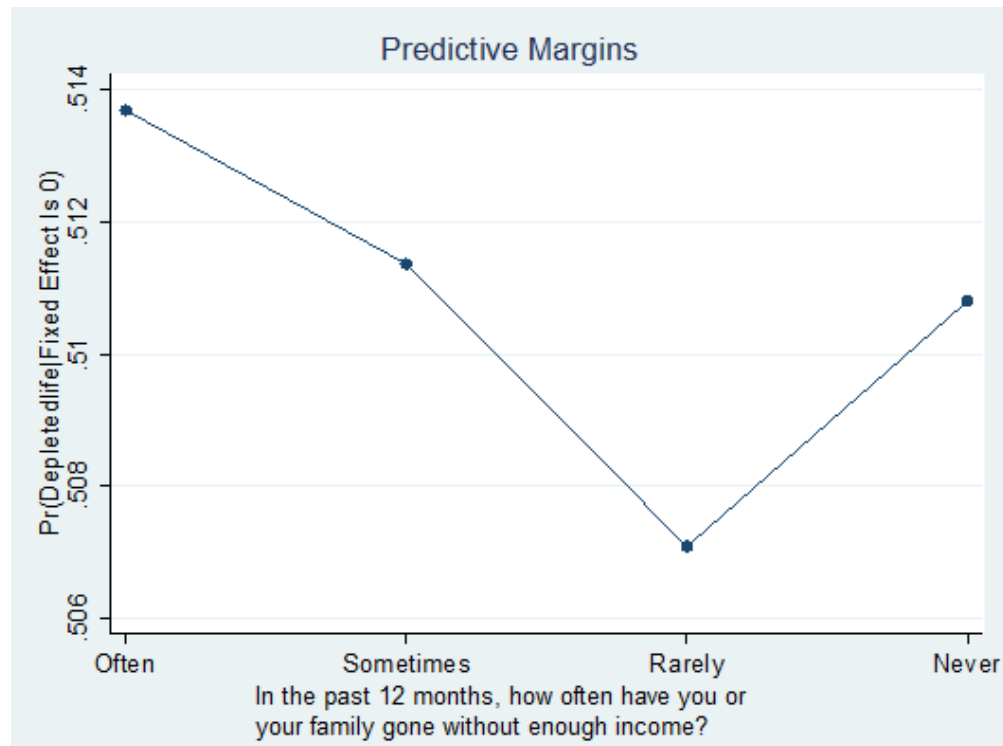


Figure 10 Probability of being cognitively depleted according to *Enough income*

The relationship between *Depleted Life* and *Enough income* is not statistically significant either. Its results indicate that those who often go without enough income are more likely to be depleted than those who never go without enough income. However, Figure 10 shows there is not a clear relationship between the *Enough income* and the likelihood of being depleted.

The results of the regression of *Financial satisfaction* and *Depleted Life* in Figure 11 shows their relationship is statistically significant. Moreover, it supports the prediction that the more satisfied one is with the financial situation of one's household, the less likely one is to be depleted. Finally, Figure 12 shows the results of the conditional logistic regression of *Depleted Life* and *Income inequality*. It is both statistically significant and in support of our prediction: The higher one's income group, the less likely one is to be cognitively depleted.

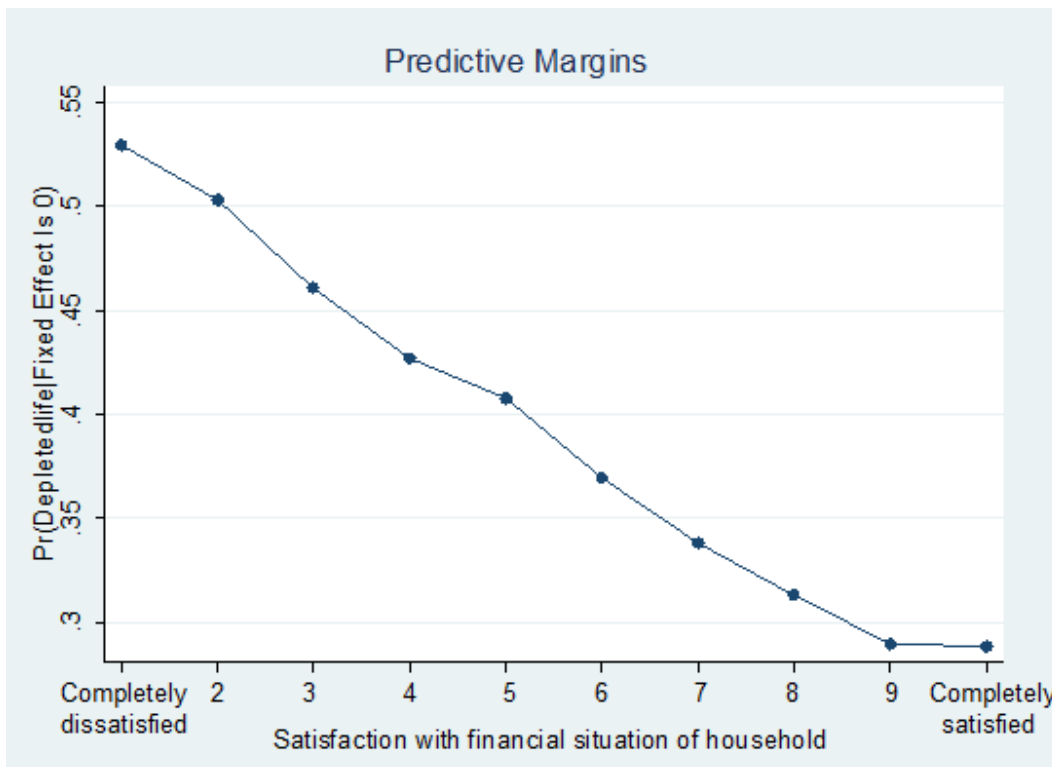


Figure 11 Probability of being cognitively depleted according to *Financial satisfaction*

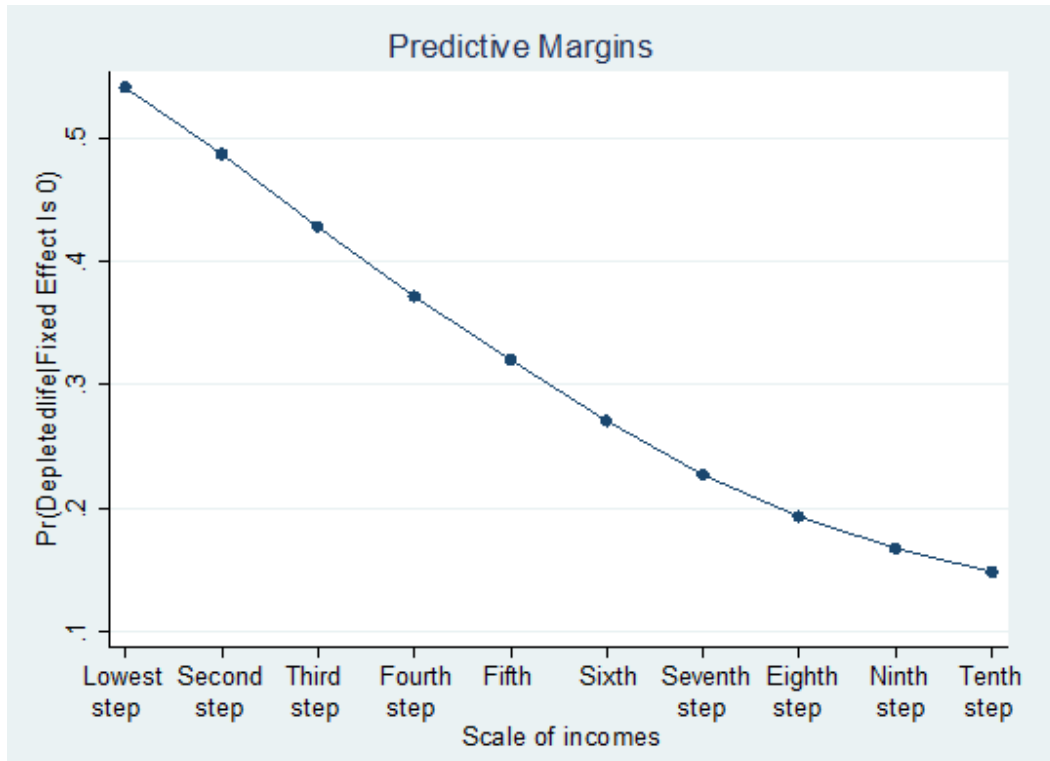


Figure 12 Probability of being cognitively depleted according to *Income inequality*

IV. Discussion

i. Main findings

As observed in the *Results* chapter, the statistically significant relationships found between *Poverty* variables and *IntentionActionGapEmployment* or *Depleted Life* are in support of hypothesis 3. More specifically, for *IntentionActionGapEmployment*, we find subjects from Algeria, Bahrain, Iraq, Kuwait, Lebanon, Tunisia and Yemen are more likely to be cognitively depleted when they are poorer in terms of *Enough health*, *Enough income*, or *Financial satisfaction*. Therefore, going without required medical treatment or medicines less often, or without enough income or being less satisfied someone is with the financial situation of one's household corresponds to being more likely to be cognitively depleted.

