Merit or luck? - An interpretation of people's beliefs from an economic perspective

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Preface

I would like to thank my supervisor Hans Olav Melberg from the Department of Health Management and Health Economics for valuable guidance, great input and positive energy troughout the process of writing this thesis. I would also like to thank my family and the people close to me (you know who you are) for their endless support trough the whole duration of my studies at the University of Oslo. I could not have done this without you.

All remaining errors are my own.

Karen Høgholen, May 11th 2018

Abstract

This thesis studies the tendency people seem to have to belittle the role of luck in life outcomes, especially in the aftermath of success. Translating high income and high state of health to reflect sings of success, I analyse whether having high income or high state of health affects the proneness to believe, that income or health is achieved mainly trough own actions rather than luck. Beliefs around luck are noted to be affecting preferences over redistribution, and this aspect is explored by investigating the relationship between beliefs about societal versus individual responsibility over drug addiction problems. Ordered and binary logistic regression models are constructed to inspect the relationship between beliefs and belief determining predictors, utilising data from a Norwegian survey scanning people's opinions around drug addiction and responsibility. The main findings suggest that having higher income does not significantly increase the tendency to believe that income is deserved due to effort. Whereas in the case of health, higher self reported state of health seems to increase the tendency to associate bad health with bad habits and lifestyle choices. For the aspect of beliefs about redistribution, it seems like the more the cause of an addiction is related to individual responsibility, the higher is the tendency to think that the addiction problem remains to be solved by the individual himself, rather than being something the society should be responsible for. The role of beliefs in economic theory in general, and what implications beliefs around luck and control have in a policy context is discussed. Parts of an economic model of belief forming mechanisms by Benabou and Tirole (2006), is also presented as an inspiration for the overall themes discussed in this thesis.

Contents

1 Introduction

This thesis aims to analyse what factors might affect people's beliefs about whether luck or individual actions form life outcomes. For example, to what extent one's income level affects the degree to which the person believes people in general get the income they deserve is explored. Whether a person having good health thinks it is mainly due to her own effort in the form of healthy habits and lifestyle choices is analysed as well. Beliefs around luck can be seen to affect people's preferences over redistribution. Therefore the link between beliefs over internal versus external control as the cause, and the preferences over individual versus societal responsibility as the solution to some problems, is analysed. Possible relationships between these and other items are explored trough secondary survey data analysis by utilising data from a Norwegian survey conducted in 2011.

The background theory for the data analysis will be a theoretical model about belief forming mechanisms from a paper by Benabou and Tirole (2006). The authors set up a theory to explain mechanisms behind the need people have to believe in a "just world". That is the need to believe in a world where exerting effort always pays off and the role of luck is minimised. The paper introduces a model framework where beliefs are internalised as a part of the agents utility maximisation problem. The motivation for presenting the model is to use it as a springboard for the data analysis. Moreover, the aim is to discuss the findings of the survey data analysis from an economic perspective.

The thesis is organised as follows. The second chapter takes a look at why people might want to believe in explainable reasons rather than luck, and how economic reasoning could be used to explain this. A brief introduction to beliefs within economic literature is also presented and discussed within this chapter. Chapter 3 presents parts of a specific theoretical model of belief forming mechanisms by Benabou and Tirole (2006). The mechanisms through which people come to choose their beliefs, as well as some predictions to be analysed further utilising the Norwegian survey data will be discussed towards the end of the chapter.

The empirical analysis is two-folded. The first part in chapter 5 takes a look at whether

people's income level or state of health affects their beliefs about whether one's income level or state of health is self-caused versus due to uncontrollable factors. In the second part of the analysis, in chapter 6, the prediction from the model by Bénabou and Tirole (2016), that people who do not believe in luck as an explanation for life outcomes are less supportive of redistributive policies, is tested. Though, translated to a slightly different context as the objective is to analyse people's beliefs about preferences over responsibility to solve drug addiction related problems. The data and methods for the empirical analysis are described in chapter 4, and the data analysis is executed using Stata 15 software. The conclusion summarises the empirical findings, and includes also a brief discussion about why beliefs around luck matter in an economic context.

2 Beliefs around luck and the economics of it

2.1 Luck, chance and coincidence vs. control, effort and just world

People like to think that their actions in life are meaningful, or at least to believe that we can have some control over our lives (Kahneman, 2011; Bandura, 1997). One may assess that someone who has established a successful firm and is making great revenue with it, must be skilled and has worked hard to achieve such success (Kahneman, 2011; Frank, 2016). This often leads to the quick conclusion of thinking that the person has thus earned his wealth. If the persisting ideology is opportunistic and the belief in returns to effort are high, the likelihood that a person believes that hard work is always valuable is high (Benabou and Tirole, 2006; Alesina and Angeletos, 2005; Alesina et al., 2001).

The main implication from the discussion above is that many people have a tendency to substitute luck with something more tangible as an explanation for life outcomes. There could be many possible explanations to why people would want to believe in a world where working pays off and people in general get what they deserve, rather than thinking that luck plays a large role in our lives. The following subsections beneath discuss a couple of possible mechanisms trough which people might substitute away luck as an explanation to outcomes in lives with.

2.1.1 Possible reasons to substitute luck away

As mentioned above, the first obvious reason why people would rather try and connect life outcomes to explainable reasons rather than luck, is the fact it could be *meaningful in itself* to believe that we live in a world where things make sense.

Secondly, one could question whether *"where we sit where we stand"* is affecting our beliefs? That is, if we were born to a wealthy family, or if we have good health, do we think this is due to our own good lifestyle choices and decisions rather than due to the fact that we are incredibly lucky? Rytina et al. (1970) find that there is most support for an

"effort-based" ideology of income among those that are rich. This could mean that people are prone to choose to believe in an ideology that favors their own situation. Alesina and La Ferrara (2005) find persisting evidence of Americans believing in the statement that everyone can experience success and goal achievement by working hard enough. The common belief in Europe about the returns to effort are much more careful, taking more to account the fact that to be successful, one has to also be lucky. Such that based on the place of birth and sociocultural context, we hold different beliefs about the amount luck affects our life, which would imply that to some extent *"where you sit is where you stand"*.

In this context, it is natural to discuss the concept of *self serving bias*. This cognitive strategy stands for the process when people try to protect their self esteem by exaggerating the role of outer factors when things go wrong, and internal factors and own ability in the case of success. Also related to the belief that what is beneficial to oneself could also be considered as fair (Babcock and Loewenstein, 1997; Campbell and Sedikides, 1999; Kriss et al., 2011). Kriss et al. (2011) for example finds in a survey conducted among college students from US and China, that students tended to disagree on an objectively fair division of the economic burden created by climate change between US and China. The students rather tended to view the fair distribution in such a way, that it would benefit their own country of residence. Editing the country labels to just A and B countries, instead of USA and China, diminishes this effect substantially. This suggests that some kind of self serving bias towards what is beneficial for one's own country exists.

Mechanisms on how beliefs are formed could also be thought to be based on the traditional economic approach of comparing costs and benefits and optimising utility. It could be reasonable to argue, that people are prone to choose to believe in things that turn out to be profitable for themselves. For example those that are rich, could try to justify their state of wealth by convincing themselves to believe that they deserve it. The intuition being that there could be some discomfort related to thinking that one's wealth compared to others might be unfair. We know there are people that are worse off and could need a helping hand, and this information can feel unpleasant. Human beings are not purely self interested agents, but also concerned about reciprocity and altruism (Fehr and Schmidt, 2001; Fehr and Gächter, 2000; Simon, 1993). But to some point a rational

agent may want to hold onto what one has, as it contributes to one's utility. Thus, instead of having to share a deal of the cake, is it be easier to explain wealth and high income by believing that one's own effort was the main contributor to it, rather than believing that one simply was lucky?

Evidence shows that people tend to reject luck also when it comes to bad outcomes. Poor people often hold stigma about their situation being their own fault, but this can also be reinforced by others. It is not uncommon to find beliefs among people stating that unemployment is due to the individuals themselves rather than other factors (Furåker and Blomsterberg, 2003). This also relates to the skepticism some have towards a generous welfare and social insurance system. Thus in the worst case, strong beliefs in individual responsibility rather than luck can lead to lack of empathy for the disadvantaged (Frank, 2016).

The thought of beliefs as *self-serving* could possibly be extended to *"community-serving"* or *"state-serving"*. That is, *ideology* also has its position in the formation of people's perception about whether life outcomes are due to individual actions or luck. Believing that individuals can be in control of their lives as long as they exert effort and work hard, could be beneficial for a community or a society, if this leads to higher commitment and work ethic among the society's or community's members. This could in best case result in higher productivity. Also, as Elster (1983) cites Nisbett and Ross (1980), one can argue that science, art and innovations can be seen to occur much thanks to individual's overly optimistic beliefs about the probability success of outcomes. Thus, it could be in the interest of a superior political organ to make people believe, that one can succeed by working hard. Furthermore, justify that those who succeed should to be awarded for it.

2.2 Beliefs role in economic theory

"'Belief' will be defined as an idea, concept, or value that an individual holds, with some probability, to be true." (MacFayden, 2006, p.185)

Beliefs are not directly related to the traditional theoritising of an agent's decision making process, but rather explanations of how people come to reckon that the probability

that a state of the world or phenomenon is true. As MacFayden (2006) explains, if we ought to understand how people make decisions, we must consider the beliefs people hold about the world, what they value and how beliefs possibly are modified. The same has been stated by Kahneman (2003): *"Findings about the role of optimism in risk taking, the effects of emotion on decision weights, the role of fear in predictions of harm, and the role of liking and disliking in factual predictions all indicate that the traditional separation between belief and preference in analyses of decision making is psychologically unrealistic."* (Kahneman, 2003, p.1470). In line with this notion, MacFayden (2006) constructs a quite informative figure, see figure 2.1, of how economic decision making is a complex sum of many factors.

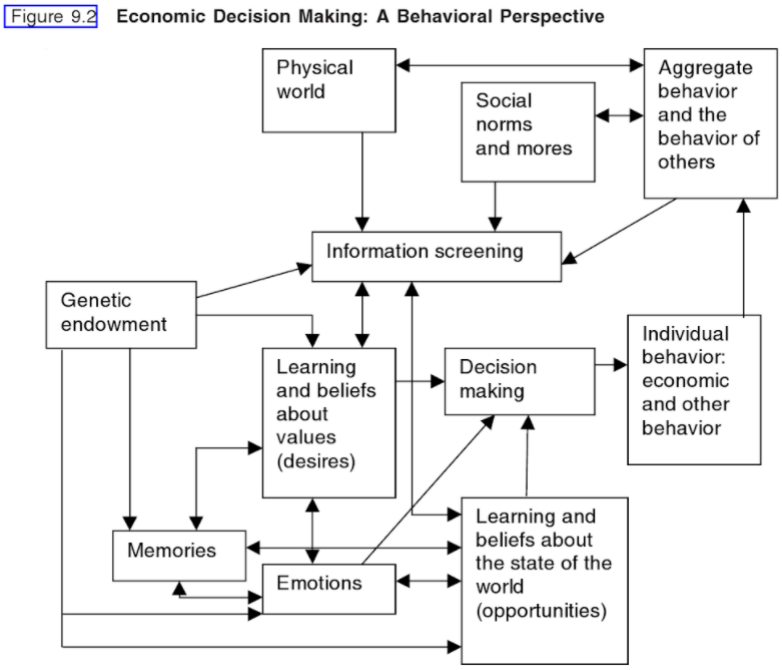


Figure 2.1: Reproduction of Figure 9.2 from *"Beliefs in Behavioral and Neoclassical Economics"* by MacFayden (2006) (p.189).

A brief elaboration of the diagram by MacFayden (2006) in figure 2.1 explains that people's decision making is affected both by external (upper part of the diagram) and internal (lower part of the diagram) factors. External markers count for social surroundings, environment and other agents' behavior, whereas internal markers are based on genetics, memories, emotions and learning process for example. All these factors provide knowledge and information to the individual about the state of the world. If we are to model

belief forming mechanism as a weighting of benefits against costs, one quite obvious block would be to look at the "information screening" process, placed on the upper middle in the graph. This could be seen as one mechanism trough which beliefs by filtering external and internal signals are formed.

The existing literature internalising beliefs into economics has to a large extent focused on heuristics and biases, which of course is one way to account for the inference of people's beliefs in decision making (Simon, 1986; Tversky and Kahneman, 1974; Rabin, 1995). Another option is to assess the psychological, social and environmental factors as needs, that are a natural part of the agent's utility maximisation problem. That is, not to think of them as deviations from the rational, but as intrinsic parts of agents' utility objective (Benabou and Tirole, 2006; Bénabou, 2015; Gigerenzer, 2008). As the diagram 2.1 though suggested, a quite apparent way of modeling beliefs from an economic perspective, would be to consider what information an agent would accept and what one would reject. That is, whether to hold onto an existing belief, gather more information about the topic to either confirm or reject it, or to take it at face value (MacFayden, 2006; Hardin, 1997; Benabou and Tirole, 2006; Bénabou and Tirole, 2016). As Hardin (1997) writes, economic theory can be seen as a suitable way to examine how people come to hold their beliefs, as it focuses on the subjective rather than objective point of view of coming to hold some knowledge.

Motivation as a driver for beliefs

How could we sustain our motivation to do anything, if the prevalent belief is that we cannot trust that our actions will lead to our desired outcome? Related to some of the topics discussed above, recent economic literature has also focused on the possibility that beliefs may be formed trough desire of achieving goals that require motivation (Benabou and Tirole, 2006; Bénabou, 2015; Epley and Gilovich, 2016). That is, it is beneficial for us to believe that we can reach what we want in the world as long as we work hard. Especially if this belief can make us work harder. Overconfidence can in some situations be beneficial, if it pushes us to work harder than objectively ex ante rational. Holding excessively positive beliefs about our abilities, and disregarding the possibility for unlucky incidents, might make us more efficient as it lowers the costs of being anxious and stressed

as well. Malmendier and Tate (2008) for example find that moderate overconfidence and optimism of the CEO can actually be beneficial for a firm. Moderate overconfidence helps CEOs make decisions about excercising real options faster than if they had behaved completely rationally, and this can help align the preferences of the shareholders and the firm better, leading to better outcomes. If the optimism or overconfidence is too large, the results can though turn out to be harmful. Too much risk might be taken and the level of effort can be lowered, as the optimism makes the desire to invest in more effort lower as the CEO might not see any value in it.

In order to be motivated to pursue a healthy lifestyle, could it be reasonable to think that making healthy lifestyle choices and avoiding health endangering activities, makes one live a long and healthy life. It is generally known, that certain lifestyle and behavior increases the risks of catching disease and even sudden death. But on the other hand, we also are aware of that illness can occur, even when the lifestyle and consumption decisions have been of the right type. Genes, environment and luck also plays a role. For the sake of our our own and our children's motivation, we may want to reduce the discomfort of knowing that our investments in health could be of total waste, by believing in the fact that healthy lifestyle is always correlated with good state of health. Thus also allowing us maybe to think, that people who smoke or drink considerable amounts of alcohol, should automatically be responsible for their state of health themselves. It could be costly in the sense of discomfort, and also in the sense of loosing motivation, to believe that health outcomes might be altered by the incidence of bad luck.

2.3 Way further

As discussed above, there could be various different reasons to why people could be prone to belittle the role of luck, as the determining factor for life outcomes. Bénabou and Tirole (2016) list a great number of suggested mechanisms and explanations through which these kind of beliefs may occur and persist. As it would be too comprehensive to consider all of the mechanisms at once, I have chosen to limit the empirical research of this thesis to investigate two main topics. Firstly I investigate if we can find tendencies in the Norwegian Survey data for the *"where you sit is where you stand"* proposition.

Secondly I explore whether people's beliefs over redistributive measures differ based on their beliefs about life outcomes, being either in the hands of the individuals themselves or being exposed to uncontrollable events mainly.