For having enough access to required medical treatment or medication (measured by *Enough health*), the marginal effect between never going without enough required medical treatment or medicines to often going without medical care makes the probability of cognitive depletion increase by 1.4%. For *Enough income*, the effect of going from always having enough

income to often going without enough income means one's probability of being depleted increases by 2.4%. Finally, the marginal effect of going from being completely satisfied with the financial situation of one's household to being completely dissatisfied with the financial situation of one's household is an increase in the probability of being depleted of 1.5%. Whereas these percentages appear small, the results do indicate a clear direction in the data. For *Depleted Life*, similar but stronger trends were observed.

The statistically significant relationships of *Enough food*, *Financial satisfaction* and *Income inequality* with *Depleted Life* also support the prediction by hypothesis 3. Therefore, the more poor one is as defined by *Enough food*, *Financial satisfaction* or *Income inequality*, the more likely one is to be cognitively depleted according to *Depleted Life*. For *Enough food*, the likelihood of depletion increases by 12.6% when moving from always having enough food to often going without enough food to eat. The marginal effect of going from being completely satisfied to being completely dissatisfied with the financial situation of one's household (as measured by *Financial satisfaction*) is an increase in the likelihood of being depleted by 24.1%. Finally, for *Income inequality*, the likelihood of being depleted increases by 39.3% when looking at the difference between being in the highest income decile as compared to being in the lowest income group.

Overall, there are multiple relationship between cognitive depletion and the different types of *Poverty* variables which predict that being poorer predicts cognitive depletion. Our results show the likelihood of being cognitively depleted (measured by either *IntentionActionGapEmployment* or *Depleted Life*) increases when one is more poor for all three (absolute, perceived and relative) poverty measures.

ii. Study limitations

In the chapter *Methodology*, several health factors (such as nutrition and exercise) were discussed stating they may influence one's cognitive function. Moreover, among the elderly, one's health was found to potentially influence one's cognitive function (Rosano et al., 2005). Consequently, those who experience a poor state of health may be more cognitively depleted than those who experience a good state of health. Perhaps having access to health care (measured by *enough health*) does not just capture the difference between the poor and the non-poor but captures something more complex. For example, some wealthy people may live in remote areas

where they have limited access to health care such that they score low on *enough health* but do belong to the non-poor. This would imply the findings in this study do not represent the direct relationship between poverty and cognitive depletion but may (in part) indirectly work through other health factors.

Furthermore, the period in which this data was collected (2010-2014) was simultaneously a period of political instability and uncertainty in the MENA region as it signed the beginning of the Arab Spring (Chau, Deesomsak, & Wang, 2014). Throughout all countries in the *IntentionActionGapEmployment* dataset this unrest was felt. Therefore, the Arab Spring may have influenced the relationships as found in this study. For example, in case there is lots of political instability in one's hometown, one may be preoccupied with coping with that situation while they would simultaneously be interested in employment.

Hence perhaps the findings using the *IntentionActionGapEmployment* dataset are not generalizable to other regions in the world. This highlights the unfortunate weakness of using the *IntentionActionGapEmployment* dataset: It contains a limited number of countries and limited total number of observations. Future research into the relationship between poverty and people's ability to look for employment when desiring employment is required, both in other parts of the world and perhaps in other timeframes in the MENA region.

For the variable *Depleted Life*, the direct connection with cognitive function or depletion is weaker than for *IntentionActionGapEmployment*. Moreover, *Depleted Life* assumes it captures all the possible 'external factors' which may potentially influence one's experience of free choice over one's life. Additionally, a restraint on the capacity to act or a lack of self-control (or cognitive depletion) may be influenced by health issues (as stated before). Therefore *Depleted Life* may capture both cognitive depletion and some interaction effect with health. This implies that perhaps, *Depleted Life* captures more than just cognitive depletion.

Regarding the data, given that the World Values Survey Association is a well-established institution, the WVS data is considered trustworthy and unbiased. However, using survey data makes one question whether such subjectively gathered data is internally valid to draw strong conclusions upon. To sketch an example, Donnelly and Pop-Eleches point out that the majority of Americans consider themselves middle class income earners. Indeed, they found the WVS in the US of 2006 showed that the responses of people's responses when asked about where they are on the income distribution, were strongly concentrated in the middle (Donnelly & Pop-

Eleches, 2012). However, the responded distribution was nowhere near representative of the actual income distribution in the US.

Therefore, perhaps the income distribution as collected with the WVS is not accurate either due to such fallacy. Complementary, Donnelly and Pop-Eleches compared data on objective and subjective incomes in Chile, Moldova and the US and found that subjective income was always significantly scored higher than people's objective income (Donnelly & Pop-Eleches, 2012). Perhaps the data collected by WVS and used in this thesis may be subject to such fallacy, too.

Finally, this study used existing data which was obtained for a different purpose than studying people's cognitive function. To create variables on cognitive function, and possible cognitive depletion, the survey questions were analysed to see which may refer to cognitive function and cognitive depletion. The same goes for the poverty variables. The downside of having to 'create variables' is that they may not fully capture their intended use. The upside of using WVS data is that it contains many more observations than the author could capture which strengthens the internal validity of the study. One simply cannot have their cake and eat it, too.

iii. Alternative explanations

This study uses WVS data to assess the relationship between poverty and people's cognitive function. Most literature using WVS data revolving around income focuses on the relationship between income and happiness or income and life satisfaction (Brockmann, Delhey, Welzel, & Yuan, 2009; Bruni & Stanca, 2006; Helliwell & Putnam, 2012; Layard, Nickell, & Mayraz, 2008). They find significant results for these relationships. However, they are not as straightforward as they appear to be:

Using WVS data, Easterlin, et al. (2010) find that (in both developed and developing countries) there is a positive relationship between happiness and income in the short-term such that happiness tends to increase with economic expansion and decrease with economic contraction. However, Brockmann et al. (2009) found that over a period of 10 years, WVS data shows happiness decreased in China while the country experienced strong improvements in "material living standards", which contradicts the short-term finding by Easterlin et al. (2010).

In China, the drop in happiness was found to be due to high levels of income inequality (since much of the accumulated wealth went to those at the higher end of the income

distribution) rather than due to some change in people's own income (Brockmann et al., 2009). Indeed, Easterlin and Angelescu find no relationship between happiness and economic growth (in GDP per capita) in the long-run (Easterlin & Angelescu, 2009). While using WVS data on life satisfaction as measure for utility, Layard, Mayraz and Nickell find that 'the marginal utility of income declines with income' (Layard et al., 2008). Therefore, there does appear to be a distinct (marginally declining) positive relationship between life satisfaction and income.

Accordingly, absolute poverty may influence happiness in the short-term (such that an increase income corresponds to an increase in happiness) while, in the long run, happiness may be negatively affected by an increase in relative poverty where others' income grows but one's own does not (such that income inequality increases). However, life satisfaction is argued to have a positive (albeit declining) relationship with income such that poverty alleviation would correspond to an increase in life satisfaction.

Combined with the finding that cognitive function may be influenced by one's well-being (Bratman, Hamilton, & Daily, 2012), perhaps the significant relationships between poverty and cognitive function found in this study in fact run through happiness or life satisfaction as opposed to directly from poverty to cognitive function. This would imply that policy recommendations based on the results in this study may not suffice to focus merely on poverty alleviation to stimulate people's cognitive function. Rather, if the relationship between poverty and cognitive function is indeed an indirect one, perhaps the focus should lie on well-being, happiness or life satisfaction.

Furthermore, the results found in this study imply correlations but no causality. The theory used in this study implies that there is a causal effect flowing from poverty to cognitive function (such that impoverishment causes mental depletion). This may indeed be the case. However, the two variable may also be subject to a reversed causal effect: Cognitive function may be a cause of one's financial situation.

As mentioned in *Review of Relevant Literature*, Spears (2011) has made attempts to investigate the causality of this relationship. He argues the explanation which best fits his results states that poverty makes 'economic decision-making more consuming of cognitive control for poorer people than for richer people' such that poverty indeed causes cognitive depletion. This conclusion is based on the results of only one study. Perhaps, Spears' work in India cannot be generalized over the rest of world.

To check for causality, researchers require time series data and lagged variables such that one can investigate whether poverty in time period t corresponds to cognitive depletion in period $t+1$ (representing a later point in time). Future research may thus use the different WVS waves (together making up six waves with data from 1981-2014), comparing the poverty data from one wave with the cognitive function data from the succeeding data wave. However, such research would still be subject to the internal validity questions which arise for this study (thus, whether the questions in the survey indeed accurately represent *poverty* and *cognitive function*). Additionally, the first WVS data waves only contained a limited number of countries such that the number of observations may diminish (whereas you need sufficient numbers of observations to draw valid conclusions from one's results).

iv. Policy recommendations

How to design poverty alleviation policies? Some suggest the poor may benefit from more social control and more access to higher quality services (Joseph, Chaskin, & Webber, 2007). However, the evidence on such matters is unclear. Additionally, it is important to keep in mind that even though authorities may offer services of good quality, information provided on such services does not equal understanding or processing information on such services (Mullainathan & Shafir, 2009). Especially regarding the poor, if people do not understand information on how to obtain aid programs or other access to financial funds, such policies targeting poverty remain ineffective. It is therefore important to understand the actual –not intended or hypothesized– behavior of the poor in order to effectively tackle poverty and its perpetuating process.

The findings in this thesis state that absolute and perceived as well as relative poverty are predictors of cognitive depletion. We therefore argue policy workers (who aim to stimulate the poor to act more rationally in order to end their poverty cycles and alleviate themselves from poverty) should aim to better understand people's level of absolute poverty, how people perceive their personal financial situations and the relative income levels in society, or in people's personal surroundings. From this study, it is not clear which measure of poverty corresponds to the most detrimental effects on people's cognitive depletion. Our results show that perhaps *Financial satisfaction* and *Income inequality* (the perceived and relative poverty measures) have the capacity to be most detrimental for people's cognitive ability. However, future research into which poverty eradication methods is required to draw stronger conclusions from our findings.

For now, let us make a suggestion for alleviating people from perceived and relative poverty. Absolute poverty, such as having too little food, is frequently studied and used as general poverty measure (World Bank Group, 2017) such that ways to alleviate people from such poverty have frequently been studied. Examples of methods to alleviate people from poverty as measured by absolute poverty measures are welfare subsidy arrangements or foodbanks. Alleviating people from poverty as defined by the perceived or relative poverty measure is a different story.

As mentioned earlier, we argue policy makers should aim to improve their understanding of how people perceive their personal financial situations and the relative income levels in society, or in people's personal surroundings. Such understanding should then be used to lower people's relative poverty to have people pass a critical level at which they no longer perceive themselves as being too poor. Living with a financial situation which is below this critical level then implies one is too poor. It should in turn define the cognitive depletion threshold. Having people reach or rise above this critical threshold should thus alleviate them from being too poor and provide them with sufficient cognitive function to act rationally enough to not trap themselves in poverty.

What does it mean to discover this critical threshold? One's financial satisfaction may either increase through receiving additional funds (such that one's absolute financial situation increases which would hopefully lead to one's satisfaction of the new situation being higher than that of the old situation). Alternatively, one's perspective on one's financial situation may change in the direction where one is more satisfied with the same situation. Both methods are subject to risk. The first is both costly and may not be effective since simply providing people with funds such as subsidies does not necessarily make people feel less poor. Perhaps they become framed to think they are in need of aid such that they may feel weaker and even more poor than before.

The second method involves lowering the income inequality in a society. In part, for those in the lower end of the income distribution, this may be beneficial for their cognitive function. However, it is likely that others would put up resistance such that policy makers would not be able to execute this measure. Therefore our main question becomes: How to avoid cognitive depletion and stimulate people to make rational decisions without dumping subsidies on them or letting others suffer? To answer this question, we return to the municipality of Breda.

v. The case of Breda

The municipality of Breda wants to understand why its low income residents do not make the rational decision of signing up for the municipality's special health care insurance. If attempting to lower people's chances of being cognitively depleted, the municipality of Breda rightly offers them the collective health care insurance. Firstly, it should provide people with access to proper health care and medical advice and, secondly, it should lower people's health care costs, thus, lower people's possible financial stress about high health care costs. Given the finding (for *IntentionActionGapEmployment* in MENA countries) that having access to required medicine and medical treatment corresponds to a lower probability of being depleted, the municipality should strongly argue for people to ensure they receive such care.

Given our findings, it appears cognitive depletion is not caused by one's 'isolated' poverty situation. It rather depends on poor people's situation in society: how poor people frame themselves in society. As Spicker's work described in the *Review of Relevant Literature*, one way to understand poverty is as a 'social issue'. Perhaps one form of poverty which is detrimental to one's cognitive function is exclusion, or feeling different, from society.

To alleviate people from the feeling of being different due to their financial situation, the municipality of Breda offers a so-called 'Bredapas' to low income residents of the city. It is a card with which residents can get discounts on all kinds of products and services in Breda (M. van Heugten, personal communication, February 6, 2017). The first remark on such a card is that it allows for low income residents to enjoy similar services as those who have higher income such that the poor no longer need to feel excluded from society.

Currently, people with low incomes must themselves apply for a 'Bredapas' (M. van Heugten, personal communication, February 6, 2017). Therefore, a second remark on the 'Bredapas' is that having such a card is, by definition, a sign of poverty (even if it only to yourself). This may negatively impact people's identity and their perceived poverty.

Thus, our advice to the municipality of Breda is to offer a Bredapas to all citizens of the city such that each Breda citizen is entitled to it. If everyone has a card, it no longer carries the identity of poverty. The distinction, however, is that not everyone receives the same discounts. The discounts registered on one's card depend on one's personal situation. Given that the cards are issued by the municipality, an institution which should be informed of whether one is a student in middle school or in higher education, whether one receives welfare subsidies or

whether one is aged 65+ (which often are target groups for special discounts), the municipality should be able to provide all its citizens with a personalized card.

This method, firstly, allows for all citizens to take part in society (since the discounts on products and services make these more affordable). Secondly, it does not force a poverty identifying object onto people (since a 'Bredapas' for all Breda citizens merely identifies you as a resident of Breda). Finally, it indirectly lowers income inequality in society by means of discount rates (which are higher and apply to more products and services for those with less financial means). Consequently, such a method will benefit poor people's scores on relative (albeit indirectly) and perceived poverty scores. Therefore, people's cognitive depletion will be weakened and poor citizens are stimulated to make more rational decisions.

Conclusion

Given the recent surge in literature on poverty in the field of behavioural economics, we wondered whether poverty impacts behavioural biases as caused by mental depletion. Using data from the 2010-2014 World Values Survey, we looked at various types of poverty and different means to measuring cognitive depletion. We discovered that indeed there is a clear relationship between (different types of) poverty and cognitive depletion. Namely, an increase in poverty corresponds to an increase in the likelihood of being cognitively depleted.

The results for the two cognitive depletion measures (with the first revolving around employment and one's ability to act on intended goals and the second revolving around one's experience of control over one's life) slightly differ. For the employment variable, not having enough access to required medical treatment or medicines or not having enough income were found to correspond to an increase in the likelihood of being depleted. Furthermore, the satisfaction people experience over the financial situation of their household also appears to matter: The less satisfied one is with the financial situation of one's household, the more likely one is to be cognitively depleted.

This last factor, financial satisfaction, is also important for the other cognitive depletion variable (which measures people's experience of control over their lives). It again shows that low financial satisfaction predicts cognitive depletion. Additionally, it is important whether people have enough food. The likelihood of cognitive depletion increases with the frequency at which

people do not have sufficient food available to them. Finally, the income decile which people are in (thus, their income level relative to that of others in their country) is an important predictor of people's cognitive ability. The lower one's income decile, the higher the likelihood of being cognitively depleted.

Overall, we conclude that the findings are in line with our hypothesis that poverty predicts cognitive depletion. Given these findings, there are multiple ways to tackle the issue of cognitive depletion among the poor. One may either focus on alleviating people from poverty in the absolute poverty sense, or focus on poverty eradication in terms of perceived or relative poverty. Moreover, given that all poverty variables are correlated with one another, it is likely that an approach to diminish poverty in the absolute sense will impact the other types of poverty.