As the basis for my discussion and some of the empirical approach, I present parts of the economic model of belief forming process by Benabou and Tirole (2006) from their paper *"Belief in a just world and redistributive politics*"*. The paper's main aim is to explore how people come to hold "just world" type beliefs, and how collective beliefs emerge trough an endogenous process internalising people's psychological and rational needs. An important part of the theory provided in this paper are the implications "just world" -type beliefs might have on preferences over redistribution. The main framework, which will be relevant for the survey data analysis in the following sections, is presented in the next chapter.

3 Economic model of belief forming mechanisms

In this section, I briefly present some parts of an economic model on belief forming mechanisms developed by Benabou and Tirole (2006) in their paper *"Belief in a Just World and Redistributive Politics*"*[1]. The authors set up an economic model to explain some of the mechanisms behind the somewhat peculiar need people have to believe in a "just world", the phenomenon originally noted by Lerner (1980). The objective of the theory also being to try and explain why these beliefs, according to other empirical studies, seem to differ across countries.

The authors discuss many possible implications these type of beliefs might have on political ideology, labor supply and redistribution. The most relevant parts of this model framework for the data analysis I construct in the next sections, is firstly the mechanism trough which people receive signals and about the state of the world, and either choose to hold on to these or reject them. The second important prediction is that the optimistic people holding "just world" beliefs should have lower preferences for redistribution.

3.1 Model framework

The economy consists of a continuum of agents who produce output y, which realisation depends on a parameter θ. This θ is the expected returns to effort e^i, which is unknown for the agents in the long run. High expectations over θ reflect the "just world" type beliefs. The timeline of the model framework consists of three periods, where information receiving and the agent's actions take place.

The agent's expected utility function can be defined as follows:

$$U_t^i \equiv E\left[(1-\tau)y^i + \tau\bar{y} - \frac{(e^i)^2}{2\alpha\beta_t}\middle|\Omega_t^i\right], \tag{3.1}$$

[1]The model framework is explained mainly in words, and this presentation is in no way an exhaustive explanation of the full theory. For omitted equations and precise calculations of the theory, I recommend having a look at the paper Benabou and Tirole (2006) on pages 706-714 in their article "Belief in a Just World and Redistributive Politics*".

where τ is a linear tax rate the agents vote for in period 1, determining the level of redistribution of market income in period 2 (where $\tau \leq 1$). Ω_t^i is the agent's date t information set and β ($\beta_1 \equiv \beta < 1 \equiv \beta_0$) represents a measure for *"salience of the present"*. Having $\beta < 1$ can be translated to measure the lack of willpower of the agent, which makes the agent choose a level of effort lower than he ex ante would desire. (As an example, before going to bed you decide that you will go for a run in the morning, but when the morning eventually comes you decide to stay in bed and sleep instead). In summary, the expected utility of the agent is defined by the returns to individual output y^i, the tax rate τ, the redistributed transfers in the last period of the model, defined by the average output in the economy $\bar{y}$ and the level of effort e^i the agent chooses (based on the value of β and expected returns to effort).

3.1.1 Signals and determination of agent's beliefs

The base mechanism of the belief formation goes as follows according to figure 3.1 below: All agents in the economy receive a signal about the state of the world, which is either good ($\oslash$, arriving at probability q) or bad (L, arriving at probability $1 - q$). The good signal is interpreted as the agents getting no information at all, whereas the bad signal is interpreted as some information about the world not being as just as initially thought. The latter case would lower the demand to believe in high returns to effort, as the agent learns that hard work might not always pay off, because luck also plays a role in life outcomes.

When the initial signal is received, agents either choose hold on to this information or not with a probability λ. This probability can be modified at a cost $M(\lambda)$, which means to engage in some form of dissonance reducing procedures, as the signals information might contradict with what the agent wants to believe. (I will return to explain the concept of dissonance reduction and its limitations in section 3.2.). The cost function is graphed in the left hand side of figure 3.1.

The objective is to look especially at the case where the initial signal received by the agents is of the bad type (L). Which means that the agent learns that the expected returns to effort might not be as high as the agent initially wants to think. This gives reason to for example try and attain new reassuring information, eliminate evidence or engage political

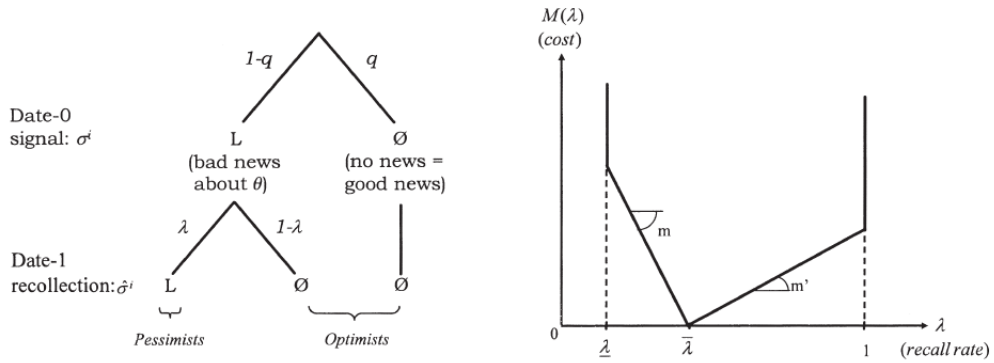


FIGURE IIIa
The Determination of Beliefs

FIGURE IIIb
The Awareness Technology

Figure 3.1: Reproduction of the illustration of the belief determination process as well as the awareness cost function, from Benabou and Tirole (2006), p.709.

or religious circles, as Benabou and Tirole (2006) suggest[2] to "reject" this information. In the model framework this would mean decreasing λ (see figure 3.1). The case could also be that parents try and shield their child from information, that possibly could alter the child's motivation to exert high effort. As a sophisticated measure, the agents are allowed to consider the reliability of the recollected signal through including the possibility of full Bayesian rationality of agents[3]. This is noted by: $r = \frac{q}{q+\chi(1-q)(1-\lambda)} \equiv r^*(\lambda|\chi)$ (where χ denotes the agent's "cognitive sophistication", and $\chi = 1$ is then full Bayesian rationality and $\chi = 0$ complete naiveté of agents).

The effort decision of the agents will be a function of the expected returns to effort, which are modified by the tax rate in the economy (as the tax will be collected from the realised output of the agent). Since the tax rate is determined from the average output in the economy, the agent will have to consider the other agent's beliefs about returns to effort in the decision about how much effort to exert himself. Such that at the time effort is chosen, the agents' expected utility will be a function of the tax rate, the agent's initial social background (poor or wealthy given by π^i) as well as the beliefs at the moment effort is chosen (μ^i): $V(\tau, \pi^i, \mu^i)$.

[2] (Benabou and Tirole, 2006, p.709)

[3] By full Bayesian rationality meaning that the agent acts completely rationally according to the information/probabilities given.

3.1.2 Defining the degree of redistribution

Solving for $\frac{\partial V(\tau,\pi^i,\mu^i)}{\partial \tau} = 0$, one can yield the agent's optimal tax $T(\pi^i, \mu^i)$. Given the full model, there are three main effects that define the agent's preferences over the tax rate. An increase in the endowment of social capital of the agent compared to the average, decreases the desired tax rate. The second effect comes from the agent's subjective beliefs about income mobility. That is if the agent believes it is possible to move upwards in the income distribution by working harder, the preferences for the tax rate will be lower. The third effect is the fact that agents may try to compensate for time-inconsistency problems arising, when their ex ante preferences over effort differ largely from the ex post (the case of low willpower given by low β). Explained in words: trying to motivate themselves to exert effort by preferring a lower tax rate, as the higher tax rate could make them less motivated as it reduces the award for exerting effort, and a higher tax rate means possibly higher transfers to themselves in the later period. In summary, fearing tax distortions.

Which tax rate eventually will be set in the economy, depends on the initial state of the world, and the value λ (information recollection rate) takes for the majority of the agents in the economy (defined by poor (π_0) or rich (π_1)). Benabou and Tirole (2006) present two cases, which give equilibrium outcomes of tax rate according to "Belief in a Just World" (BJW) type of preferences or tax rate according to "Realistic Pessimism" (RP) preferences. The first one gives a tax rate $\underline{\tau}$ and the second $\bar{\tau}$, where $\underline{\tau} < \bar{\tau}$.[4]

An important assumption of the model of Benabou and Tirole (2006) states that in equilibrium[5], agents are either pessimists or optimists. And they thus define their desired level of tax as (T_p = pessimists desired tax level and equally T_o for optimists).

$$T_p(\pi) = T(\pi, 0) \quad or \quad T_o(\pi) = T(\pi, r),$$

and tax desired tax preferences will be of the following order:

$$T_o(\pi_1) \leq T_o(\pi_0) < T_p(\pi_0) < 1$$

So the "rich optimists" would set the tax rate at a lower level than the optimistic poor and pessimistic poor. The important note to make here, is that the model thus allows to

[4]The collective political preferences emerge trough the majority vote, and the elaboration of this mechanism can be seen on pages 714-719 in Benabou and Tirole (2006).

[5]Given the assumption Benabou and Tirole (2006) state on page 713 in their paper.

look at the fact that beliefs in a just world are not only restricted to the rich - also poor people can be of the optimistic type. And poor optimists would desire to have a tax rate lower than the poor pessimists. As the authors of the model also refer, there are several other empirical studies that have pointed out the tendency of not only the rich, but also the poor believing that they have a possibility to move upwards on the income ladder, if they just worked hard enough (Benabou and Tirole, 2006, p.707). And thus that also the "disadvantaged" can be supporting policies that limit the degree of redistribution.

Further in their paper, Benabou and Tirole (2006) present the agent's decision problem from various different angles. For example, the authors consider that believing in a "just world" might be affective and thus derive utility to the agent on its own, or that agents' beliefs might be affected by religion and the amount of religious individuals in the economy. Although highly interesting, I will not elaborate these applications of the model further, but focus on discussing the information filtering mechanism presented in the model. That is, if it is possible for people to choose their beliefs, as assumed in the model. Thereafter I will reinterpret some aspects of the model and test whether some of the model's implications can be seen also in the Norwegian survey data.

3.2 Is dissonance reduction possible?

In the model presented above by Benabou and Tirole (2006), the assumption is that people can "choose" to modify their beliefs. This relates to the concept of dissonance reduction theory from psychology originally noted by the American psychologist Leon Festinger (1962). When a person is faced with conflicting cognitions (for example in the form of receiving contradictory information, attitudes or behavior about subject or phenomenon), the person will strive to reduce the dissonance in his mind to end up with balanced, consistent cognitions (Colman, 2014). An example where dissonance reduction could be argued to be a legit explanation for the belief forming mechanism is to think of a coal miner. A coal miner that initially thinks its dangerous to work in a coal mine might have to engage in dissonance reduction procedures to adjust the belief, in order to be able to enter the mine and work.

Whether it is possible for a person to try to reduce the mental discomfort of con-

tradicting beliefs, values, information or ideas by engaging in dissonance reduction can though be questioned. Elster (1999,9) is for example sceptic to the idea that people can "choose" their beliefs according to what serves their self-interest. Firstly, the theory does not count for the fact that it might be emotions rather than some actual or psychological needs that induce beliefs. The process of reducing dissonance of cognitions must also be thought to be unconscious. This is especially the case if the dissonance reduction is to confirm that a decision made earlier was the right one. As an example Elster (1999) mentions the case where an individual after purchasing a car of brand A is paying attention to advertisements concerning this same brand. On the other hand the individual is avoiding advertisements concerning another brand B, in order to confirm that he landed on the right decision. For this information gathering to be confirmatory, it must be such that the individual unconsciously chose to focus on advertisements on brand A but not B (Elster, 1999, p.364). Otherwise the agent might understand that he is fooling himself by his actions, and thus the information gathering procedure would not be powerful enough. Benabou and Tirole (2006) allow the agent to consider the reliability of a bad signal, but this is still more related to a decision of a choice to either believe or not believe in some information provided. And thus could the mechanism of people "choosing" their beliefs according to those that maximise their utility, be thought to be ambiguous.

MacFayden (2006) argues that economic models with expected utility approach might overestimate people's ability to calculate themselves to outcomes, and some decisions are just not worth paying too much attention to. The human mind has difficulties in statistical thinking, and thus people are prone to make also "incorrect" calculations with respect to their utility (Tversky and Kahneman, 1974; Kahneman, 2011; Fetherstonhaugh et al., 1997). That is, the agent might not know well enough what is the best belief to choose what actually would optimise his utility.

One could also argue, that making changes to our beliefs by avoiding information, searching for new reassuring information or for example eliminating evidence might not be enough in order to push aside some previously learned information. Also being in a "state of success" could lead to higher beliefs about the success being earned, as thinking otherwise could lead to discomfort and thus mental costs. This aspect is especially what I will try to explore in the the first part of the empirical analysis in the following sections,

utilising the data from the Norwegian survey. The intuition behind being, whether *"where you sit is where you stand"* affects people's beliefs in the direction that favors themselves.

4 Data, theory and method of empirical analysis

The empirical approach in this thesis will be two-folded. In the first part, presented in chapter 5, the Norwegian survey data is used to analyse whether people who have high income, also believe they have deserved it. The aspect of whether one's state of health affects the beliefs about to what extent health status is a question of habits and lifestyle rather than luck is also explored. Thus, checking if we can find any evidence for the *"where you sit is where you stand"* proposition. In the second part of the empirical analysis, chapter 6, the prediction that there should be less support for redistributive politics among those who hold optimistic beliefs about returns to effort is tested, as proposed in the model by Benabou and Tirole (2006).

4.1 Norwegian Survey data

We have data from a survey, which scans for people's opinions and beliefs around drug addiction and responsibility. The study was conducted in 2011 by a global research concern[1][2]. The final selection consists of 1000 respondents from all around Norway (originally 1002, but 2 of the respondents were eliminated due to lack of background information). The questionnaire consists of 32 items in total, including some demographic questions such as age, gender, education, gross total household income and place of residence. The description and coding of the items used in the analysis in this thesis can be seen in table A.1 in the appendix (the full survey questionnaire (in Norwegian) can be requested). The items chosen for further analysis contain mapping of respondents beliefs about the righteousness of income people earn, whether one's state of health depends on own actions or individual actions or to what extent the society should support drug addicted individuals quit their addictions.

There is a slight underrepresentation of younger respondents, respondents from the

[1] Ipsos MMI

[2] The paper *"Addiction and Responsibility: A Survey of Opinions"* by Melberg et al. (2013), is related to similar survey data.

lowest income groups as well as respondents with low levels of educational background. To get the data sample to reflect the unbiased actual population, weights are included in the regression analyses. The sampling weights constructed by the data provider are computed with respect to gender, age and education according to official population statistics (Statistics Norway data). Omitting the weights could lead to biased estimates, as it possibly leads to erroneous standard errors (Heeringa et al., 2010; StataCorp, 2017). Moreover, omitting population weights could lead to significant estimated coefficients, but which cannot be linked back to the real world population with too high reliability.

4.2 The features of the data and suitable methods for analysis

The survey data consists of ordered and categorical responses to items regarding beliefs and though concerning mainly drug addiction and responsibility. When analysis of correlation and causality of this type of variables, one must keep in mind that we cannot assume standard normal distribution as the base for the analysis. And thus, standard linear regression models such as ordinary least squares (OLS) might produce biased inaccurate results. Many of the items have response alternatives over a Likert scale. This scale measures the level of agreement or disagreement over a statement on a symmetric basis. Response alternatives range thus from completely agree to completely disagree, and in most cases include also a neutral response alternative in the middle (McIver and Carmines, 1981). Items measured on a Likert scale are sometimes treated as interval data that can be thought to have nearly continuous properties, as the ordering of the data creates a seemingly increasing or decreasing scale, which can be useful to simplify the analysis. Whenever this assumption is made for the items where responses are measured on a Likert scale, or other ordered categorical variables in the analysis, I will note it and justify my decision. The methodology for the statistical analysis and regressions provided in this section and throughout the thesis is in line with Heeringa et al. (2010) and Stock and Watson (2012).