By means of an example I attempted to suggest a possible solution to improve the cognitive function (thereby the ability to act rationally) of the poor. Through creating a system which anonymously allows all people (regardless of their financial status) to take part in society, those who possess less financial means may perceive themselves as less economically deprived and be more satisfied with their current financial situation. Indirectly, such a system will lower income inequality as expenses become more affordable to those with lower funds. Consequently, these individuals will be less likely to be cognitively depleted as it allows one to identify themselves as just that:

A person.

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Appendices

Appendix A: World Values Survey, Wave 6 (2010-2014), Selected questions

V2.	Country	158	Taiwan	376	Israel	554	New Zealand	768	Togo
	code (write in 3-	170	Colombia	380	Italy	558	Nicaragua	780	Trinidad
	digit code from list	180	Dem. Rep. of Congo	384	Côte d'Ivoire	562	Niger	784	United Arab Emirates
	below): _____	184	Cook Islands	388	Jamaica	566	Nigeria	788	Tunisia
		188	Costa Rica	392	Japan	578	Norway	792	Turkey
		191	Croatia	398	Kazakhstan	586	Pakistan	795	Turkmenistan
8	Albania	192	Cuba	400	Jordan	591	Panama	800	Uganda
12	Algeria	196	Cyprus	404	Kenya	598	Papua New Guinea	804	Ukraine
16	American Samoa	203	Czech Republic	408	North Korea	600	Paraguay	807	Macedonia
20	Andorra	208	Denmark	410	South Korea	604	Peru	818	Egypt
24	Angola	214	Dominican Republic	414	Kuwait	608	Philippines	826	Great Britain
28	Antigua and Barbuda	218	Ecuador	417	Kyrgyzstan	616	Poland	834	Tanzania
31	Azerbaijan	222	El Salvador	418	Laos	620	Portugal	840	United States
32	Argentina	226	Equatorial Guinea	422	Lebanon	624	Guinea-Bissau	850	U.S. Virgin Islands
36	Australia	231	Ethiopia	426	Lesotho	626	Timor-Leste	854	Burkina Faso
40	Austria	232	Eritrea	428	Latvia	630	Puerto Rico	858	Uruguay
50	Bangladesh	233	Estonia	430	Liberia	634	Qatar	860	Uzbekistan
51	Armenia	246	Finland	434	Libya	642	Romania	862	Venezuela
52	Barbados	250	France	438	Liechtenstein	643	Russia	887	Yemen
56	Belgium	268	Georgia	440	Lithuania	646	Rwanda	891	Serbia and Montenegro
60	Bermuda	270	Gambia	442	Luxembourg	682	Saudi Arabia	894	Zambia
64	Bhutan	275	Palestine	450	Madagascar	686	Senegal	900	West Germany
68	Bolivia	276	Germany	454	Malawi	690	Seychelles	901	East Germany
70	Bosnia	288	Ghana	458	Malaysia	694	Sierra Leone	902	Tambov
72	Botswana	292	Gibraltar	466	Mali	702	Singapore	903	Moscow
76	Brazil	300	Greece	470	Malta	703	Slovakia	904	Basque Country
84	Belize	320	Guatemala	474	Martinique	704	Viet Nam	906	Andalusia
100	Bulgaria	324	Guinea	478	Mauritania	705	Slovenia	907	Galicia
854	Burkina Faso	328	Guyana	480	Mauritius	706	Somalia	909	North Ireland
104	Myanmar	332	Haiti	484	Mexico	710	South Africa	910	Valencia
108	Burundi	340	Honduras	492	Monaco	716	Zimbabwe	911	Serbia
112	Belarus	344	Hong Kong	496	Mongolia	724	Spain	912	Montenegro
116	Cambodia	348	Hungary	498	Moldova	736	Sudan	913	SrpSka Republic
120	Cameroon	352	Iceland	504	Morocco	740	Suriname		
124	Canada	356	India	508	Mozambique	752	Sweden		
144	Sri Lanka	360	Indonesia	512	Oman	756	Switzerland		
148	Chad	364	Iran	516	Namibia	760	Syria		
152	Chile	368	Iraq	524	Nepal	762	Tajikistan		
156	China	372	Ireland	528	Netherlands	764	Thailand		

V55. Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out (*code one number*):

No choice at all A great deal of choice
 1 2 3 4 5 6 7 8 9 10

V59. How satisfied are you with the financial situation of your household? Please use this card again to help with your answer (*code one number*):

Completely dissatisfied Completely satisfied
 1 2 3 4 5 6 7 8 9 10

I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all? (*Read out and code one answer for each*):

		A great deal	Quite a lot	Not very much	None at all
V109.	The armed forces	1	2	3	4
V113.	The police	1	2	3	4
V115.	The government (in your nation's capital)	1	2	3	4
V116.	Political parties	1	2	3	4
V117.	Parliament	1	2	3	4
V118.	The Civil service	1	2	3	4

I see myself as someone who...	Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree Strongly	Don't know
V160C ...tends to be lazy	1	2	3	4	5	9
V160D ...is relaxed, handles stress well	1	2	3	4	5	9

V170. Could you tell me how secure do you feel these days in your neighborhood ?

Very secure	1
Quite secure	2
Not very secure	3
Not at all secure	4
DK/NA	-1

To what degree are you worried about the following situations?

	Very much	A good deal	Not much	Not at all	DK/NA
V183. A war involving my country	1	2	3	4	-1
V184. A terrorist attack	1	2	3	4	-1
V185. A civil war	1	2	3	4	-1
V186. Government wire-tapping or reading my mail or email	1	2	3	4	-1

In the last 12 month, how often have you or your family

	Often	Sometimes	Rarely	Never	DK/NA
V188. Gone without enough food to eat	1	2	3	4	-1
V190. Gone without medicine or medical treatment that you needed	1	2	3	4	-1
V191. Gone without a cash income	1	2	3	4	-1

V229A Have you actively looked for work in the past four weeks:

1 Yes 2 No

V229B If you received an employment opportunity in the last four weeks or during the next month, would you be interested and able to start working?

1 Yes 2 No

(Show Card AE)

V239. On this card is an income scale on which 1 indicates the lowest income group and 10 the highest income group in your country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in. (Code one number):

Lowest group Highest group
 1 2 3 4 5 6 7 8 9 10

DEMOGRAPHICS

V240. (Code respondent's sex by observation):

- 1 Male
- 2 Female

V242. This means you are ____ years old (write in age in two digits).

V248. What is the highest educational level that you have attained? [NOTE: if respondent indicates to be a student, code highest level s/he expects to complete]:

- 1 No formal education
- 2 Incomplete primary school
- 3 Complete primary school
- 4 Incomplete secondary school: technical/vocational type
- 5 Complete secondary school: technical/vocational type
- 6 Incomplete secondary: university-preparatory type
- 7 Complete secondary: university-preparatory type
- 8 Some university-level education, without degree
- 9 University-level education, with degree

Appendix B: DO-File

```
//DO FILE Master Thesis Leanne Heuberger//
use "U:\thesis 2.0\F00005810-WV6_Data_stata_v_2016_01_01\WV6_Stata_v_2016_01_01.dta", clear
drop V1 V2A V3-V11 V12-V54 V56-V58 V60-V80 V84-V89 V90-V108 V110-V112 V114 V119-V160
V160E-V160J V161-V160B V171-V182 V187 V189 V192-V234 V235-V238 V241 V243-V247 V248_CS-
V262 S024-MN_228S8 MN_230A-MN_233B MN_234A MN_237A MN_237B1-MN_237C5 MN_237C6-
MN_249A3 sacsecval secvalwgt resemaval weightb I_AUTHORITY I_NATIONALISM I_DEVOUT defiance
WEIGHT1A I_RELIGIMP I_RELIGBEL I_RELIGPRAC disbelief WEIGHT2A I_NORM1 I_NORM2
I_NORM3 relativism WEIGHT3A I_INDEP I_IMAGIN I_NONOBED autonomy WEIGHT1B I_WOMJOB
I_WOMPOL I_WOMEDU equality WEIGHT2B I_HOMOLIB I_ABORTLIB I_DIVORLIB choice
WEIGHT3B I_VOICE1 I_VOICE2 I_VOI2_00 voice I_TRUSTARMY I_TRUSTPOLICE I_TRUSTCOURTS
scepticism WEIGHT4A WEIGHT4B
describe
//Data is now set up//
// To scan the data, it is first summarized //
sum V2 V55 V59 V109 V113 V115 V116 V117 V118 V160C V160D V170 V183 V184 V185 V186 V188
V190 V191 V229 V239 V240 V242 V248 MN_229A MN_229B

// CHECKING THE DATA //
// Some people have not answered some questions. Missing data may either be missing at random or not at
random. For example, 160C and 160D often not answered (in many different countries), therefore it appears to
be missing at random. There are multiple ways to deal with missing values. This study will both drop subjects
with missing relevant data and replace missing values by the mean value of that of others for the same question.
Regressions will be performed using both methods, to test for robustness of the analyses to see which method fits
best //

// Scenario 1: LISTWISE DELETION //
drop if V55<0
drop if V59<0
drop if V109<0
drop if V113<0
drop if V115<0
drop if V116<0
drop if V117<0
drop if V118<0
drop if V160C<0
drop if V160D<0
drop if V170<0
drop if V183<0
drop if V184<0
```

```

drop if V185<0
drop if V186<0
drop if V188<0
drop if V190<0
drop if V191<0
drop if V240<0
drop if V242<0
drop if V248<0
drop if MN_229A<0
drop if MN_229B<0
drop if V239<0
describe