4.2.1 Regression models to be used in the analysis

For the regressions binary and cumulative ordered logit regression approach will be used. The base method of constructing and execution of the analysis is done according to Heeringa et al. (2010). The binary logistic regression is chosen when the dependent variable (y) takes the values 1 or 0. The interest is in the conditional probability that the dependent variable y takes the value 1. The coefficients of the predictors in the binary regression models ($\beta_1, ..., \beta_p$) cannot be treated the same way as coefficients of a linear regression model (eg. OLS), as the conditional probability function is not a linear function of its predictors. The main implications we can get from looking at the coefficients of a binary logistic regression model is whether the coefficient takes a negative or positive value. The magnitude of the effects may be analysed calculating the odds ratios, which I have done in this thesis when using the ordered logistic model approach (see below).

Cumulative logit regression

The case where the dependent variable has ordered characteristics, such as response categories ranging from low to high or disagreement to agreement, it is possible to use ordered logistic regression to analyse the data. In line with Heeringa et al. (2010), the cumulative logit model can be defined as *"the probability of having an ordinal response less than or equal to k, relative to the probability of having a response greater than k"* (Heeringa et al., 2010, p.278):

$$logit[P(y \leq k)|x] = ln\left[\frac{P(y \leq k)|x}{P(y > k)|x}\right] = B_{0(k)} - (B_1x_1 + B_2x_2 + ... + B_px_p)$$

For an outcome variable with K kategories, K-1 logit functions are defined, which share a set of regression coefficients. Thus, there will be K-1 cutoff values for the outcome, which are not so much of interest on their own, but are necessary for estimating the full model. For the ordered logit regressions executed in the following sections, I have included the estimated cumulative odds ratios of the regression models to be able to say something more about the possible magnitude of the effects. Following Heeringa et al. (2010) again (p.282), the estimated cumulative odds ratios tell us how much bigger the odds of being in a higher category relative to a lower of the outcome variable is, given the predictor's

characteristics. For a continuous predictor for example, the cumulative odds predict the odds of being in a higher category relative to a lower for each additional unit of the predictor's value (year of age for example).

Software used

Stata 15 software is used for the empirical analysis of the data. To account for population weights when running regressions and estimating means, I use the Stata *svy* command when analysing the data, which takes into account the sampling weights. An alternative could have been to define the population weights in each stage manually.

5 Part 1: Is "where you sit is where you stand"?

The theory by Benabou and Tirole (2006) predicts that receiving information about the returns to effort affects whether the agent will want to hold on to just world type of news or not. Roughly interpreted, the hypothesis is that people who receive good news about returns to output should be of the optimistic type, believing in a world where hard work pays off. The others, who receive bad news about the returns to effort, make the decision to either hold on to these news or engage in some form of dissonance reducing activity to reject the information. The main assumption in both cases thus has to be that everyone initially wants to believe in a world that is just.

5.1 Income level and beliefs about income

Having the model framework in mind, let's assume that the signal the agent receives about the state of the world is the actual income level of the household. Considering the model framework by Benabou and Tirole (2006) this of course is a quite rough modification to make. The signal here is subjective rather than universal information everyone in the economy receives, as the case is in the original model. The justification of doing this simplification is to make it possible to measure, whether the prediction that receiving any signals about the returns to output affects beliefs about whether the world is just or not.

The other motivation is to check, whether the simple hypothesis of *"where you sit is where you stand"* applies in this context. For example, that the rich believe they are rich because they deserve it and have worked for it. This relates to the more general implication that people have a tendency to attribute luck with effort in case of success, where success here would be measured as having a high level of income or health. The prediction of the model by Benabou and Tirole (2006) though being, that this might not be true as pessimists and optimists are found across all income levels.

5.2 Beliefs about income: luck versus effort

There are items in the Norwegian survey data that ask the respondents to rate their beliefs about whether they think people in general get the income they deserve or not, deserve it based on effort, and also whether one's income level is thought to be affected by luck. The items are listed in table 5.1. Same type of questions about the respondents own income are also asked, and these items are listed in table 5.2.

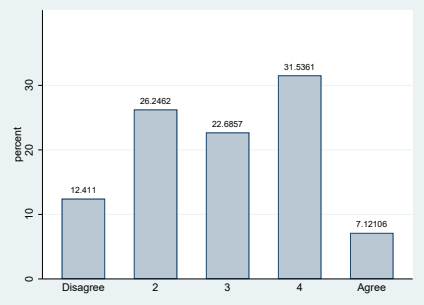
Table 5.1: Items mapping income beliefs about the income of people in general. *"Some people think high income is due to hard work and ability. Others say it is more due to luck or coincidences. How much do you agree or disagree in the following statement?"*

Item	Question	Response alternatives
DeserveGen	Most people get the income they deserve.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
EffortGen	Most people get the income they deserve based on effort.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
GLuckGen	Those with high income have often had a lot of luck.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
BLuckGen	Low income is often caused by bad luck.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)

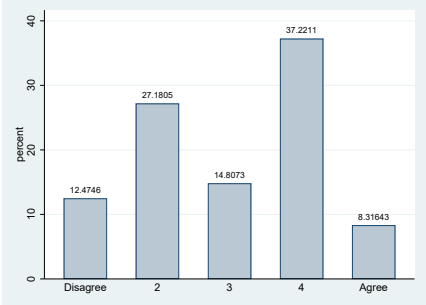
All responses to these preceding items are measured on a 5-point Likert-scale, where 1 stands for *"Completely disagree"*, 5 for *"Completely agree"* and a middle variable for neutral responses included. The original scale ranged from agree to disagree, but to make it easier to interpret the results of the analysis in the coming sections, I have reversed the scale of the responses such that higher values of the items mean more agreement to the underlying statement (as the original scale was from *"Completely agree"* to *"Completely disagree"*). The distribution of the income belief items are graphed in figures 5.1 and 5.2[1].

[1]The *"don't know"* and *"don't want to answer"* categories are omitted from the analysis. Around 2% of responses are in these categories for the general income belief items, and around 5% for the individual income belief items.

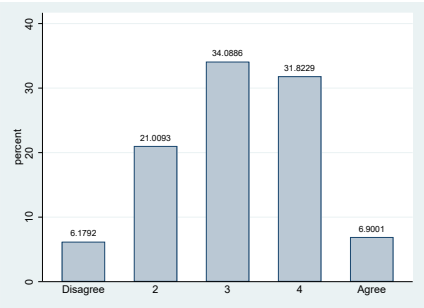
Figure 5.1: Distribution of general income belief items.



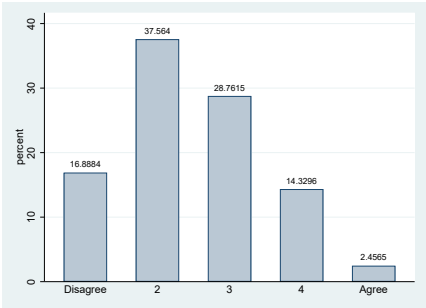
(a) "Most people get the income they deserve." (**DeserveGen**)



(b) "Most people get the income they deserve based on effort." (**EffortGen)**



(c) "Those with high income have had a lot of luck." (**GLuckGen**)



(d) "Low income is often caused by bad luck." (**BLuckGen**)

The distributions of the general income beliefs in figures 5.1a and 5.1b, state that most respondents partly agree on the statements that people's income in general is deserved (31.5%), and deserved due to effort (37.2%). On the other hand 26.2% and 27.2% of the respondents respectively have responded that they partly disagree with these statements. High income is to some extent also related to good luck, as the second most frequent response category to the GLuckGen item is *"Partly agree"* (figure 5.1c), where the most frequent response was the neutral category (34%). But on the contrary, low income does not seem to be thought to be a result of bad luck as 37.6% of respondents replied *"Partly disagree"* (see figure 5.1d).

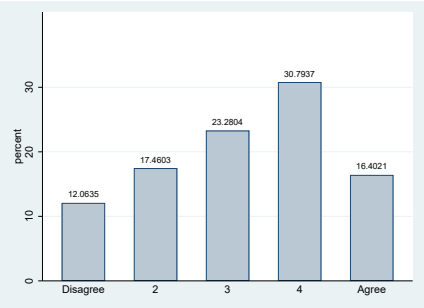
On the items asking the respondents beliefs about whether their own income is as deserved, figures 5.2a and 5.2b, show a right-skewed distribution towards the *"Partly agree"* statement. The majority (around 31% for both items) seems to think their own income is as deserved and also deserved due to effort. On the luck inference, the respondents seem to mainly disagree (40.2%) on the statement that luck has been affecting their income

Table 5.2: Items mapping income beliefs about the respondents own income. *"How much do you agree or disagree that your own income is.."*

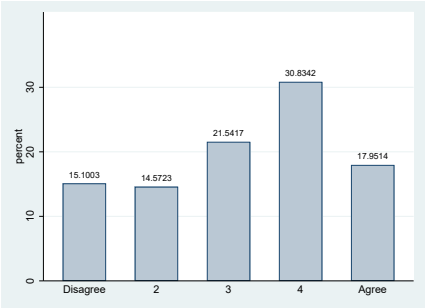
Item	Question	Response alternatives
DeserveInd	as deserved.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
EffortInd	as deserved based on effort.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
LuckInd	affected a lot by good and bad luck.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)

level (see figure 5.2c).

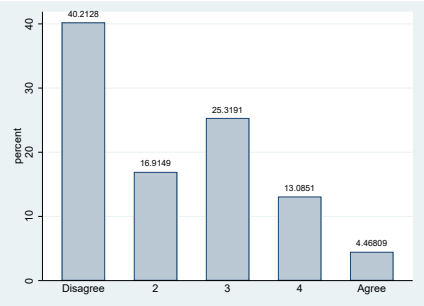
Figure 5.2: Distribution of subjective income belief items.



(a) Your own income is... "as deserved" (**DeserveInd**)



(b) Your own income is... "as deserved due to effort" (**EffortInd**)



(c) Your own income is... "affected by a lot of good and bad luck." (**LuckInd**)

5.2.1 Income as the signal about returns to effort

The distribution of the gross total household income for the respondents is tabulated in table 5.3. The distribution shows that the highest income groups are mainly represented. Most of the respondents have stated their income to be in the intervals NOK 600.-799.000 and NOK 800.-999.000. The median gross income of all Norwegian households was NOK 431.000 in 2011 (SSB, 2011), which implies that we have a slight overrepresentation of the wealthy in the data. The reason for this could be that the younger people are a bit underrepresented and the mean age of all the respondents is 50,7 years (see table A.3 in the appendix). Higher age is often correlated with higher income, as the people around 50 years have already had time to finish their education and pursue their careers for a while.

Table 5.3: Gross total income of the household

Category	Frequency	Per cent
Up to NOK 100.000	13	1
NOK 100.-199.000	23	2
NOK 200.-299.000	42	4
NOK 300.-399.000	107	11
NOK 400.-499.000	138	14
NOK 500.-599.000	100	10
NOK 600.-799.000	180	18
NOK 800.-999.000	180	18
NOK 1 mill. +	127	13
Don't want to specify	61	6
Don't know	29	3
Total	1,000	100

To investigate if there exists a relationship between the income and income belief variables, the correlation between the income belief items and the actual gross total income of the household is calculated using the Spearman's rank correlation coefficient measure. This correlation measurement does not assume a normal distribution for the underlying variables, and thus it is suitable for correlation analysis of categorical survey data. The

results of the individually tested pairs are listed in table 5.4.

Table 5.4: List of Spearmans correlation coefficients between income belief variables and income. (One pair at a time)

Items	Spearman's rho	Prob> $\|t\|$	Observations
Beliefs about income in general			
DeserveGen and Income	0.1137**	0.001	897
EffortGen and Income	0.1078**	0.001	899
GLuckGen and Income	-0.0591	0.079	887
BluckGen and Income	-0.1194***	0.000	892
Beliefs about subjective income			
DeserveInd and Income	0.1590***	0.000	877
EffortInd Income	0.1292***	0.000	878
LuckInd Income	-0.0863**	0.011	873

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We see that there seems to be positive correlation between the DeserveGen and Income items as well as EffortGen and Income. Beliefs about luck seem to be negatively correlated with higher income. The same results hold for the beliefs about one's own income. The correlation coefficients are not very large, but all results besides the correlation between GLuckGen and the Income variable are statistically significant with a p-value less than 0.01. Thus, it does seem reasonable to suspect that there exists a relationship between the level of gross income of the household and opinions about whether one's income is as deserved.

5.2.2 Regression of effort belief variables and income

To inspect the relationship between income beliefs and income further, an ordered logistic regression model is constructed. EffortGen will be used as the outcome variable in the first model and EffortInd variable as the outcome variable in the second. I justify that these items are quite in line with the "just world" type belief mapping, as they measure whether respondents' think people's income in general and the respondents' own income is deserved due to effort. Positive predictor coefficients will mean higher odds of agreeing more

(stating a higher category to the questions) to the statements of the outcome variable. The method of model setup and execution of these regressions follows the steps by Heeringa et al. (2010) with some additional input from Stock and Watson (2012).

The first and most important predictor to include in the model is of course income, as it is the main variable of interest. To simplify the analysis and especially the interpretation of the regression results, I chose to treat the income variable as continuous although its original categorical nature. (I will also later on rerun the model with the income as a categorical variable.) The original item Income is measured on a 9-step scale, as seen in table 5.3. Thus, the variable has increasing ordered characteristics, although the sizes of the income steps are not completely equal. The lowest income steps are measured with 100.000 NOK difference, whereas the highest groups are measured with 200.000 NOK difference. I though justify this not to be a large issue, as the marginal utility of having 100.000 NOK extra can be seen to be much lower for those already earning 700.000 NOK, than for those in the absolute lowest income groups.

The second predictor to be included in the regression is age. Higher age is often correlated with higher income, such that the variable age could be thought to affect the EffortGen or EffortInd outcomes trough the Income variable. But it is also possible to argue, that higher income itself might affect beliefs about the returns to effort when it comes to income. Elderly people might hold different beliefs about their income, as they were born under different economical conditions than the younger generation today. Focusing on Norwegians, which is in line with our data, those over 60 years old were born before the first National Insurance Act took place in 1966, that is before a large "safety net" of a welfare state existed. Inglehart (2008) for example finds evidence for differences in values about the materialist and self-expression needs between generations.

The third thing to check in this simple model is whether there are differences in income beliefs between genders. Research suggests that men are prone to be more overconfident about their own abilities and actions, and also prone to substitute luck with effort as an explanation to their success. Furnham (1986) finds that women are more likely to relate wealth and poverty to chance rather than men. It is also noted in several studies, that men tend to be more confident in their own ability and skills than women, whereas women more frequently explain their success with luck (Deaux and Emswiller, 1974; Niederle and

Vesterlund, 2007). Such that it is reasonable to say that one would expect a negative coefficient for the gender variable Male (takes value 1 if respondent is a male and 0 if the respondent is a woman) in both of the regression models, and especially in the latter of them where the beliefs are related to the respondent's own income.

The fourth predictor to be included in the regression models with the income belief as outcome variables is education. Including this variable, we can also check if a person's educational level affects the beliefs about whether people's income is as deserved. Education is measured on a 4-step scale where the lowest educational group is *Primary school (<8 years)* and the highest *University level (>12 years + studies).* As with the predictor for income, I choose to treat the variable Education also as continuous, or moreover as an increasing ordered variable. That is, inspecting whether the agreement to the income beliefs changes when educational level increases. As the educational level is measured by only four different categories, I will also inspect the possible groupwise effects by including education as a categorical variable in the regressions at a later stage, just as with income, as well.