```

```

// The number of observations dropped is 90,350-3,591 = 86,759. So about 96% of the data would be deleted
when using listwise deletion. //

```

```

//Scenario 2: Instead of full listwise deletion, replace missing data with mean values for INDEPENDENT and
CONTROL VARIABLES. Listwise deletion for dependent variables//

```

```

mean V59 if V59>=0
replace V59= 6 if V59<0
mean V160C if V160C >=0
replace V160C = 2 if V160C<0
mean V160D if V160D>=0
replace V160D= 3 if V160D<0
mean V188 if V188>=0
replace V188= 3 if V188<0
mean V190 if V190>=0
replace V190= 3 if V190<0
mean V191 if V191>=0
replace V191= 3 if V191<0
mean V239 if V239>=0
replace V239= 5 if V239<0

```

```

drop if V55<0
drop if V109<0
drop if V113<0
drop if V115<0
drop if V116<0
drop if V117<0
drop if V118<0
drop if V170<0

```

drop if V240<0
drop if V242<0
drop if V248<0
drop if MN_229A<0
drop if MN_229B<0
describe

// The remaining number of observations is 4,082. Thus even though this appears better than scenario 1, it is still only 4,5% of the original dataset. Firstly, the independent variables are set up and checked, as this is the same for each regression and dependent variable. //

// Turn to the independent variable: POVERTY. Poverty is measured with the following variables: V59, V188, V190, V191, and V239. To have a general check of the poverty variables, create a table for each one //
tab1 V59 V188 V190 V191 V239

// V59 asks how satisfied people are with the financial situation of their household, measured on a scale from 1 to 10 with 1 being the least satisfied and 10 being completely satisfied. Thus, the higher the score, the less impoverished a subject is assumed to be. //

// V188 looks at how often people have gone without enough food to eat, with score 1 for often, 2 for sometimes, 3 for rarely and 4 for never. Thus, the lower the score, the less impoverished the respective subject is assumed to be. //

// V190 looks at how often people have gone without needed medicine or medical treatment, with score 1 for often, 2 for sometimes, 3 for rarely and 4 for never. Thus, the lower the score, the less impoverished the respective subject is assumed to be. //

// V191 looks at how often people have gone without cash income, with score 1 for often, 2 for sometimes, 3 for rarely and 4 for never. Thus, the lower the score, the less impoverished the respective subject is assumed to be. //

// The last question looking at poverty is V239. This asks subjects to rank their household income on a scale from 1 to 10 representing the income scale in their country. 1 represents the lowest income group and 10 represents the highest income group. Therefore, the higher the score, the less impoverished a subject is assumed to be //

// Turn towards the overall dependent variable: COGNITIVE FUNCTION. There will be two variables for cognitive function: *IntentionActionGapEmployment* and *Depleted Life* //

// First dependent variable: *IntentionActionGapEmployment*. It is made up of two questions: MN_229A and MN_229B. MN_229A asks whether one has actively looked for work in the past four weeks (score 1 being yes, score 2 being no). MN_229B asks that if one received an employment opportunity in the last four weeks or during the next month, one would be interested and able to start working (again, with score 1 being yes and 2 being no) //

drop if MN_229A<0

```
drop if MN_229B<0
```

```
tab1 MN_229A MN_229B
```

```
// The variable IntentionActionGapEmployment will indicate the depletion as following from one's ability to look for a job while wanting to find employment. IntentionActionGapEmployment equals 1 in case of depletion and 0 in case of no suggested depletion. Given the rationale behind IntentionActionGapEmployment this implies that if MN_229A=2 and MN_229B=1 then IntentionActionGapEmployment =1, while in all other cases IntentionActionGapEmployment=0 //
```

```
gen IntentionActionGapEmployment=0
```

```
replace IntentionActionGapEmployment =1 if MN_229A==2 & MN_229B==1
```

```
tab IntentionActionGapEmployment
```

```
// To be sure the dataset contains enough observations, and check for separation problems, see whether there are any empty cells in the following tables//
```

```
tab IntentionActionGapEmployment V59
```

```
tab IntentionActionGapEmployment V188
```

```
tab IntentionActionGapEmployment V190
```

```
tab IntentionActionGapEmployment V191
```

```
tab IntentionActionGapEmployment V239
```

```
drop if V240<0
```

```
drop if V242<0
```

```
drop if V248<0
```

```
// CONDITIONS FOR THE REGRESSION ANALYSES //
```

```
// Before running regressions, the data needs to be checked as to see whether they meet the respective regression assumptions. IntentionActionGapEmployment is a two category nominal variable. Logit regression will be used to analyse it. The assumptions for a logit regression are: independency of error terms, little to no multicollinearity (the independent variables should be independent from each other), linearity of independent variables and log odds (A solution to this problem is the categorization of the independent variables. That is transforming metric variables to ordinal level and then including them in the model) and large sample size. All the independent variables are either nominal or ordinal such that the condition of linearity of the independent variables is met //
```

```
//Generate dummies for countries. Use later as fixed effects in logit regression if necessary //
```

```
tabulate V2, generate(country)
```

```
logit IntentionActionGapEmployment country*
```

```
//Indeed significant effects for countries, will be accounted for in the final regression//
```

```
// To check for multicollinearity, the variance inflation factors (VIFs) of each independent variable on the other independent variables of interest are calculated//
```

```
regress V59 V188 V190 V191 V239 V240 V242 V248
```

```
estat vif
```

```
regress V188 V59 V190 V191 V239 V240 V242 V248
estat vif
regress V190 V59 V188 V191 V239 V240 V242 V248
estat vif
regress V191 V59 V188 V191 V239 V240 V242 V248
estat vif
regress V239 V59 V188 V190 V191 V240 V242 V248
estat vif
```

```
ologit V59 V188 V190 V191 V239 V240 V242 V248
margins, over(V248)
marginsplot, noci
ologit V188 V59 V190 V191 V239 V240 V242 V248
margins, over(V248)
marginsplot, noci
ologit V190 V59 V188 V191 V239 V240 V242 V248
margins, over(V248)
marginsplot, noci
ologit V191 V59 V188 V191 V239 V240 V242 V248
margins, over(V248)
marginsplot, noci
ologit V239 V59 V188 V190 V191 V240 V242 V248
margins, over(V248)
marginsplot, noci
```

```
// REGRESSION, IntentionActionGapEmployment //
```

```
xtset V2
xtlogit IntentionActionGapEmployment V188 V160C V160D V240 V242 V248 , fe
margins, over(V188)
marginsplot, noci
xtlogit IntentionActionGapEmployment V190 V160C V160D V240 V242 V248 , fe
margins, over(V190)
marginsplot, noci level(90)
xtlogit IntentionActionGapEmployment V191 V160C V160D V240 V242 V248 , fe
margins, over(V191)
marginsplot, noci
xtlogit IntentionActionGapEmployment V59 V160C V160D V240 V242 V248 , fe
margins, over(V59)
marginsplot, noci level(90)
xtlogit IntentionActionGapEmployment V239 V160C V160D V240 V242 V248 , fe
```

```
margins, over(V239)
marginsplot, noci
```

```
// The second dependent variable: DepletedLife. It consists of a cluster of questions. The first is V55 (which targets how much control of free choice one feels over one's life. Such control may be caused by external factors, which we will now eliminate from the findings. When one experiences little control or free choice over one's own life while one experiences no insecurity from external factors, one's lack of control is an indicator of cognitive depletion //
```

```
drop if V55<0
```

```
tab V55
```

```
// Answers to V55 are on a scale of 1 to 10 with 1 indicating people experience no choice at all whereas 10 indicates people experience a great deal of choice. Whereas compartmentalizing this scale is ambiguous, this study choses to use scores of 1, 2, 3 and 4 as indicators of a low level of control or free choice over one's life. The variable 'lifecon' is designed to capture this. If lifecon equals 1, V55 equals 1, 2, 3 or 4 and experienced choice is thus low, or at least no longer feeling somewhat or full choice over their lives. In other cases, lifecon equals 2. 'extcon' represents external control, one's feeling of security as caused by external factors such as whether one has confidence in the police or whether one feels safe in their neighborhood //
```

```
drop if V109<0
```

```
drop if V113<0
```

```
drop if V115<0
```

```
drop if V116<0
```

```
drop if V117<0
```

```
drop if V118<0
```

```
drop if V170<0
```

```
drop if V183<0
```

```
drop if V184<0
```

```
drop if V185<0
```

```
drop if V186<0
```

```
gen extcon=1
```

```
label variable extcon "external control"
```

```
replace extcon=2 if V109==3 | V109==4 | V113==3 | V113==4 | V115==3 | V115==4 | V116==3 | V116==4 | V117==3 | V117==4 | V118==3 | V118==4 | V183==1 | V183==2 | V184==1 | V184==2 | V185==1 | V185==2 | V186==1 | V186==2 | V170==3 | V170==4
```

```
tab extcon
```

```
gen lifecon=2
```

```
label variable lifecon "life control"
```

```
replace lifecon=1 if V55==1 | V55==2 | V55==3 | V55==4
```

```
tab lifecon
```

```

// Depleted Life will indicate the depletion as following from one's experience of free choice, without the
insecurity of external threats. It equals 1 in case of depletion and 0 in case of no suggested depletion//
gen DepletedLife =0
label variable DepletedLife "Depleted Life"
replace DepletedLife =1 if lifecon==1 & extcon==1
tab DepletedLife

// To be sure the dataset contains enough observations, and check for separation problems, see whether there are
any empty cells in the following tables//
tab DepletedLife V59
tab DepletedLife V188
tab DepletedLife V190
tab DepletedLife V191
tab DepletedLife V239

drop if V240<0
drop if V242<0
drop if V248<0

// CONDITIONS FOR THE REGRESSION ANALYSES //
// Before running regressions, the data needs to be checked as to see whether they meet the respective regression
assumptions. Depleted Life (DepletedLife) is a two category nominal variable. Logit regression will be used to
analyze it. The assumptions for a logit regression are: independency of error terms, little to no multicollinearity
(the independent variables should be independent from each other), linearity of independent variables and log
odds (A solution to this problem is the categorization of the independent variables. That is transforming metric
variables to ordinal level and then including them in the model) and large sample size. All the independent
variables are either nominal or ordinal such that the condition of linearity of the independent variables is met //
//Generate dummies for countries. Use later as fixed effects in logit regression if necessary//
tabulate V2, generate(country)
logit DepletedLife country*
//Indeed significant effects for countries, will be accounted for in the final regression//
// To check for multicollinearity, the variance inflation factors (VIFs) of each independent variable on the other
independent variables of interest are calculated//
regress V59 V188 V190 V191 V239 V240 V242 V248
estat vif
regress V188 V59 V190 V191 V239 V240 V242 V248
estat vif
regress V190 V59 V188 V191 V239 V240 V242 V248
estat vif
regress V191 V59 V188 V190 V239 V240 V242 V248

```



```
estat vif
regress V239 V59 V188 V190 V191 V240 V242 V248
estat vif
```

```
ologit V59 V188 V190 V191 V239 V240 V242 V248
margins, over(V242)
marginsplot, noci
ologit V188 V59 V190 V191 V239 V240 V242 V248
margins, over(V242)
marginsplot, noci
ologit V190 V59 V188 V191 V239 V240 V242 V248
margins, over(V242)
marginsplot, noci
ologit V191 V59 V188 V191 V239 V240 V242 V248
margins, over(V242)
marginsplot, noci
ologit V239 V59 V188 V190 V191 V240 V242 V248
margins, over(V242)
marginsplot, noci
```

```
// REGRESSIONS, Depleted Life //
```

```
xtset V2
xtlogit DepletedLife V188 V160C V160D V240 V242 V248 , fe
margins, over(V188)
marginsplot, noci level(90)
xtlogit DepletedLife V190 V160C V160D V240 V242 V248 , fe
margins, over(V190)
marginsplot, noci
xtlogit DepletedLife V191 V160C V160D V240 V242 V248 , fe
margins, over(V191)
marginsplot, noci
xtlogit DepletedLife V59 V160C V160D V240 V242 V248 , fe
margins, over(V59)
marginsplot, noci
xtlogit DepletedLife V239 V160C V160D V240 V242 V248 , fe
margins, over(V239)
marginsplot, noci level(90)
```

Appendix C: Results

Firstly, the conditional logistic regressions with *IntentionActionGapEmployment* are presented. The tables presented contain the both the output of the regressions and the respective marginal effects of the *Poverty* variable in the regression on *IntentionActionGapEmployment*. Tables 1-3 present the conditional logistic regressions with the absolute poverty measures (*Enough food*, *Enough health* and *Enough income*, respectively). Table 4 presents the output of the perceived poverty measure *Financial satisfaction* while Table 5 presents the output of the relative poverty variable *Income inequality*.

Table 1 Regression output and margins, *IntentionActionGapEmployment*, for *Enough food* (V188)

```
. xtlogit IntentionActionGapEmployment V188 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
```

```
Iteration 0: log likelihood = -2673.9367
Iteration 1: log likelihood = -2668.3124
Iteration 2: log likelihood = -2668.3114
Iteration 3: log likelihood = -2668.3114
```

```
Conditional fixed-effects logistic regression   Number of obs   =       7,331
Group variable: V2                             Number of groups =         7
```

```
Obs per group:
      min =         724
      avg =    1,047.3
      max =         1,203
```

```
LR chi2(6) =         63.15
Prob > chi2 =         0.0000
Log likelihood = -2668.3114
```

IntentionActionGapEmployment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V188	-.0055137	.0470456	-0.12	0.907	-.0977214	.086694
V160C	-.0166522	.0293029	-0.57	0.570	-.074085	.0407805
V160D	-.0330632	.0303487	-1.09	0.276	-.0925457	.0264192
V240	-.1417905	.0738494	-1.92	0.055	-.2865327	.0029518
V242	-.0145696	.002884	-5.05	0.000	-.020222	-.0089171
V248	.0617889	.0149098	4.14	0.000	.0325663	.0910115

```
. margins, over(V188)
```

```
Predictive margins   Number of obs   =       7,331
Model VCE           : OIM
```

```
Expression   : Pr(IntentionActionGapEmployment|fixed effect is 0), predict(pu0)
over         : V188
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V188					
Often	.3364857	.0473491	7.11	0.000	.2436832 .4292882
Sometimes	.3435131	.0513206	6.69	0.000	.2429266 .4440996
Rarely	.3526754	.0565787	6.23	0.000	.2417831 .4635677
Never	.3609991	.0630407	5.73	0.000	.2374416 .4845566

Table 2 Regression output and margins, *IntentionActionGapEmployment*, for *Enough health (V190)*

```
. xtlogit IntentionActionGapEmployment V190 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
```

```
Iteration 0: log likelihood = -2672.2279
Iteration 1: log likelihood = -2666.8198
Iteration 2: log likelihood = -2666.8188
Iteration 3: log likelihood = -2666.8188
```

```
Conditional fixed-effects logistic regression   Number of obs   =   7,331
Group variable: V2                             Number of groups =     7
```

```
Obs per group:
min = 724
avg = 1,047.3
max = 1,203
```

```
LR chi2(6) = 66.13
Prob > chi2 = 0.0000
Log likelihood = -2666.8188
```

IntentionActionGapEmployment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
V190	-.0716153	.0410911	-1.74	0.081	-.1521525 .0089219
V160C	-.0174075	.029304	-0.59	0.552	-.0748422 .0400272
V160D	-.0288537	.0303066	-0.95	0.341	-.0882536 .0305462
V240	-.1375308	.0738959	-1.86	0.063	-.282364 .0073024
V242	-.0147781	.0028909	-5.11	0.000	-.0204442 -.009112
V248	.0651523	.0148799	4.38	0.000	.0359881 .0943164