Regression results, income beliefs

The regression results are summarized in table 5.5. The first two columns show the regression results for the model where EffortGen is the outcome variable, and the last two columns show the regression results for the model with EffortInd as the outcome. The first column shows the estimated coefficients for the predictors, and the second lists the respective estimated cumulative odds ratios. As we can see, the t-statistics moving from the first column to the second do not change, since the cumulative odds ratios are just exponentiations of the initial regression coefficients[2]. From the columns with the coefficients, we can mainly inspect whether the relationship between the variables are positive or negative. The estimated odds ratios in the second columns though can help us indicate something about the magnitude of the effects. As noted earlier, the cutoff values at the bottom of the table are not so much of interest for the sake of the interpretation of the results, but they are necessary for estimating the full model.

What we immediately see is that for both models, the coefficients for the income

[2](see Heeringa et al. (2010) p.282 for a more precise explanation)

Table 5.5: Ordered logit regression results for the income belief variables.

	EffortGen *"People in general get income as deserved based on effort."*		EffortInd *"Your own income is as deserved based on effort."*	
	Coefficients	Odds ratios	Coefficients	Odds ratios
Income	0.0341	1.035	0.0813*	1.085*
	(0.87)	(0.87)	(2.00)	(2.00)
Age	0.0187***	1.019***	0.0111*	1.011*
	(3.47)	(3.47)	(2.20)	(2.20)
Male	0.446**	1.562**	0.468**	1.598**
	(2.84)	(2.84)	(3.12)	(3.12)
Education	−0.0910	0.913	0.0739	1.077
	(−0.87)	(−0.87)	(0.66)	(0.66)
/				
cut1	−0.765	0.465	−0.213	0.808
	(−1.49)	(−1.49)	(−0.41)	(−0.41)
cut2	0.629	1.875	0.764	2.148
	(1.26)	(1.26)	(1.44)	(1.44)
cut3	1.284*	3.612*	1.696**	5.455**
	(2.55)	(2.55)	(3.17)	(3.17)
cut4	3.497***	33.02***	3.117***	22.58***
	(6.72)	(6.72)	(5.64)	(5.64)
Observations	888	888	869	869

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

predictors are positive. That is, having higher income seems to lead to more agreement (higher odds of responding with higher categories to the EffortGen or EffortInd questions) to the statement that people in general get the income they deserve due to effort, and also that the respondent's own income is deserved due to effort. From the odds ratios, we can though read that this effect is quite marginal especially for the EffortGen outcome (1.035), and only in the model for EffortInd is the income predictor statistically significant. This could possibly be interpreted as having higher income is affecting beliefs about one's own income, but not significantly affecting the beliefs about people's income in general.

In both models, the predictor for age is slightly positive and significant. The estimated odds ratios suggest that for each additional year of age over 18 (which is the lower bound of age in the data), the odds of agreeing more to the statements (responding to a higher category of the EffortGen and EffortInd questions) increase by 1.9% and 1.1% respectively. If there are differences between the young, middle aged and older respondents could though be questioned. I will elaborate this notion later, when I construct an ordered logit with some of the predictors as categorical variables. But sticking to this table (5.5), the results suggest that as respondents age increases, the odds of agreeing more to the statements compared to disagreeing increases.

The gender seems to be a quite substantial and significant predictor for the beliefs about income. For men, the odds of responding to a higher category on the EffortGen item are around 1.56 times the odds of what they are for women. And for the EffortInd item, the same multiplier is around 1.6 according to this model. This is what we would expect to see according to a wide range of research made earlier, as discussed in the variable selection section. The predictor for education is insignificant, which implies that a person's educational level might not be an important explanatory factor for beliefs about whether income is deserved or not due to effort.

But as discussed already in the predictor specification process, it might be interesting to look at the effects of the main predictor for income, as well as the predictors for age and education as categorical variables. The pattern of income is especially of interest as the coefficient for the continuously considered predictor for income was significant in the regression model for EffortInd. To inspect these aspects, both models were run with

the categorical versions of income, age and education predictors as well. For the income variable, I chose to reduce the original 9 income groups to consist of 5 for simplicity, resulting in an income variable called Income5. The distribution of this new 5-step income predictor is tabulated in the appendix in table A.2. The age is grouped into four categories, and the distribution of this new categorised AgeCAT variable can be seen in the appendix in table A.4. The education predictor consists of the original item with 4 categories, as in table A.5.

The regression results for the ordered logit models for the income beliefs as the outcome variables, where income, age and education were treated as categorical variables are presented in table 5.6 below. The coefficients for gender (Male) are pretty much the same as in the previous models, but the effect of gender on the belief about one's own income (EffortInd) seems to be even stronger in this model specification, increasing the estimated cumulative odds somewhat.

The only income group that shows a significant positive relationship with the beliefs about one's own income (EffortInd), is the highest income group. The positive and significant coefficient for the highest income category (*gross total household income over NOK 1 mill.*) could predict that there is some truth in the discussed phenomenon that those who are rich, also believe they deserve it due to their input of effort. At least compared to the poorest income group (as this is the reference category for the Income5 predictor). If we look at the overall pattern of the odds ratios as well, the odds seem to increase for every additional category for the EffortInd outcome, whereas there is not a so clear pattern inspecting the odds ratios of the EffortGen outcome model. Interestingly though, the coefficient for the second lowest income group is negative in the case of beliefs about people's income in general (EffortGen), suggesting that compared to the poorest reference group, "the second to poorest" seem to be more prone to disagree to the statement that people in general get the income they deserve based on effort. As this result is though not statistically significant, I will not elaborate it further. But overall, reading the regression results, it seems like people's income does not matter significantly for the beliefs about income being achieved and deserved mainly due to effort.

The effect of age as suspected seems to differ between age-groups as well. The oldest (>60 years) seem to be quite much more likely to agree with both statements than the

Table 5.6: Ordered logit regression results for the income belief variables, with income, age and education as categorical predictors.

	EffortGen *"People in general get income as deserved based on effort."*		EffortInd *"Your own income is as deserved based on effort."*	
	Coefficients	Odds ratios	Coefficients	Odds ratios
<199.	*ref.*	*ref.*	*ref.*	*ref.*
200.-399.	−0.0590	0.943	0.415	1.514
	(−0.16)	(−0.16)	(1.00)	(1.00)
400.- 599.	0.246	1.278	0.430	1.537
	(0.71)	(0.71)	(1.10)	(1.10)
600.-999.	0.330	1.391	0.466	1.594
	(1.00)	(1.00)	(1.20)	(1.20)
>1 mill.	0.369	1.446	1.122**	3.070**
	(1.09)	(1.09)	(2.83)	(2.83)
18-29 years	*ref.*	*ref.*	*ref.*	*ref.*
30-49 years	−0.285	0.752	−0.560*	0.571*
	(−1.26)	(−1.26)	(−2.06)	(−2.06)
50-59 years	0.0937	1.098	−0.466	0.627
	(0.39)	(0.39)	(−1.70)	(−1.70)
>60 years	0.376	1.456	0.0628	1.065
	(1.48)	(1.48)	(0.23)	(0.23)
Male	0.444**	1.559**	0.591***	1.805***
	(3.01)	(3.01)	(4.08)	(4.08)
Primary school	*ref.*	*ref.*	*ref.*	*ref.*
Secondary level	−0.328	0.721	−0.479	0.619
	(−0.66)	(−0.66)	(−0.84)	(−0.84)
High School	−0.996*	0.369*	−0.576	0.562
	(−2.14)	(−2.14)	(−1.08)	(−1.08)
University level	−0.758	0.468	−0.183	0.833
	(−1.65)	(−1.65)	(−0.34)	(−0.34)
/				
cut1	−2.203***	0.110***	−1.609*	0.200*
	(−4.02)	(−4.02)	(−2.47)	(−2.47)
cut2	−0.782	0.457	−0.655	0.519
	(−1.44)	(−1.44)	(−1.01)	(−1.01)
cut3	−0.104	0.901	0.328	1.388
	(−0.19)	(−0.19)	(0.51)	(0.51)
cut4	2.100***	8.163***	1.787**	5.970**
	(3.78)	(3.78)	(2.76)	(2.76)
Observations	974	974	937	937

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

youngest (18-29 years). This effect is significant in both regression models. In the case of statements about the respondents own individual income (EffortInd), the coefficient for the second youngest (30-49 years) is also significant. Such that some differences of beliefs between generations might exist.

The regression results imply also that the relationship of educational level on income beliefs is somewhat spurious, and there does not seem to be any increasing pattern in the odds ratios. The only significant coefficient is for education is the second highest educational category (*High school*) in the ordered logit model with the beliefs about people's income in general (EffortGen) as the outcome, which is negative.

Concluding remarks on the regressions about income beliefs

The correlation between the EffortGen and Income variables as well as the EffortInd and Income variables were significant, as seen in table 5.4. But the ordered logistic regressions run on EffortGen and EffortInd as the outcome variables show that although mainly positive, the effect of income seems to only matter significantly in the case of beliefs about one's own income. And when inspecting the pattern of the relationship, we saw that only the highest income group seemed to be significantly related to income beliefs. This could imply a hint in the direction, that those who are among the richest, could agree more to the statement that their own income is as deserved due to effort than those in the lowest income groups. But this only holds for the income beliefs about one's own income.

In summary, the results show that income cannot be thought of as a significant determinant for the beliefs about whether people in general deserve the income they have based on effort. This is actually in line with the predictions of the model framework by Benabou and Tirole (2006), as they argue that optimists (believing in a world where success can be achieved by working hard enough), are found across all social classes (see section 3.1.2). Such that the poor just as the rich might prefer lower tax rates, for example if they are afraid of possible tax distortions. And also, if the poor become more optimistic, their desired level of redistributive politics decreases. In the case the poor eventually do achieve success, high taxes won't benefit themselves anymore.

One thing we can note from this small regression analysis is that the odds that a man

will show more agreement to the statement about income being deserved due to effort, are substantially higher than they are for a woman. Which can be related to multiple research on gender differences in self confidence, beliefs about ability etc. (for example Barber and Odean (2001); Niederle and Vesterlund (2007)).

Possible problems with reliability of results

The regression models were constructed to check the hypothesised relationship between a respondents' income level and the beliefs around the deservedness of their own income as well as people's income in general. There are some issues about reliability that could be discussed concerning these fairly parsimonious regression models.

First of all, the measured income in this analysis is the gross total household income of the respondent. We don't actually know how much of the income was earned by the person himself. It could have been such that the income was earned mainly by another household member and thus could this affect the beliefs about one's own income (EffortInd) especially. I would have wanted to control for the number of people living in the household, but could not find this item in the data set I have (even though it was mentioned in the survey form).

Omitted variable bias could be a problem in these small regression models. The models aim to mainly test for one main relationship, which is the relationship between one's income level and beliefs about income. There are many factors that could affect the beliefs about to what extent one believes income is as deserved due to effort. For example the level of control over one's life a person feels could be an interesting item to check in regards to this. Also a question whether one has seen success or failure in one's own life or in the life of those close to oneself could be a relevant item to be tested in the context as well. Related to this, it could also have been good to know whether there are differences in respondents' answers if they live alone or share their household with others.

The third problem with reliability could be the fact that there are only 5 response categories to the EffortGen and EffortInd items. One could argue that a Likert-scale of 7 categories would be catching a more realistic picture of the beliefs of people, as they would count in more variation in beliefs. Thus, also possibly catching those people's preferences, who tend to respond neutral even though they actually have a slight preference towards

one end of the scale. It is though suggested that increasing the number of response alternatives using a Likert scale, might not increase the accuracy of what one is trying to measure significantly (Preston and Colman, 2000; Dawes, 2008).

An important assumption that should hold if we are to model the relationship of income and income beliefs using a cumulative ordered logit model, is the proportional odds (equal slopes) assumption. This assumption states that the relationship between pairs of outcome categories should be the same for every pair. Which leads us to have only one set of coefficients for the model results. If the assumption is not met, other model designs might be a better choice for the analysis such as multinomial logit or even dichotomising the outcomes and construct binomial logit or probit models. The proportional odds assumption could have been tested using the Brant test, but as this test in Stata does not allow survey weights, I did not run it. But referring to Heeringa et al. (2010)[3], even though the assumption of proportional odds might not be met, the usefulness of the parsimonious characterisation of the model, might still point in the direction of justifying the use of it in comparison to multinomial logit for example.

As a form of inspection of the model specification, I tried fitting both the "continuous" models (continuous predictors for income, age and education) and the "categorical" models (categorical predictors for income, age and education) with ordered probit and OLS (ordinary least square) methods as well. The summarised coefficients for the continuous versions of the models are listed in the appendix in table A.10, and for the categorical versions in table A.11. The first three columns show the estimated results for the EffortGen outcome and the last three columns the estimations for the EffortInd outcomes. For the continuous predictors model in table A.10, the coefficients do not change much between the different type of models. But in general the estimated coefficients and standard errors are larger in the ordered logit specification than in the ordered probit and OLS models. The coefficient of gender, is for example somewhat higher in the ordered logit model than in the other type of models. For the models with mainly categorical predictors in table A.11, we see somehwat the same, although the coefficients for the OLS model differ quite to some extent from the ordered logit and probit models. There definitely can be some issues with the model assmumptions not being met for the OLS approach, and thus the

[3](Heeringa et al., 2010, 285-286)

difference in coefficient sizes does not suprise. The probit regression also assumes normally distributed standard errors, which might not be met with the data used in these models. But as the implications of the "continuous" model though shows, the pattern of the effects remains quite similar across all different estimation approaches. Therefore, I justify that we may inspect the pattern of the results at least, but may need to be a bit cautious when stating something about the magnitude of the relationships between variables.

5.3 Beliefs about health: luck versus effort

Income is often used as a measure of success. But there are also other dimensions one could consider when looking at people's beliefs around luck and effort. To extend the analysis of checking the property of *"where you sit is where you stand"*, let's see what implications the respondent's health status has on the person's beliefs about whether the health is achieved by own actions rather than luck. Good state of health can possibly be described as the most important asset an individual has. Having good state of health enables a person to function in everyday life, work and participate in the society. Such that from this point of view, health could be seen as even more important than income as a measure of "success" in life. But one could argue that beliefs about whether luck or responsibility causes health is different from what the respective beliefs for income are. Health is generally known to be dependent on many factors, and illness can emerge even though the individual has "invested" in him health, by exercising and sticking to a healthy diet. Thus, could the beliefs about what causes success, luck or own actions, be directed more towards luck in the case of health than with income.

The hypothesis constructed for this part of the analysis is: *whether a person with good health is more prone to believe that one's state of health is largely affected by mainly lifestyle choices and good habits rather than chance.* Good health could be seen as a good signal about the state of the world, to be filtered in the belief forming mechanism in the context of the model framework by Benabou and Tirole (2006). There are two

items in the survey that ask the respondents to rate their thoughts on whether bad state of health is due to individual decisions or uncontrollable factors. These two variables are named HealthLuck and HealthHabits, and the full description of the question and response alternatives can be seen in table 5.7 below.

Table 5.7: Items mapping income beliefs about the income of people in general. *"Some people think good health is to a large extent due to healthy habits and good lifestyle. Others say it is more due to luck and coincidences. How much do you agree or disagree in the following statement?"*

Item	Question	Response alternatives
HealthLuck	Bad health is often due to coincidences	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)
HealthHabits	Bad health is often due to self caused bad habits and lifestyle.	(1 = Completely disagree, 2 = Partly disagree, 3 = Neither agree nor disagree, 4 Partly agree, 5 = Completely agree)

Both items are again measured on a 5-point Likert scale, with response alternatives from *"Completely disagree"* to *"Completely agree"*. As done with the income belief items, I reversed the original scale such that higher numerical values of the variable mean higher agreement to the statement. The main variable, which relationship with the mentioned items above is of interest, is the item that measures the subject's self reported state of health. This item, named Selfrhealth, has an increasing response scale from 0 to 10 where 0 describes *"very bad"* and 10 *"very good"* state of health. The frequency distribution of the health beliefs items as well as the self reported state of health items are listed in the appendix in tables A.8, A.9 and A.7. Briefly described, the distribution of beliefs seems to be clustered around the middle variables, *"Partly disagree", "Neither agree nor disagree" and "Completely agree"* both for the HealthLuck and the HealtHabits item. But clearly, there is more weight on the *"Partly agree"* statement to the statement that "Bad health is often due to bad habits and lifestyle." than what there is for the statement "Bad health is often due to coincidences." The majority of the respondents have stated their health on the upper scale of the response alternatives. Meaning that the respondents mainly

consider their health to be fairly good.

To inspect the relationship graphically, I have predicted the means of the responses to the health belief items over every level of self reported health. Figure 5.3 shows the relationship between the means of HealthLuck responses to Selfrhealth items. It seems like there is a slight negative relationship between the items. Such that higher subjective state of health could be correlated with more disagreement to the statement that bad health is mainly caused by coincidences. Whereas for the second item, HealthHabits, the relationship with Selfrhealth seems to be slightly positive - graphed in figure 5.4. The distribution of responses to the self-reported health item, see table A.7, shows that there were less than 1 % of respondents stating their health as very bad (0 and 1 on the scale from 0 to 10). This could give reason to "look away" from the outliers in both figures (on the lower left in both figures). Meaning that there might be a seemingly monotonic, close to linear relationship between the health belief variables and the self rated status of health. Especially, the right hand side of the graph A.7 shows a close to linear negative relationship between higher self reported health and beliefs about bad health being due to bad luck. It is though good to note that the magnitude of the effect might not be very big, as the range of means to responses to the HealthLuck item varies only between 2.75 and 3.75.

Interpreting these findings, it looks like respondents with lower state of health seem to agree more to the statement that bad health is due to coincidences than the respondents with good state of health. For the one's reporting their state of health high, bad state of health is considered to a lower extent a result of coincidences. Accordingly the relationship is confirmed by the other item, HealthHabits, as well (in figure 5.4). If we can reinterpret the belief about self-inflicted bad habits as the main cause for bad state of health to correspond with beliefs about one's own responsibility in health matters, the data suggests that people with good health, think it is mainly due to their own effort and good lifestyle choices rather than good luck.

To check whether there is any significant association between the items HealthLuck and Selfrhealth as well as HealthHabits and Selfrhealth, I run a few association tests including the Spearman's rho, Pearson's χ^2 test. The test results can be read in table 5.8. The first test, Spearman's rank-correlation, is about the possible correlation between the

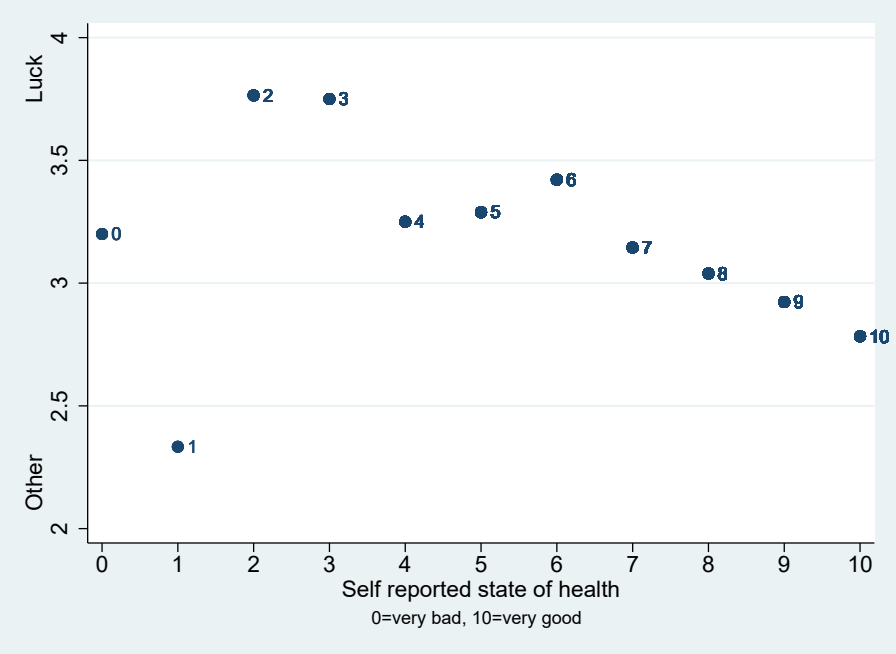


Figure 5.3: Relationship between beliefs about health being a question of coincidences (*HealthLuck*) and self reported status of health (*Selfrhealth*)

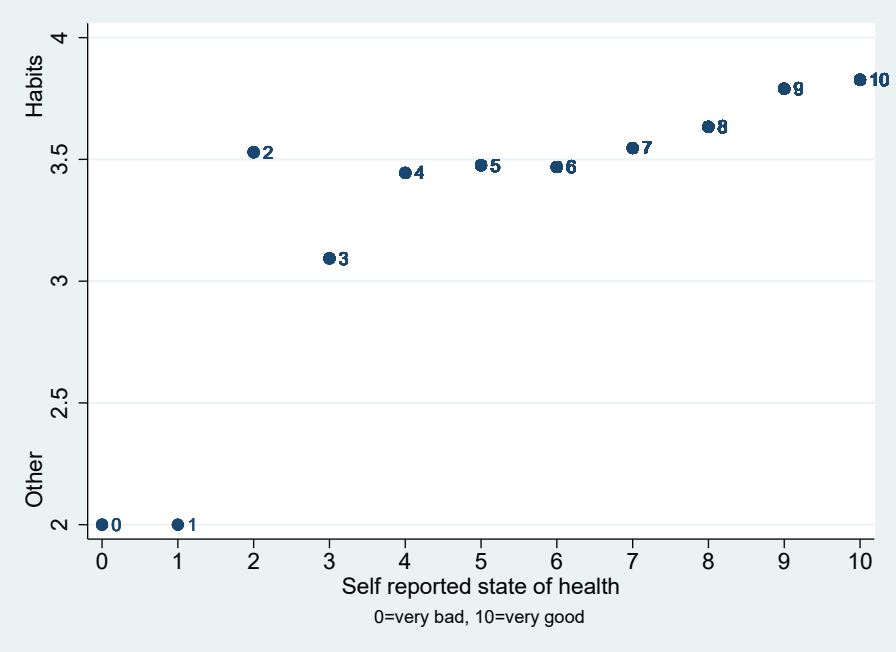


Figure 5.4: Relationship between beliefs about health being a question of bad habits and lifestyle (*HealthHabits*) and status of health (*Selfrhealth*)

variables. The χ^2-test is to check whether the rows and columns of the twoway-table with the respective variables are independent of each other. Thus the null-hypothesis being that there is no significant association between the variables.

Table 5.8: Tests of association between health belief items and self related health item. (One pair at a time)

Items	Spearman's rho	Prob> $\|t\|$	Observations
HealthLuck and Selfrhealth	-0.180***	0.000	977
HealthHabits and Selfrhealth	0.166***	0.000	979
Items	**Pearson's χ^2**	**p-value**	**Observations**
HealthLuck and Selfrhealth	chi2(40)=106,311***	0.000	977
HealthHabits and Selfrhealth	chi2(40)=197.559***	0.000	979

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As we see from table 5.8, the Spearman's rank correlation is significant, but the correlation is rather low, although pointing in the direction the graphs in figures 5.3 and 5.4 suggest. That is, negative relationship between HealthLuck and Selfrhealth and positive relationship between HealthHabits and Selfrhealth items. The Pearson's chi-squared test shows that the we can reject the null-hypothesis of independence of rows and columns between both of the health-belief items and the item Selfrhealth. Such that some association between the variables seems to exist.

5.3.1 Regression of health belief items

To explore the possible association of the health belief items and the self related state of health item further, I run small ordered logistic regressions with HealthLuck and HealthHabits as outcome variables. The approach is similar as for the income and income belief variables in the previous section. All predictors besides the predictor for gender are treated as continuous, and thus a positive coefficient does mean higher odds of agreeing more to the statements the outcome variables stand for.

The main association of interest is the relationship between HealthLuck and Selfrhealth as well as the HealthHabits and Selfrhealth items. I chose to treat variable Selfrhealth

as continuous in these regressions rather than categorical with the 11 steps. I justify this decision, like the case was with the income predictor in the previous section, due to the increasing ordered nature of the scale. Other predictors are also included in the model, again in a similar matter as with the income beliefs.

Age is the first thing to be checked with the health belief items in addition to the Selfrhealth. Age could be seen to affect the beliefs about whether one's state of health is a result of luck or own actions, for example through the hypothesis that older people have already a lot of life experience. An older individual has highly likely explored some periods with bad lifestyle (periods with high alcohol consumption or bad diet) during one's life. And thus beliefs about health might being more a question of own actions rather than luck is "confirmed" as a person ages. On the other hand, the elderly are prone to have worse health than young for biological reasons and could be thinking more in the direction that having good health means being lucky. But as the question is asked about if health in general can be connected more to luck or habits, this should possibly not matter too much. Unless the respondent has understood the question to resemble his own subjective state of health. To inspect the possible differences for beliefs between age groups, I later on also chose to categorise the age into groups, when including it as a predictor in the regression models.

The third predictor to include in the regression models on health beliefs is the gender. As with income and income belief, if we think of good health as an asset that reflects success, we could expect that men would be more prone to associate health status with own actions rather than luck.

The last predictor to be included, just as with income, is the educational level of the respondents. Those with higher education could hypothetically be thought to have more knowledge around the possible effects bad lifestyle choices can have on one's health. According to research based on the Grossmann's model for health capital demand (Grossman, 1972), investment in preventive care tends to increase with education, for example (Folland et al., 2007).

Table 5.9: Ordered logit regression results for the health belief outcomes.

	HealthLuck *"Bad health is often due to coincidences"*		HealthHabits *"Bad health is often due to bad habits."*	
	Coefficients	Odds ratios	Coefficients	Odds ratios
Selfrhealth	-0.141^{***}	0.869^{***}	0.218^{***}	1.243^{***}
	(-3.48)	(-3.48)	(4.13)	(4.13)
Age	0.0225^{***}	1.023^{***}	-0.0331^{***}	0.967^{***}
	(4.71)	(4.71)	(-6.11)	(-6.11)
Male	-0.0519	0.949	0.709^{***}	2.032^{***}
	(-0.36)	(-0.36)	(4.45)	(4.45)
Education	0.137	1.147	-0.0953	0.909
	(1.51)	(1.51)	(-0.90)	(-0.90)
/				
cut1	-2.151^{***}	0.116^{***}	-3.061^{***}	0.0469^{***}
	(-3.52)	(-3.52)	(-4.64)	(-4.64)
cut2	-0.275	0.760	-1.631^{*}	0.196^{*}
	(-0.47)	(-0.47)	(-2.57)	(-2.57)
cut3	0.604	1.829	-0.701	0.496
	(1.03)	(1.03)	(-1.12)	(-1.12)
cut4	2.659^{***}	14.28^{***}	2.446^{***}	11.55^{***}
	(4.44)	(4.44)	(3.78)	(3.78)
Observations	965	965	967	967

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Regression results, health beliefs

The results of the regressions in table 5.9 shows the regression results of the ordered logistic regression model with HealthLuck as the outcome variable in the first two columns, and the model with HealthHabits as the outcome in the third and fourth columns. The two columns for each outcome stand for the estimated coefficients of the regression model in the first, and the estimated odds ratios in the second.

I consider the regression results for the model with beliefs about bad health being a question of luck (HealthLuck) outcome first, and thereafter the model for beliefs about bad health being a question of bad habits (HealthHabits) outcome, as we would expect to see opposite results from the models. The first implication is that the coefficient for Selfrhealth is negative and statistically significant in the regression with HealthLuck as the outcome variable (see columns (1) and (2) in table 5.9). Such that higher health status is related to more disagreement to the statement that bad health is caused mainly by luck and coincidences. The odds ratios suggest that the odds of stating a higher category to the HealthLuck item (agreeing more to the statement) decreases by approximately 13.1% for every additional level of health status starting from very bad, when holding the other variables unchanged.

The second implication is that the coefficient for the Age predictor is also highly significant and positive. Thus it does seem like higher age is related to more agreement with the statement that bad health is mainly due to bad luck. This could relate to the fact that as people become older, they could also have been exposed to sudden illness or accidents, leading to worse state of health. Accidents and sudden illness of course is more related to luck than neglection of healthy habits. The coefficient for the predictor for gender, Male, is negative but not statistically significant. Education as well does not seem to have a statistical significant inference with the HealthLuck outcome.

For the HealthHabits outcome, we would expect to see opposite results than what we saw for the HealthLuck outcome. From columns (3) and (4) in table 5.9 we can see that this is in fact true. Higher levels of self related health are positively related to the HealthHabits item, implying that higher state of health is related to more agreement with the statement that bad health is mainly due to bad habits and lifestyle. The coefficients

for Age is negative and statistically significant, suggesting that higher age is related to more disagreement with the statement.

Where the gender did not seem to have a statistically significant effect for the HealthLuck outcome, here the gender seems to matter. The coefficient for Male is positive and statistically significant, and the related odds ratio is as high as 2.032 (holding the other variables fixed). Meaning that the odds of a man agreeing more to the statement that "bad state of health is often caused by bad habits", is over twice the times the odds for a woman. This could relate to the discussion earlier, that men are more prone to relate their "success" to own ability and skill than women. As with the model for HealthLuck, the educational level does not seem to have a significant effect on the beliefs about the relationship between bad health and bad habits.

In the same manner as was done in the previous section with the health beliefs, I categorised the predictors for age and education and reestimated the models. The results table 5.10 suggest that for all higher age groups compared to the reference group, the young (18-29 years), the odds of agreeing to HealthLuck is higher, whereas the relationship is negative for the HealthHabits outcome. This was of course what the model with the continuous predictor for age suggested (in table 5.9). But interestingly, compared to the reference group for the young (18-29 years), it seems like the effect of age is strongest for the middle-aged group (50-50 years). All educational levels remain insignificant in this approach as well.

Conclusion of the regression of health belief items

The small ordered logistic regressions constructed with HealthLuck and HealthHabits items as the outcome variables, suggest that higher state of health is connected to beliefs about health being more a question of own responsibilities rather than luck. Higher age seems to be related to more agreement to the HealthLuck item and more disagreement to the HealthHabits item. That is, as age increases the beliefs about health being a question of luck increases, whereas the belief about health being mainly due to habits and lifestyle choices decreases. For the highest age groups this at least makes sense, as when one

Table 5.10: Ordered logit regression results for the health belief outcomes, with age and education as categorical predictors.

	HealthLuck *"Bad health is often due to coincidences"*		HealthHabits *"Bad health is often due to bad habits."*	
	Coefficients	Odds ratios	Coefficients	Odds ratios
Selfrhealth	-0.129^{**}	0.879^{**}	0.197^{***}	1.218^{***}
	(-3.16)	(-3.16)	(3.67)	(3.67)
18-29 years	$ref.$	$ref.$	$ref.$	$ref.$
30-49 years	0.837^{***}	2.309^{***}	-1.328^{***}	0.265^{***}
	(3.51)	(3.51)	(-5.21)	(-5.21)
50-59 years	1.269^{***}	3.559^{***}	-2.074^{***}	0.126^{***}
	(5.12)	(5.12)	(-7.36)	(-7.36)
>60 years	1.114^{***}	3.045^{***}	-1.822^{***}	0.162^{***}
	(4.40)	(4.40)	(-6.69)	(-6.69)
Male	-0.0796	0.923	0.757^{***}	2.133^{***}
	(-0.55)	(-0.55)	(4.75)	(4.75)
Primary school	$ref.$	$ref.$	$ref.$	$ref.$
Secondary level	0.203	1.225	-0.504	0.604
	(0.48)	(0.48)	(-0.88)	(-0.88)
High School	0.284	1.329	-0.722	0.486
	(0.74)	(0.74)	(-1.39)	(-1.39)
University level	0.285	1.330	-0.454	0.635
	(0.75)	(0.75)	(-0.88)	(-0.88)
/				
cut1	-2.484^{***}	0.0834^{***}	-3.330^{***}	0.0358^{***}
	(-4.40)	(-4.40)	(-4.89)	(-4.89)
cut2	-0.592	0.553	-1.887^{**}	0.152^{**}
	(-1.11)	(-1.11)	(-2.82)	(-2.82)
cut3	0.295	1.343	-0.950	0.387
	(0.56)	(0.56)	(-1.44)	(-1.44)
cut4	2.362^{***}	10.61^{***}	2.320^{***}	10.18^{***}
	(4.42)	(4.42)	(3.47)	(3.47)
Observations	965	965	967	967

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

becomes older, the prospects of staying healthy naturally decrease as age is related to higher risks of catching disease and in general having worse state of health Folland et al. (2007).