```
. margins, over(V190)
```

```
Predictive margins   Number of obs   =   7,331
Model VCE      : OIM
```

```
Expression   : Pr(IntentionActionGapEmployment|fixed effect is 0), predict(pu0)
over         : V190
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V190					
Often	.3269157	.0467445	6.99	0.000	.235298 .4185333
Sometimes	.3225023	.0485679	6.64	0.000	.2273109 .4176937
Rarely	.3147675	.0513668	6.13	0.000	.2140904 .4154446
Never	.3124677	.0560735	5.57	0.000	.2025656 .4223698

Table 3 Regression output and margins, *IntentionActionGapEmployment*, for *Enough income (V191)*

```
. xtlogit IntentionActionGapEmployment V191 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
```

```
Iteration 0: log likelihood = -2671.277
Iteration 1: log likelihood = -2665.7095
Iteration 2: log likelihood = -2665.7084
Iteration 3: log likelihood = -2665.7084
```

```
Conditional fixed-effects logistic regression   Number of obs   =   7,331
Group variable: V2                             Number of groups =     7
```

```
Obs per group:
min =   724
avg = 1,047.3
max = 1,203
```

```
LR chi2(6) = 68.36
Prob > chi2 = 0.0000
Log likelihood = -2665.7084
```

IntentionActionGapEmployment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V191	-.0943199	.0409903	-2.30	0.021	-.1746593	-.0139805
V160C	-.0180484	.0293221	-0.62	0.538	-.0755187	.0394218
V160D	-.0245449	.0304575	-0.81	0.420	-.0842406	.0351507
V240	-.1405289	.0738602	-1.90	0.057	-.2852923	.0042346
V242	-.0146978	.0028878	-5.09	0.000	-.0203578	-.0090377
V248	.067071	.0149361	4.49	0.000	.0377969	.0963451

```
. margins, over(V191)
```

```
Predictive margins                               Number of obs   =   7,331
Model VCE   : OIM
```

```
Expression   : Pr(IntentionActionGapEmployment|fixed effect is 0), predict(pu0)
over         : V191
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V191					
Often	.3220095	.0458579	7.02	0.000	.2321298 .4118893
Sometimes	.3201484	.0476467	6.72	0.000	.2267625 .4135343
Rarely	.3050356	.0502529	6.07	0.000	.2065418 .4035294
Never	.298264	.0539728	5.53	0.000	.1924792 .4040488

Table 4 Regression output and margins, *IntentionActionGapEmployment*, for *Financial Satisfaction (V59)*

```
. xtlogit IntentionActionGapEmployment V59 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
```

```
Iteration 0: log likelihood = -2671.644
Iteration 1: log likelihood = -2666.8772
Iteration 2: log likelihood = -2666.8764
Iteration 3: log likelihood = -2666.8764
```

```
Conditional fixed-effects logistic regression   Number of obs   =       7,331
Group variable: V2                             Number of groups =         7
```

```
Obs per group:
min =       724
avg =   1,047.3
max =   1,203
```

```
LR chi2(6) =       66.02
Prob > chi2 =       0.0000
Log likelihood = -2666.8764
```

IntentionActionGapEmployment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V59	-.0256495	.0150912	-1.70	0.089	-.0552277	.0039286
V160C	-.0162948	.0292909	-0.56	0.578	-.073704	.0411143
V160D	-.0291015	.0303022	-0.96	0.337	-.0884927	.0302897
V240	-.1352218	.0739009	-1.83	0.067	-.280065	.0096213
V242	-.0147522	.0028898	-5.10	0.000	-.0204161	-.0090883
V248	.063868	.0147812	4.32	0.000	.0348974	.0928386

```
. margins, over(V59)
```

```
Predictive margins                               Number of obs   =       7,331
Model VCE      : OIM
```

```
Expression   : Pr(IntentionActionGapEmployment|fixed effect is 0), predict(pu0)
over         : V59
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V59					
Completely dissatisfied	.3402433	.0467431	7.28	0.000	.2486285 .431858
2	.347233	.0455383	7.63	0.000	.2579795 .4364864
3	.3368145	.0471903	7.14	0.000	.2443233 .4293058
4	.3361316	.048066	6.99	0.000	.2419241 .4303392
5	.3320222	.0496066	6.69	0.000	.234795 .4292494
6	.3325382	.0511885	6.50	0.000	.2322106 .4328658
7	.3353179	.0523272	6.41	0.000	.2327585 .4378772
8	.3314816	.0535873	6.19	0.000	.2264524 .4365109
9	.3303089	.0549693	6.01	0.000	.222571 .4380468
Completely satisfied	.3251884	.0565809	5.75	0.000	.2142919 .4360849

Table 5 Regression output and margins, *IntentionActionGapEmployment*, for *Income inequality* (V239)

```
. xtlogit IntentionActionGapEmployment V239 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
```

```
Iteration 0: log likelihood = -2675.2981
Iteration 1: log likelihood = -2667.994
Iteration 2: log likelihood = -2667.993
Iteration 3: log likelihood = -2667.993
```

```
Conditional fixed-effects logistic regression   Number of obs   =   7,331
Group variable: V2                             Number of groups =     7
```

```
Obs per group:
      min =   724
      avg = 1,047.3
      max =  1,203
```

```
LR chi2(6) = 63.79
Prob > chi2 = 0.0000
Log likelihood = -2667.993
```

IntentionActionGapEmployment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V239	-.0149658	.0185537	-0.81	0.420	-.0513305	.0213988
V160C	-.0162363	.0292791	-0.55	0.579	-.0736222	.0411497
V160D	-.0322687	.0302137	-1.07	0.286	-.0914865	.0269491
V240	-.1392924	.073887	-1.89	0.059	-.2841083	.0055234
V242	-.0146249	.0028869	-5.07	0.000	-.0202831	-.0089667
V248	.064107	.0150681	4.25	0.000	.0345741	.0936399

```
. margins, over(V239)
```

```
Predictive margins   Number of obs   =   7,331
Model VCE      : OIM
```

```
Expression   : Pr(IntentionActionGapEmployment|fixed effect is 0), predict(pu0)
over         : V239
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V239					
Lower step	.329621	.0461201	7.15	0.000	.2392272 .4200147
second step	.3326985	.0460603	7.22	0.000	.2424221 .422975
Third step	.3300989	.0464069	7.11	0.000	.239143 .4210548
Fourth step	.3426884	.0490207	6.99	0.000	.2466097 .4387671
Fifth step	.3512449	.0516052	6.81	0.000	.2501006 .4523891
Sixth step	.3517884	.0537414	6.55	0.000	.2464571 .4571196
Seventh step	.3568256	.0560856	6.36	0.000	.2468999 .4667514
Eighth step	.358831	.0583989	6.14	0.000	.2443712 .4732907
Nineth step	.359172	.0611301	5.88	0.000	.2393591 .4789848
Tenth step	.3468244	.0615749	5.63	0.000	.2261398 .467509

Secondly, the conditional logistic regressions with *Depleted Life* are presented. Again, the tables presented contain the both the output of the regressions and the respective marginal effects of the *Poverty* variable in the regression on *IntentionActionGapEmployment*. Tables 6-8 present the conditional logistic regressions with the absolute poverty measures, while Tables 9 and 10 present the outputs of the perceived poverty measure *Financial satisfaction* and the relative poverty variable *Income inequality*, respectively.

Table 6 Regression output and margins, *Depleted Life*, for *Enough food* (V188)

```
. xtlogit DepletedLife V188 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
note: 20 groups (22,955 obs) dropped because of all positive or
      all negative outcomes.
```

```
Iteration 0: log likelihood = -1111.891
Iteration 1: log likelihood = -1110.1871
Iteration 2: log likelihood = -1110.1777
Iteration 3: log likelihood = -1110.1777
```

```
Conditional fixed-effects logistic regression   Number of obs   =   42,711
Group variable: V2                             Number of groups =     34

Obs per group:
      min =   596
      avg = 1,256.2
      max = 3,352

LR chi2(6) =   43.93
Prob > chi2 = 0.0000

Log likelihood = -1110.1777
```

DepletedLife	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V188	-.1468269	.088219	-1.66	0.096	-.3197331	.0260792
V160C	-.0154328	.1003027	-0.15	0.878	-.2120225	.1811569
V160D	.0420923	.1121943	0.38	0.708	-.1778045	.2619891
V240	.2006202	.144934	1.38	0.166	-.0834452	.4846855
V242	.0122911	.004707	2.61	0.009	.0030657	.0215166
V248	-.1504697	.0364377	-4.13	0.000	-.2218863	-.0790532

margins, over(V188)