In line with the findings for income beliefs, gender seems to play a role in whether the one's state of health is considered to be mainly due to the individual's own behavior. According to the regression with HealthHabits as the outcome, men are more prone than women to relate bad state of health with people's own lifestyle and habits. But as discussed above, the coefficient related to gender when looking at the HealthLuck as the outcome was not significant. This could imply that it is not necessarily so that men don't believe luck plays a role in the determination of one's state of health at all. An important note to make is that the questions do not ask about the cause of the respondent's own state of health, but rather what the cause of bad state of health in general is. This could have affected the beliefs in one direction or another.

Issues with reliability of the regression results

The issues with reliability of the regression results in this subsection are much the same as for the regression for the income belief variables. Omitted variable bias is one of the main concerns, as there are not many variables included in these parsimonious models. Keeping the models simple, possibly eases the understandability of the hypotheses to be tested, but on the other hand gives reason to doubt whether the results can be trusted.

As the data is not gathered for the purpose of the questions I specially am trying to explore, we cannot be sure that we are measuring exactly the beliefs about health being a matter of luck versus habits or lifestyle choices. The questions ask whether bad health is a question of luck or the individual's own actions, which do not give us any information whether the results would hold if the question was rather asked rather concerning good state of health. That is, whether good state of health is believed to be caused by coincidences or good habits and lifestyle.

The same question arises in the context of these regression models, whether the assumptions for proportional odds is met. For this concern, I refer back to the section with income beliefs, where this assumption was discussed (see the last subsection of section 5.2.2). In line with the same section, I also constructed ordered probit and OLS

regression models and compared their results. The coefficients from these regressions are listed in the appendix in tables A.13 and A.13. There seems to be some differing results between the ordered logit compared to the ordered probit and the OLS regressionr results. The magnitude of the coefficients as well as standard errors are somewhat bigger for the ordered logit approach, which could imply that the model selection might not have been completely right. The tendency of the effects though stay the same for all different model approaches, and thus I do justify that we at least can predict the direction of effects from the original models in tables 5.9 and 5.10 with some degree of robustness.

6 Part 2: Societal versus individual responsibility and helping behaviour

The theory by Benabou and Tirole (2006) implies that optimistic people holding "just world" beliefs should be less willing to support high levels of redistribution than pessimists, who acknowledge the fact that the world is not always fair (and that the amount effort pays off, can be ambiguous). The preferred level of redistribution is also assumed to decline with income.

The intention of the analysis in this section is to test whether the hypothesised statement "Stronger beliefs in "just world" lower the preferences for redistributive policies", holds. Or at least, if it is possible to see some patterns in the survey data that may support this theory.

6.1 Suitable items for analysis

In the model by Benabou and Tirole (2006), the endogenously decided tax rate serves as the indicator for preferences for redistribution. In our data, there are no items asking the respondents to elicit their preferred tax level. The original purpose of why the survey in the first place was constructed, was to assess people's beliefs over addiction and responsibility. There are some items within this topic that possibly can be reinterpreted to gather some information about people's beliefs over societal versus individual responsibility - which can be seen to be linked to preferences for redistribution.

The items chosen ask respondents whether they think addicted individuals are self responsible for the problems caused by their addiction, or whether the society should be responsible for these issues. The item, which asks the respondents to rate their opinions on whether the addicted self is responsible for quitting his addiction or whether the society is responsible to help the addicted person quit, is especially of interest. The three items related to opinions about social versus individual responsibility are listed in table 6.1.

In the model by Benabou and Tirole (2006), beliefs over the expected returns to effort

Table 6.1: List of items mapping beliefs over responsibility of addiction issues.

Item	Question	Response alternatives
Rescost	Would you say the addicted individual himself is responsible for the costs and damage caused to himself and his closest, or is the society responsible for these?	(1 = Mainly individual responsibility, 2 = More individual than societal responsibility, 3 = More societal than individual responsibility, 4 = Mainly society's responsibility)*
Resprob	Who is responsible for misuse or addiction of the following substances, such that the problem gets solved, the addicted person himself or the society?	(1 = Mainly individual responsibility, 2 = More individual than societal responsibility, 3 = More societal than individual responsibility, 4 = Mainly society's responsibility)
Resstop	Do you think it is the addicted individual's own responsibility to quit or the society's responsibility to help the addicted individual quit?	(1 = Mainly individual responsibility, 2 = More individual than societal responsibility, 3 = More societal than individual responsibility, 4 = Mainly society's responsibility)*

*Neutral *"Neither nor"* response category omitted.

Every question asked over 9 subcategories of addictive substances and activities: alcohol, tobacco, cannabis, gambling, amphetamine, heroin, prescription drugs, cocaine and internet.

are formed through many endogenously and exogenously determined factors: the agent's initial endowment level, beliefs about the level of tax rate, the level of willpower, the level of "Bayesian skepticism" as well as beliefs about other agent's beliefs. I choose to ignore this complex mechanism for now, and select an item from the survey data that would hypothetically measure the level people believe that everyone get's as deserved. The chosen item, named Control, is described in table 6.2. The item maps respondents beliefs about whether they think addiction is due to "controllable" decisions by the individual himself or circumstances outside the individual's control. As addressed by Benabou and Tirole (2006) in the theory, and by findings in empirical research (Fong, 2001; Bundorf and Fuchs, 2008), suggest that people who believe they can determine the outcomes of their life to a large extent, are less supportive of redistributive policies. According to this we could expect less support for social intervention for addiction to the substances and activities people consider as more self chosen and controllable than uncontrollable.

The three questions regarding the responsibility as well as the Control question mapping people's thoughts on the cause of addiction, are asked with respect to nine different

Table 6.2: Control item mapping beliefs about "internal" versus external control as a cause of addiction.

Item	Question	Response alternatives
Control	Do you think addiction or misuse of the following substances is due to the individual himself or circumstances outside his control?	(1 = Mainly the individual himself, 2 = More due to the individual himself than other circumstances, 3= More due to other circumstances than the individual himself, 4 = Mainly other circumstances)

Question asked over 9 subcategories of addictive substances and activities: alcohol, tobacco, cannabis, gambling, amphetamine, heroin, prescription drugs, cocaine and internet.

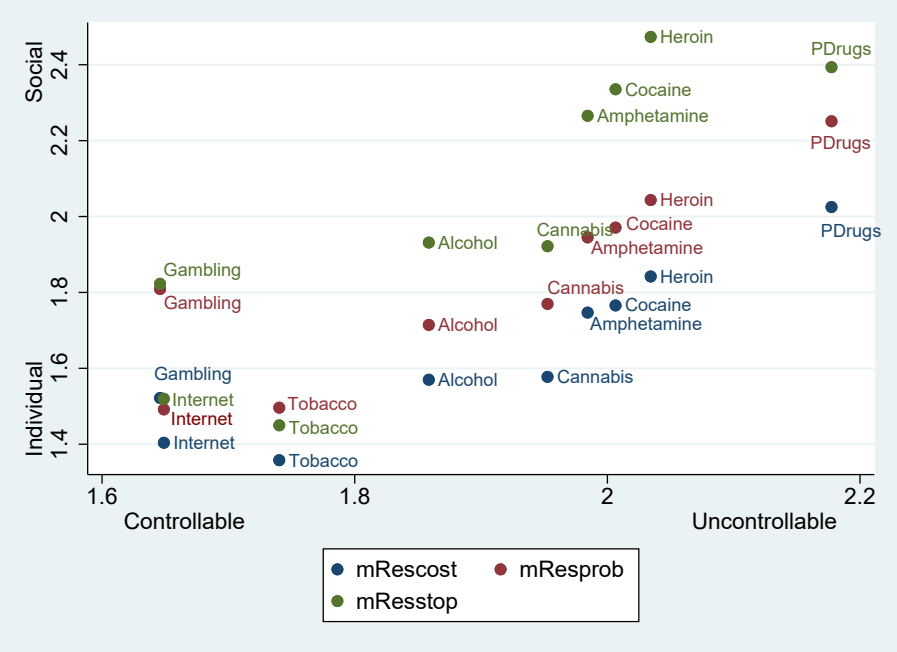
addictive substances and activities. This creates the opportunity to analyse whether there are consistent beliefs over a substance on both the responsibility and the cause of addiction items. That is, whether a respondent who stated addiction being mainly due to the addicted individual himself rather than uncontrollable circumstances, also responded that addiction related problems are mainly the individual's own responsibility rather than social (or the other way around), as the theory would predict.[1]

6.2 Beliefs about the cause and beliefs around the responsibility of addiction related problems

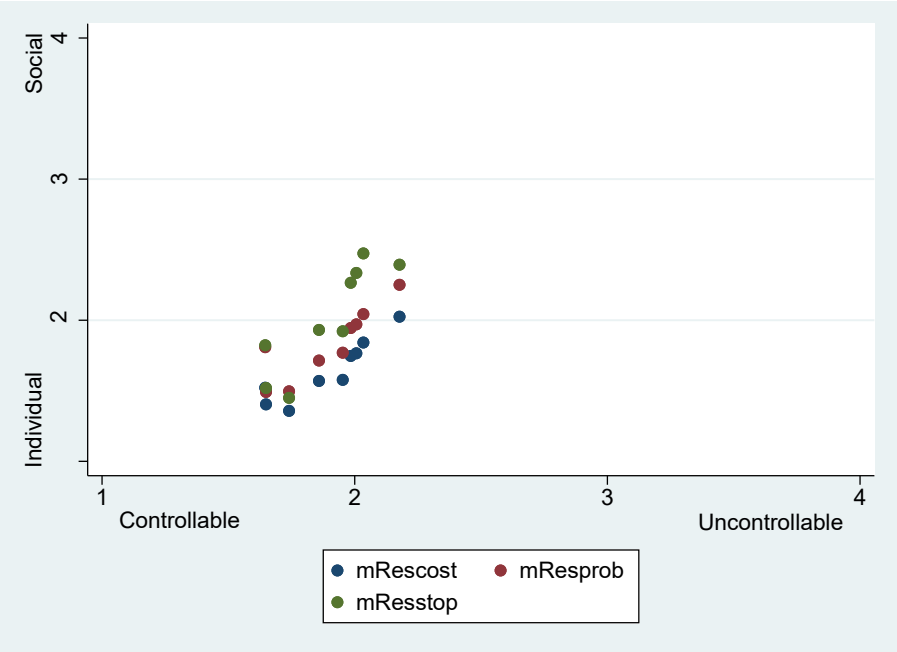
I predict the means to the responsibility items as well as the item for beliefs around internal or external control as a cause for addiction. The values of the predicted means for all addictive substances and activities are gathered under the indicators *mRescost, mResprob, mRestop*[1] and *mControl* respectively. The scatterplot of these predicted means of responses of the items for all addictive substances and activities are graphed in figure 6.1a. Every dot stands for a predicted mean over responses to one of the nine different addictive substances or activities.

[1]This analysis is also inspired by an article by Melberg et al. (2013), who go trough similar data to check same kind of connections. Their approach though differs somewhat, and the response scale to items is different as well.

[2] **mRescost, mResprob, mResstop= predicted mean of responses to responsibility items Rescost, Resprob and Resstop respectively.*



(a) Beliefs about addiction being due to controllable or uncontrollable factors and beliefs about responsibility of addiction related issues.



(b) Replication of the scatterplot in 6.1a, but plotted on the complete scale of response alternatives.

Figure 6.1: Beliefs about the cause of addicton; uncontrollable or controllable by the individual, and beliefs around the responsibility to addiction related issues.[2]

As we can see in figure 6.1a, there seems to be an upward slope in the scatterplot. Addiction to substances that are thought to be more due to uncontrollable circumstances than individual decisions seems to be related more towards social responsibility rather than individual. And vice versa for substances where responses score lower on the Control scale, the responses regarding responsibility are pointed towards the individual rather than the society. This could imply that the hypothesis, that people who believe more in self-determination are less willing to support redistribution, could also be present in the context of this data.

Although there seems to be a monotonic relationship between these items, the differences can't be considered to be overwhelmingly large. This is shown by the distribution of the tics using the full axis of responses, as done in figure 6.1b. This graph implicates that even if there might be differences between the levels of beliefs, they aren't substantially different from each other. All predicted means for the items are clustered mainly below 2 on both axis. The respondents seem to relate the addiction responsibilities as well as cause of addiction mainly to the individual rather than the society. But since there seems to be a small but pretty clear relationship, I chose to analyse this finding further, and especially to explore if we can see the same pattern within beliefs over one single addictive substance.

6.3 Association of beliefs about responsibility within a type of addiction

I chose to run small regressions on the responsibility variables to check if there are associations between beliefs about control within the levels, given by the addictive substances. The three responsibility items could have possibly been combined to one factor, but I chose for simplicity only the Resstop variable as the outcome variable for the regression analysis. The question asks the respondents to rate their thoughts on whether the society should help the addicted person quit or whether the individual is responsible for this himself. Thus assessing a concrete issue of a societal intervention, towards which governmental resources could be distributed. The intention with the regression analysis is to investigate whether respondents are more prone to reply that the society should help

addicted individuals quit their dependencies, if beliefs around the cause of addiction are thought to be mainly exogenous and outside the individuals control.

In the original data, there was a neutral category on the scale of responses for the Resstop item. I chose to omit the category as the frequency of responses to this seemed to be very low for all nine substances and activities. The *"Neither individual nor social responsibility"* response category was coded as number 5 on the scale, besides the number 6 *"Don't know"* alternative, instead of placing it in the middle as number 3. Thus, in light of this, I argue that the neutral variable was possibly misleadingly coded on the response scale, resulting in less neutral replies than if the response option would have been placed in the middle of the scale.

Not having a clear neutral category on the item, could be contributing to the fact that all tics lie on the lower left corner of the graph in figure 6.1a. Moving from one opposite statement to the other gives certainly a threshold between response alternative 2 (more individual than social) and response alternative 3 (more social than individual). But in this case it could be seen as natural to dichotomize the original 4-point scale to consist of only two levels. I thus developed a binary variable dResstop, that takes the value 0 if the respondent replied the responsibility to be individual (*1 = "Mainly individual"* or *2 = "More individual than social"*), and the value 1 if the responsibility was rated to be social (*3 = "More social than idnividual* or *4 = "Mainly social"*). This enables to construct a binary logistic regression model where the binary outcome variable of some substances can be tested against the Control variable as well as other predictors selected from the data.

Gambling, alcohol and prescription drugs (PDrugs) are selected as the subcategories of Resstop, to construct the binary logistic regression models around. Looking at the graph in figure 6.1a, these substances score respectively on the lower left, middle and upper right in the scatterplot.

The baseline model looks at the relationship between dResstop and dControl variables for each subcategory (alcohol, gambling and prescription drugs). To check some additional explanations, the models are run twice with control variables included in the second. The

control variables include 3 items that are directly related to drug addiction beliefs and the other 4 are demographic variables consisting of the income, age (and squared of age as a check for non-linearity), gender and educational level. The control items related to drug addiction are Recover, Socialprob and AddictedClose and the full description of the questions asked are listed in table 6.3.

Table 6.3: Items mapping experiences and beliefs related to drug addiction

Item	Question	Response alternatives
Recover	How big do you think the possibility to recover from an addiction of the following substances or activities is with treatment?	*(1=Big, 0=Small/Neither nor)
Socialprob	How serious do you think the following social problems are on a scale from 1 to 10? (with respect to gambling, alcohol problems and misuse of prescription drugs among other)	(1=Not serious at all, 10=Very serious)
AddictedClose	To what extent do you have experience with friends or close family consumes drugs, on a scale from 0 to 10?	(1 = No one I know consumes or has consumed, 10=A close family member has consumed many different substances over a long period of time)

*Response scale recoded from original.

The first item (Recover) asks the respondents to rate their thoughts on how big the possibility to recover from a drug addiction is with treatment. The original response scale consisted of 5 categories from small to big. I chose for simplicity to dichotomise this variable such that it takes the value 1 if the respondent replied that there is a big chance of recovering with treatment (categories 4="relatively big" and 5="big") and 0 otherwise. The second item (Socialprob) asks the respondents how serious they think some specific social problems are. Here gambling, alcohol addiction as well as misuse of prescription drugs are included. The responses are measured on a scale from 1 to 10 from "not serious" to "very serious". The last drug addiction related item (AddictedClose) measures to what extent the respondents know someone among their family or friends is consuming drugs. All of these three control items could be thought to have a positive

relationship with the outcome variable. That could indicate willingness to support more societal interventions in helping addicted people quit their dependence. The two first of these items, Recover and Socialprob, are measured with respect to the addictive substance or activity of interest. That is either gambling, alcohol or pharmaceutical drugs. And also to be noted, I chose to include the items Socialprob and AddictedClose as continuous predictors in the regression models, as these are have a quite large response scale with increasing characteristics.

Of the demographic factors, income is included as a predictor mainly to check if the implications from the previous section regressions holds. That income level should not affect the beliefs about whether people should be responsible for their own life. As discussed, "just world" type beliefs should be present across social classes. The income is included as the 5-step categorical predictor Income5. The other demographics included are labelled in the same manner as in the previous sections of this thesis: age (Age), gender (Male), as well as the respondent's educational level (Education).

Table 6.4: Tests of bivariate associations between the dichotomised variables dControl and dResstop items for Gambling, Alcohol and PDrugs. (One pair at a time)

Items	Subcategory	Pearson's χ^2	p-value	Observations
dControl and dResstop	Gambling	chi2(1)=11.003***	0.000	970
dControl and dResstop	Alcohol	chi2(1)=27.045***	0.000	976
dControl and dResstop	Prescription drugs	chi2(1)=72.587***	0.000	959

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Before running the regressions, I checked if the main predictor variable chosen for the analysis, dControl, actually has a significant association with the binomial response variable dResstop. The Pearson's chi-squared test statistic is calculated again to check the null hypothesis of no association between the main predictor of dControl and the outcome variable dResstop, with respect to the three different substances. The calculated results for these tests can be seen in table 6.4. The results imply that the dichotomised Control variable dControl has significant bivariate association to the outcome dResstop, for all addictive substances or activities we are looking at: gambling, alcohol and prescription drugs. Keeping in mind that we might have lost some information by dichotomising these

respective variables[3].

6.3.1 Regression results, addiction related beliefs

The regression results are presented for each of the addictive substances and activities of interest in the appendix in tables A.14, A.15 and A.16. The first columns in each table represent the binary logistic regression with only the main predictor, that is the binary item dControl for each substance. The second columns represent the regression results of the full models including all predictors. The coefficients do not significantly change moving from the baseline model (first column) to the model with all controls included (second column). Thus are all full models with variable descriptions collected in table 6.5 below (equaling the second columns in A.14, A.15 and A.16).

What we can see from table 6.5 is that for all substances, the coefficient for the dControl variable is positive and significant. This means that beliefs about drug addiction being due to factors outside the individuals control are related to support for societal intervention in helping addicted quit. The significance is especially strong for the two latter substances, alcohol and prescription drugs. Of the drug addiction related control items, Recover, Socialprob and AddictedClose, only the coefficients for the Socialprob item (for all respective substances) are significant. Considering gambling, alcohol addiction and misuse of prescription drugs as severe social problems, increases the likelihood of supporting the statement that the society should help addicted individuals quit their addiction. The AddictedClose item is negative in all regressions, but insignificant. One could expect that having more experience of family and friends being addicted or consuming drugs, could lead to more willingness to support societal intervention in drug addiction quitting. The coefficient points in the opposite direction, but is not significant and thus I will not elaborate the finding further.

Of the demographic items, no items seem to have significant coefficients in the regression models besides the third category of income in the regression model for subcategory alcohol, and the squared term of age for the regression model with the prescription drugs as the subcategory. Such that the middle income group (gross total household income

[3]I checked these associations using the original 4-step items, which also rejects the null hypothesis of no association between the variables for all three subcategories.

Table 6.5: Summary of output for the estimated full binary logistic regression models for the outcome dResstop for the subcategories: gambling, alcohol and prescription drugs

		dResstop *"The society should help the addicted individuals quit their dependence"*		
Item	Category	Gambling	Alcohol	PDrugs
dControl[a]	*Uncontrollable factors*[b]	0.724*	0.814***	1.154***
"Cause of addiction"		(0.289)	(0.244)	(0.179)
dRecover[a]	*Big*[b]	-0.0636	-0.0472	0.0904
"Possibility to recover"		(0.290)	(0.255)	(0.201)
Socialprob[a]		0.283***	0.227***	0.136**
"Seveirity of problem"		(0.0552)	(0.0530)	(0.0449)
AddictedClose		-0.0259	-0.00584	-0.0161
"Anyone close to you using drugs"		(0.0342)	(0.0335)	(0.0291)
Income5	<199.	*ref*	*ref*	*ref*
	200.-399.	-0.333	-0.472	0.164
		(0.560)	(0.538)	(0.514)
	400.-599.	-0.929	-1.171*	0.172
		(0.567)	(0.540)	(0.503)
	600.-999.	-0.920	-0.582	-0.183
		(0.561)	(0.522)	(0.494)
	>1 mill.	-0.837	-0.641	0.112
		(0.549)	(0.516)	(0.505)
Age		0.0509	0.0482	0.0585
		(0.0482)	(0.0441)	(0.0344)
Age2		-0.000739	-0.000610	-0.000747*
		(0.000519)	(0.000469)	(0.000354)
Male	Male	-0.147	-0.161	0.0119
		(0.238)	(0.213)	(0.179)
Education	*Primary School*	*ref*	*ref*	*ref*
	≤Secondary level	0.456	0.375	0.0660
		(1.062)	(0.742)	(0.615)
	High School level	0.735	0.0146	-0.290
		(1.001)	(0.687)	(0.582)
	University level	0.584	-0.0687	-0.107
		(1.003)	(0.684)	(0.581)
cons		-3.736*	-3.387**	-2.324*
		(1.499)	(1.278)	(1.040)
N		931	951	914

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[a] Items Control, Recover and Socialprob are defined with respect to the addiction substances or activities.

[b] Reference categories: dControl (Due to the person herself/himself), dRecover (Low / Neither nor),

of NOK 400.000-599.000) seems to be less supportive for societal intervention of alcohol addiction quitting as the coefficient is negative. For the case of prescription drugs, the squared age term seems to be negative and significant. This means that there are possibly different magnitude of effects between age groups (stronger for the young than the old for example) on the beliefs about societal versus individual responsibility of quitting drug addiction in the case of prescription drugs.

To check if there is any association of the items for income (Income5) and Education at all, I checked the design-adjusted Wald test (that includes the survey weights) for all predicted categories. Test results showed that the parameters of the predictors are not significantly different from zero in either of the models (models for each substance in columns (1)-(3),table 6.5). Meaning that the predictors as whole including all categories do not have statistical inference with the outcome variables.

Are the results reliable?

Omitted variable bias is again the most obvious problem with this model, as there could be other underlying explanatory variables that should have been included in the model to get more reliable result. Another important issue is that I have chosen to dichotomise the main variables of interest, the Resstop and Control items. Some important information might be lost by doing this, which could affect the model estimates. Like I did in the previous part with income and health beliefs, it could be beneficial to check if the same results would occur if one used another type of regression model. For example the probit regression could have been constructed using the same predictors, and the results could have been compared. Or alternatively, restoring the original scale of the results and running a multinomial logistic regression on the items.

6.4 Concluding remarks on the analysis of beliefs related to drug addiction problems

In conclusion, these results imply that both across and within the substance levels, the higher the beliefs that addiction is due to mainly uncontrollable circumstances, the higher are the odds of stating that the society should intervene in helping addicted individuals

quit their addiction. And vice versa: the more the cause of the addiction is related to individual choice, the less is the support for societal intervention.

Controlling for what other factors might cause beliefs towards societal rather than individual responsibility in addiction quitting problem, only the belief to what extent the addiction was seen as a social problem had an significant effect. The beliefs about how big the possibility to recover from an addiction was not significant in this context. This could imply that even though people think the addicted individual should receive help from the society to quit, they don't necessarily believe that the help always leads recovery of the addiction. People might end up in support groups or methadone maintenance treatment programmes for a long time. If this is seen as a better alternative for the addiction with no intervention, the support for societal intervention could still persist. The coefficients for income were not significant in the regression results either. This could be related to the prediction by Benabou and Tirole (2006), that "just world" believers should be found across all social classes, also referred to findings by Alesina and La Ferrara (2005). Such that the level of income one has, does not significantly affect one's beliefs about redistribution. Of course, whether income directly can be related to the drug addiction responsibility questions is also uncertain. The matter is not directly about redistribution in the form of lump sum transfers, rather in the form of providing help for those in need. Especially if the belief is that addicted people are in a situation which they might not escape from on their own.

Finally, to connect the findings in this chapter back to the model framework by Benabou and Tirole (2006), the initial prediction was, that among optimists, who believe in a "just world", there should be less support for redistributive politics than among pessimists. If optimists can be seen to be those who believe addiction problems are more due to individual actions rather than some uncontrollable events, and redistribution preferences could be translated in this context to the beliefs about whether the society should help the addicted individuals quit their problem, the prediction seems to hold. The main finding of this section is, that among those that think addiction is mainly caused by individual's own actions, there is less support for the statement that society should be responsible to help addicted individuals quit.

7 Conclusion

The aim of this thesis was to explore if and why people seem to have an urge to justify their success by associating it with own actions rather than luck or chance. An empirical analysis using data from a Norwegian survey was constructed, to see if this is the case if we reinterpret high income or high state of health as success. Moreover the analysis was used to explore whether we can see any evidence of people who have faced success to consider it as deserved more than those who haven't. Furthermore, whether success is considered especially to be deserved due to people's own effort and actions rather than uncontrollable events and luck. The findings suggest that in the case of income, having high income was not significantly related to higher beliefs in income being deserved or especially, income being deserved due to effort by the person receiving the income. This might relate to the prediction in the economic model by Benabou and Tirole (2006) presented in chapter 3, that pessimists and optimists, believing in the fact that everyone can achieve success as long as they work hard, are found across all income classes.

Considering high level of health as a measure of success, the findings suggest that those with higher self reported state of health are actually more prone to believe that health is a question of own actions and healthy lifestyle choices than those with lower self reported state of health. This is quite interesting, as one could assume that people perceive good health as something one is fortunate to have or not more than income. One explanation to this could be the proposed mechanism in the model framework by Benabou and Tirole (2006). The authors argue that it might be functional and motivating for a person to believe that good lifestyle choices and habits lead to good health. Thinking that health is more a question of being lucky, could lead to loss of motivation to keep pursuing the healthy lifestyle.

Both in the case of income and health beliefs, gender of the respondent seemed to matter significantly. That is, men seem to be more confident over the statements that both income and one's state of health can be explained by an individual's own actions. This is in line with evidence from other studies, that men tend to be more optimistic than

women about their own ability and skills. They also tend to associate success with their own actions more than women do (Deaux and Emswiller, 1974; Niederle and Vesterlund, 2007).

Returning to the main reference to this thesis, the theory by Benabou and Tirole (2006) suggested that there should be less support for redistributive policies among optimists, who hold high beliefs about returns to effort. Inspired by this prediction, the association between beliefs about social versus individual responsibility over drug addiction problems was analysed using the Norwegian survey data. The objective was to see if there was more support for societal intervention in trying to solve addiction related problems, if the cause of addiction was related more to social responsibility than individual. The findings suggest that there are differences in beliefs between addictive substances and activities. But moreover, when the belief about the cause of the addiction was related to the addicted individual himself, the support for societal intervention to solve the problem was lower. The same implications were also present when analysing addictive substances and activities individually. The respondents demographic features did not significantly affect the beliefs, neither whether the people had experienced addiction close in family or friend relationships, nor whether the possibility to recover of an addiction was thought to be high. The only other factor that had a positive and significant relationship with the outcome variable (whether society should help the addicted quit or not), was how serious social problems the respective addiction was thought to be. Such that in summary, the prediction of the model by Benabou and Tirole (2006) seemed to hold in the light of this analysis.

Why beliefs around luck matter?

The largest downside of people neglecting the role of luck in life outcomes, is the fact that it might undermine the importance of the collective goods and public interventions, which could not have been possible to produce in a private market. As Frank (2016) suggests as an example, owning a $ 333.000 Ferrari compared to a $ 150.000 Porsche (or even a cheaper car) makes little sense if the roads are full of holes (Frank, 2016, p15-16). Many people tend to easily forget what infrastructure their predecessors have built, which have enabled their success. Holding thoughts that might reduce the understanding of the benefits of

redistribution and taxation, and consequently reducing the support for these, could lead to losses in firsthand for the worst off, but also later on to the successful individuals themselves. Economic growth and prosperity is dependent of constant development, which is hard to attain if infrastructure, health care systems as well as educational institutions do not work well enough. On the other hand, a too large government could also reduce the incentives to innovation, as the taxation burden and large amount of bureaucracy can become too distortive (Dar and AmirKhalkhali, 2002; Afonso and Furceri, 2010).

As the findings from the Norwegian survey data and the presented theoretical framework of Benabou and Tirole (2006) as well as other literature suggest (Alesina and Angeletos, 2005; Alesina and Giuliano, 2011), just world beliefs might reduce the desire for redistributive policies. Those who believe people's lives are mainly shaped by people's own actions rather than uncontrollable factors and luck, support redistribution less than those who weigh luck heavier. Thus this can affect the disabled in society in a negative way, if redistributive programmes are reduced or cut, or not even built in the first place (such as universal medical care in the USA). In worst case, leaving the poor, sick and disabled unable to have a good quality of life.

As the emprirical findings in this thesis also suggested, income as a measure of success was not seen to affect beliefs about the deservingess of income significantly. But when reinterpreting success to the asset of having good health, the analysis indicated that those with good health tend to associate the cause of bad health with bad habits and lifestyle rather than luck. It is generally known that lower socioeconomic status is connected to lower state of health and shorter life expectancy (Dahl et al., 2014). People with worse state of health have possibly less opportunities to pursue a healthy lifestyle to the extent wealthier and higher educated individuals have. The amount of private health insurances which could allow faster treatment and access to health care services have increased quite substantially for the past ten years in Norway for example (NRK, 2017). Thus it could be easy for people with good health to neglect the fact that health is also a question of being lucky in the sense of having the right opportunities.