```
predictive margins                               Number of obs   =   42,711
model VCE      : OIM

expression   : Pr(DepletedLife|fixed effect is 0), predict(pu0)
over        : V188
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V188					
Often	.494609	.1370787	3.61	0.000	.2259397 .7632784
Sometimes	.4554091	.1383253	3.29	0.001	.1842964 .7265217
Rarely	.4084681	.1414018	2.89	0.004	.1313257 .6856106
Never	.3682496	.147411	2.50	0.012	.0793294 .6571699

Table 7 Regression output and margins, Depleted Life, for Enough health (V190)

```
. xtlogit DepletedLife V190 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
note: 20 groups (22,955 obs) dropped because of all positive or
      all negative outcomes.
```

```
Iteration 0: log likelihood = -1112.1317
Iteration 1: log likelihood = -1111.4701
Iteration 2: log likelihood = -1111.4697
Iteration 3: log likelihood = -1111.4697
```

```
Conditional fixed-effects logistic regression   Number of obs   =   42,711
Group variable: V2                             Number of groups =    34
```

```
Obs per group:
      min =    596
      avg = 1,256.2
      max =   3,352
```

```
LR chi2(6) = 41.35
Prob > chi2 = 0.0000
Log likelihood = -1111.4697
```

DepletedLife	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
V190	-.0228704	.0897261	-0.25	0.799	-.1987304 .1529895
V160C	-.0111964	.1003873	-0.11	0.911	-.2079519 .1855591
V160D	.0329344	.1123563	0.29	0.769	-.1872798 .2531487
V240	.1998931	.1449145	1.38	0.168	-.0841342 .4839203
V242	.0120657	.0047035	2.57	0.010	.0028471 .0212844
V248	-.1546316	.0364323	-4.24	0.000	-.2260376 -.0832256

```
. margins, over(V190)
```

```
Predictive margins   Number of obs   =   42,711
Model VCE      : OIM
```

```
Expression      : Pr(DepletedLife|fixed effect is 0), predict(pu0)
over            : V190
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V190					
Often	.5190867	.1349998	3.85	0.000	.254492 .7836814
Sometimes	.5061991	.1394545	3.63	0.000	.2328733 .779525
Rarely	.483091	.1483654	3.26	0.001	.1923002 .7738817
Never	.4671337	.1598391	2.92	0.003	.1538549 .7804125

Table 8 Regression output and margins, Depleted Life, for Enough income (V191)

```
. xtlogit DepletedLife V191 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
note: 20 groups (22,955 obs) dropped because of all positive or
      all negative outcomes.
```

```
Iteration 0: log likelihood = -1111.68
Iteration 1: log likelihood = -1111.4454
Iteration 2: log likelihood = -1111.4454
```

```
Conditional fixed-effects logistic regression   Number of obs   =   42,711
Group variable: V2                             Number of groups =     34
```

```
Obs per group:
min = 596
avg = 1,256.2
max = 3,352
```

```
LR chi2(6) = 41.40
Prob > chi2 = 0.0000
Log likelihood = -1111.4454
```

DepletedLife	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V191	.026664	.0794262	0.34	0.737	-.1290084	.1823364
V160C	-.0101871	.1004112	-0.10	0.919	-.2069894	.1866152
V160D	.0299635	.1124698	0.27	0.790	-.1904732	.2504002
V240	.1999944	.1449079	1.38	0.168	-.0840198	.4840086
V242	.0119824	.0047083	2.54	0.011	.0027543	.0212105
V248	-.1567836	.0365256	-4.29	0.000	-.2283724	-.0851947

```
. margins, over(V191)
```

```
Predictive margins   Number of obs   =   42,711
Model VCE      : OIM
```

```
Expression   : Pr(DepletedLife|fixed effect is 0), predict(pu0)
over         : V191
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V191					
Often	.513683	.1363865	3.77	0.000	.2463704 .7809956
Sometimes	.5113573	.1384959	3.69	0.000	.2399105 .7828042
Rarely	.507085	.1448565	3.50	0.000	.2231715 .7909984
Never	.5107975	.1547948	3.30	0.001	.2074053 .8141897

Table 9 Regression output and margins, Depleted Life, for Financial satisfaction (V59)

```
. xtlogit DepletedLife V59 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
note: 20 groups (22,955 obs) dropped because of all positive or
      all negative outcomes.
```

```
Iteration 0: log likelihood = -1105.0711
Iteration 1: log likelihood = -1104.7759
Iteration 2: log likelihood = -1104.7759
```

```
Conditional fixed-effects logistic regression   Number of obs   =   42,711
Group variable: V2                             Number of groups =     34
```

```
Obs per group:
      min =   596
      avg = 1,256.2
      max = 3,352
```

```
LR chi2(6) = 54.74
Prob > chi2 = 0.0000
Log likelihood = -1104.7759
```

DepletedLife	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V59	-.1151204	.0312905	-3.68	0.000	-.1764485	-.0537922
V160C	-.0148184	.0999637	-0.15	0.882	-.2107437	.1811107
V160D	.054481	.111944	0.49	0.626	-.1649252	.2738871
V240	.2001746	.1449815	1.38	0.167	-.0839839	.484333
V242	.0128101	.0047361	2.70	0.007	.0035276	.0220926
V248	-.1425917	.0365566	-3.90	0.000	-.2142413	-.0709421

```
. margins, over(V59)
```

```
Predictive margins                               Number of obs   =   42,711
Model VCE   : OIM
```

```
Expression   : Pr(DepletedLife|fixed effect is 0), predict(pu0)
over         : V59
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V59					
Completely dissatisfied	.5295787	.1358962	3.90	0.000	.263227 .7959303
2	.5032182	.1365693	3.68	0.000	.2355473 .7708892
3	.4607856	.1367001	3.37	0.001	.1928583 .728713
4	.4267822	.1345975	3.17	0.002	.162976 .6905883
5	.4077645	.1340555	3.04	0.002	.1450205 .6705085
6	.3693943	.1327718	2.78	0.005	.1091664 .6296223
7	.3381188	.1312382	2.58	0.010	.0808967 .5953409
8	.3129507	.1294494	2.42	0.016	.0592345 .5666669
9	.2895576	.126464	2.29	0.022	.0416926 .5374226
Completely satisfied	.2884414	.1264887	2.28	0.023	.040528 .5363548

Table 10 Regression output and margins, Depleted Life, for Income inequality (V239)

```
. xtlogit DepletedLife V239 V160C V160D V240 V242 V248 , fe
note: multiple positive outcomes within groups encountered.
note: 20 groups (22,955 obs) dropped because of all positive or
      all negative outcomes.
```

```
Iteration 0: log likelihood = -1100.3713
Iteration 1: log likelihood = -1099.8112
Iteration 2: log likelihood = -1099.8112
```

```
Conditional fixed-effects logistic regression   Number of obs   =   42,711
Group variable: V2                             Number of groups =     34
```

```
Obs per group:
min =   596
avg = 1,256.2
max = 3,352
```

```
LR chi2(6) = 64.67
Prob > chi2 = 0.0000
Log likelihood = -1099.8112
```

DepletedLife	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
V239	-.1889751	.0395616	-4.78	0.000	-.2665143	-.1114358
V160C	-.0130025	.1000372	-0.13	0.897	-.2090718	.1830668
V160D	.0397654	.111794	0.36	0.722	-.1793468	.2588776
V240	.1891148	.1451703	1.30	0.193	-.0954138	.4736433
V242	.0114042	.0047153	2.42	0.016	.0021624	.020646
V248	-.1177756	.0374295	-3.15	0.002	-.191136	-.0444152

```
. margins, over(V239)
```

```
Predictive margins   Number of obs   =   42,711
Model VCE      : OIM
```

```
Expression   : Pr(DepletedLife|fixed effect is 0), predict(pu0)
over         : V239
```

	Delta-method				
	Margin	Std. Err.	z	P> z	[95% Conf. Interval]
V239					
Lower step	.5409899	.1371759	3.94	0.000	.2721301 .8098497
second step	.4872217	.1381681	3.53	0.000	.2164171 .7580262
Third step	.4279432	.1377028	3.11	0.002	.1580507 .6978358
Fourth step	.3717335	.1331319	2.79	0.005	.1107998 .6326673
Fifth step	.3203979	.127268	2.52	0.012	.0709573 .5698385
Sixth step	.2707428	.1186882	2.28	0.023	.0381182 .5033673
Seventh step	.2271139	.1091148	2.08	0.037	.0132528 .4409751
Eighth step	.1934742	.100533	1.92	0.054	-.0035669 .3905152
Ninth step	.1676047	.0916117	1.83	0.067	-.0119509 .3471602
Tenth step	.1484262	.0865191	1.72	0.086	-.0211481 .3180005