On the other hand, being opportunistic is also crucial in some settings. New innovations, entrepreneurship, art and new scientific findings rely upon the fact that people sometimes dear to be overly optimistic about their possibilities to succeed, and to some

extent neglect the role of luck. Beliefs about high returns to effort can make a person work harder and thus give more effort. Which can in best case lead to better outcomes, as it also boosts the individual self confidence and positivity towards tasks (de Araujo and Lagos, 2013). Sustaining motivation in some life areas, such as maintaining a healthy lifestyle or withstanding the temptation of taking up drug consumption, could also be a reason why someone would want to hold beliefs about bad health being self caused. Believing in a world that is just can also be meaningful in itself, as people may derive comfort from it. It can strenghten the existensialist feeling of an individual, as one feels his actions are contributing to something.

This thesis explored some aspects of people's beliefs over the role of luck and chance in forming life outcomes. Further research especially with respect to the interesting finding, that good state of health seems to be associated with higher beliefs about the role of healthy habits and lifestyle in health outcomes, could provide more insight to the areas of health economics and policy design. For example when discussing the topic of a divided health care system, where people with resources can pay their access to better quality and faster care. The discussion being under the spotlight in Norway lately (Johannessen, 2017; NRK, 2017). One approach could be to design experiments exploring the hypothesis further, or constructing a new survey addressing the topic more accurately.

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A Appendix

Table A.1: List of all items used for analysis from the Norwegian survey

Demographic variables

Item	*Description*	*Type of variable*
Income	Gross total household income measured in NOK	Ordered categorical (9 steps)
Income5	Gross total household income measured in NOK	Ordered categorical (5 steps)
Age	Age	Continouous
Male	Gender	Dummy (1=Man, 0=Woman)
Education	Educational level	Categorical
Selfrhealth	Self reported health status	Ordered categorical (0=very bad ...10=very good)

Belief variables

Item	*Description*	*Type of variable*
DeserveGen	People get the income they deserve	Ordered categorical (1=disagree...5=agree)
EffortGen	People get the income they deserve due to effort	Ordered categorical (1=disagree...5=agree)
GLuckGen	People with high income have been lucky	Ordered categorical (1=disagree...5=agree)
BLuckGen	People with low income have been unlucky	Ordered categorical (1=disagree...5=agree)
DeserveInd	You get the income you deserve	Ordered categorical (1=disagree...5=agree)
EffortInd	You get the income you deserve due to effort	Ordered categorical (1=disagree...5=agree)
LuckInd	Your income is affected by luck	Ordered categorical (1=disagree...5=agree)

HealthLuck	Bad health is due to coincidences	Ordered categorical (1=disagree...5=agree)
HealthHabits	Bad health is due to bad habits	Ordered categorical (1=disagree...5=agree)
Rescost	Responsibility for costs related to addiction	Ordered categorical (1=individual...4=society)
Resprob	Responsibility to solve addiction problem	Ordered categorical (1=individual...4=society)
Resstop	Responsibility to quit	Ordered categorical (1=individual...4=society)
Control	Addiction due to individual actions or uncontrollable factors	Ordered categorical (1=indivdual herself/himself ... 4=uncontrollable circumstances)
Recover	How big possibility to recover with help	Dummy (1=big, 0=small/ neither nor)
Socialprob	How serious social problems	Ordered categorical (1=not serious...10=very serious)
AddictedClose	Experience of drug consumption in close family or friends	Ordered categorical (1=no.. 10=a lot over long period of time)

Table A.2: Distribution of Income5.

Item	Number	Per cent
<199.	36	4
200.-399.	149	15
400.- 599.	238	24
600.-999.	360	36
>1 mill.	217	22
Total	1,000	100

Income displayed in thousands

Table A.3: Distribution of age.

Item	Number	Per cent
18-24 years	66	7
25-29 years	58	6
30-39 years	143	14
40-49 years	186	19
50-59 years	204	20
> 60 years	343	34
Total	1,000	100

Table A.4: Distribution of AgeCAT.

Item	Number	Per cent
18-29 years	124	12
30-49 years	329	33
50-59 years	204	20
>60 years	343	34
Total	1,000	100

Table A.5: Distribution of educational level.

Item	Number	Per cent
Primary school (<8 years)	17	2
Secondary level (9-10 years)	69	7
High School (11-13 years)	287	29
University level (>12 years + studies)	615	62
Under education	12	1
Total	1,000	100

Table A.6: Distribution of respondents with respect to gender.

Item	Number	Per cent
Female	543	54
Male	457	46
Total	1,000	100

Table A.7: Distribution of self reported status of health.

Item	Number	Per cent
0 Very bad	5	1
1	3	0
2	17	2
3	32	3
4	37	4
5	85	9
6	98	10
7	214	21
8	257	26
9	143	14
10 Very good	98	10
Don't want to reply	11	1
Total	1,000	100

Table A.8: Distribution of HealthLuck: *"Bad health is often due to coincidences."*

Item	Number	Per cent
Completely disagree	75	8
Partly disagree	268	27
Neither disagree nor agree	205	21
Partly agree	343	35
Completely agree	96	10
Total	987	100

Dont know answers counted for 1.1% of the total 1000 responses.

Table A.9: Distribution of HealthHabits: *"Bad health is often due to bad habits and lifestyle."*

Item	Number	Per cent
Completely disagree	44	4
Partly disagree	118	12
Neither disagree nor agree	156	16
Partly agree	562	57
Completely agree	109	11
Total	989	100

Dont know answers counted for 1.3% of the total 1000 responses.

Table A.10: Comparison of ordered logit, ordered probit and OLS regressions of EffortGen and EffortInd as outcome variables.

	(Ordered Logit) EffortGen	(Ordered Probit) EffortGen	(OLS) EffortGen	(Ordered Logit) EffortInd	(Ordered Probit) EffortInd	(OLS) EffortInd
Income	0.0341	0.0241	0.0270	0.0813*	0.0501*	0.0570*
	(0.0393)	(0.0228)	(0.0263)	(0.0406)	(0.0231)	(0.0285)
Age	0.0187***	0.0114***	0.0124***	0.0111*	0.00648*	0.00900*
	(0.00538)	(0.00311)	(0.00352)	(0.00504)	(0.00297)	(0.00363)
Male	0.446**	0.258**	0.325**	0.468**	0.288**	0.370***
	(0.157)	(0.0904)	(0.102)	(0.150)	(0.0882)	(0.109)
Education	-0.0910	-0.0583	-0.0684	0.0739	0.0316	0.0606
	(0.104)	(0.0608)	(0.0669)	(0.112)	(0.0643)	(0.0777)
_cons			2.272***			1.989***
			(0.335)			(0.372)
/						
cut1	-0.765	-0.436		-0.213	-0.169	
	(0.515)	(0.300)		(0.522)	(0.304)	
cut2	0.629	0.382		0.764	0.401	
	(0.499)	(0.293)		(0.529)	(0.309)	
cut3	1.284*	0.790**		1.696**	0.978**	
	(0.503)	(0.295)		(0.535)	(0.312)	
cut4	3.497***	2.063***		3.117***	1.828***	
	(0.521)	(0.301)		(0.553)	(0.319)	
N	888	888	888	869	869	869

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.11: Comparison of ordered logit, ordered probit and OLS regressions of EffortGen and EffortInd as outcome variables (income, age and education as categorical predictors).

	(Ordered Logit) EffortGen	(Ordered Probit) EffortGen	(OLS) EffortGen	(Ordered Logit) EffortInd	(Ordered Probit) EffortInd	(OLS) EffortInd
<199.	ref.	ref.	ref.	ref.	ref.	ref.
200.-399.	-0.0590	-0.0237	0.000732	0.415	0.266	0.283
	(0.364)	(0.210)	(0.253)	(0.414)	(0.241)	(0.294)
400.- 599.	0.246	0.126	0.163	0.430	0.249	0.273
	(0.345)	(0.197)	(0.241)	(0.392)	(0.230)	(0.283)
600.-999.	0.330	0.177	0.231	0.466	0.265	0.287
	(0.329)	(0.189)	(0.233)	(0.389)	(0.226)	(0.278)
>1 mill.	0.369	0.230	0.257	1.122**	0.648**	0.737**
	(0.339)	(0.196)	(0.239)	(0.397)	(0.232)	(0.281)
18-29 years	ref.	ref.	ref.	ref.	ref.	ref.
30-49 years	-0.285	-0.146	-0.191	-0.560*	-0.292	-0.348
	(0.226)	(0.134)	(0.155)	(0.272)	(0.153)	(0.182)
50-59 years	0.0937	0.0977	0.0715	-0.466	-0.238	-0.265
	(0.241)	(0.142)	(0.163)	(0.274)	(0.157)	(0.188)
>60 years	0.376	0.239	0.239	0.0628	0.0533	0.112
	(0.254)	(0.148)	(0.169)	(0.269)	(0.156)	(0.188)
Male	0.444**	0.242**	0.307**	0.591***	0.351***	0.434***
	(0.148)	(0.0852)	(0.0959)	(0.145)	(0.0843)	(0.102)
Primary school	ref.	ref.	ref.	ref.	ref.	ref.
Secondary level	-0.328	-0.247	-0.305	-0.479	-0.230	-0.266
	(0.499)	(0.281)	(0.285)	(0.567)	(0.324)	(0.365)
High School	-0.996*	-0.626*	-0.709**	-0.576	-0.317	-0.333
	(0.465)	(0.263)	(0.265)	(0.535)	(0.307)	(0.345)
University level	-0.758	-0.479	-0.548*	-0.183	-0.0972	-0.0617
	(0.460)	(0.260)	(0.263)	(0.535)	(0.307)	(0.345)
Constant			3.255***			2.966***
			(0.338)			(0.431)
/						
cut1	-2.203***	-1.341***		-1.609*	-0.917*	
	(0.548)	(0.312)		(0.652)	(0.374)	
cut2	-0.782	-0.510		-0.655	-0.363	
	(0.544)	(0.310)		(0.649)	(0.373)	
cut3	-0.104	-0.0905		0.328	0.239	
	(0.549)	(0.312)		(0.647)	(0.372)	
cut4	2.100***	1.175***		1.787**	1.106**	
	(0.555)	(0.313)		(0.647)	(0.372)	
Observations	974	974	974	937	937	937

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.12: Comparison of ordered logit, ordered probit and OLS regressions of HealthLuck and HealthHabits as outcome variables.

	(Ordered Logit) HealthLuck	(Ordered Probit) HealthLuck	(OLS) HealthLuck	(Ordered Logit) HealthHabits	(Ordered Probit) HealthHabits	(OLS) HealthHabits
Selfrhealth	-0.141***	-0.0749**	-0.0792**	0.218***	0.113***	0.101***
	(0.0405)	(0.0236)	(0.0241)	(0.0527)	(0.0279)	(0.0235)
Age	0.0225***	0.0129***	0.0141***	-0.0331***	-0.0176***	-0.0131***
	(0.00478)	(0.00278)	(0.00289)	(0.00542)	(0.00308)	(0.00222)
Male	-0.0519	-0.0177	-0.0197	0.709***	0.418***	0.351***
	(0.145)	(0.0841)	(0.0892)	(0.159)	(0.0889)	(0.0719)
Education	0.137	0.0744	0.0787	-0.0953	-0.0447	-0.0175
	(0.0909)	(0.0542)	(0.0566)	(0.106)	(0.0588)	(0.0488)
Constant			2.824***			3.304***
			(0.350)			(0.287)
/						
cut1	-2.151***	-1.195***		-3.061***	-1.694***	
	(0.610)	(0.346)		(0.659)	(0.351)	
cut2	-0.275	-0.142		-1.631*	-0.951**	
	(0.588)	(0.338)		(0.635)	(0.346)	
cut3	0.604	0.399		-0.701	-0.416	
	(0.587)	(0.337)		(0.627)	(0.342)	
cut4	2.659***	1.579***		2.446***	1.420***	
	(0.599)	(0.341)		(0.647)	(0.350)	
Observations	965	965	965	967	967	967

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.13: Comparison of ordered logit, ordered probit and OLS regressions of HealthLuck and HealthHabits as outcome variables (age and education as categorical predictors).

	(Ordered Logit) HealthLuck	(Ordered Probit) HealthLuck	(OLS) HealthLuck	(Ordered Logit) HealthHabits	(Ordered Probit) HealthHabits	(OLS) HealthHabits
Selfrhealth	-0.129**	-0.0680**	-0.0707**	0.197***	0.103***	0.0916***
	(0.0407)	(0.0237)	(0.0240)	(0.0537)	(0.0286)	(0.0236)
18-29 years	ref.	ref.	ref.	ref.	ref.	ref.
30-49 years	0.837***	0.476***	0.505***	-1.328***	-0.727***	-0.483***
	(0.238)	(0.136)	(0.142)	(0.255)	(0.140)	(0.0931)
50-59 years	1.269***	0.713***	0.780***	-2.074***	-1.166***	-0.835***
	(0.248)	(0.145)	(0.148)	(0.282)	(0.158)	(0.116)
>60 years	1.114***	0.634***	0.681***	-1.822***	-0.984***	-0.690***
	(0.253)	(0.146)	(0.149)	(0.273)	(0.151)	(0.104)
Male	-0.0796	-0.0263	-0.0283	0.757***	0.444***	0.358***
	(0.146)	(0.0841)	(0.0885)	(0.159)	(0.0884)	(0.0701)
Primary school	ref.	ref.	ref.	ref.	ref.	ref.
Secondary level	0.203	0.234	0.155	-0.504	-0.235	-0.264
	(0.425)	(0.268)	(0.287)	(0.573)	(0.299)	(0.257)
High School	0.284	0.227	0.171	-0.722	-0.358	-0.299
	(0.387)	(0.244)	(0.267)	(0.519)	(0.270)	(0.234)
University level	0.285	0.240	0.187	-0.454	-0.204	-0.183
	(0.379)	(0.240)	(0.263)	(0.513)	(0.267)	(0.231)
Constant			2.999***			3.464***
			(0.341)			(0.297)
/						
cut1	-2.484***	-1.302***		-3.330***	-1.860***	
	(0.565)	(0.330)		(0.681)	(0.355)	
cut2	-0.592	-0.242		-1.887**	-1.101**	
	(0.535)	(0.318)		(0.668)	(0.353)	
cut3	0.295	0.302		-0.950	-0.556	
	(0.531)	(0.316)		(0.660)	(0.349)	
cut4	2.362***	1.491***		2.320***	1.339***	
	(0.534)	(0.317)		(0.668)	(0.354)	
Observations	965	965	965	967	967	967

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.14: Binary logistic regression models for the outcome dResstop with gambling as the subcategory

	(1) dResstopGambling	(2) dResstopGambling
dControlGambling	0.724**	0.724*
	(0.277)	(0.289)
dRecoverGambling		-0.0636
		(0.290)
SocialprobGambling		0.283***
		(0.0552)
AddictedClose		-0.0259
		(0.0342)
<100.		*ref.*
200.-399.		-0.333
		(0.560)
400.-599.		-0.929
		(0.567)
600.-900.		-0.920
		(0.561)
>1 mill.		-0.837
		(0.549)
Age		0.0509
		(0.0482)
Age2		-0.000739
		(0.000519)
Male		-0.147
		(0.238)
Primary school		*ref.*
Secondary level		0.456
		(1.062)
High school		0.735
		(1.001)
University level		0.584
		(1.003)
_cons	-1.690***	-3.736*
	(0.117)	(1.499)
N	970	931

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.15: Binary logistic regression models for the outcome dResstop with alcohol as the subcategory

	(1) dResstopAlcohol	(2) dResstopAlcohol
dControlAlcohol	0.931***	0.814***
	(0.233)	(0.244)
dRecoverAlcohol		-0.0472
		(0.255)
SocialprobAlcohol		0.227***
		(0.0530)
AddictedClose		-0.00584
		(0.0335)
<100.		*ref.*
200.-399.		-0.472
		(0.538)
400.-599.		-1.171*
		(0.540)
600.-999.		-0.582
		(0.522)
>1 mill.		-0.641
		(0.516)
Age		0.0482
		(0.0441)
Age2		-0.000610
		(0.000469)
Male		-0.161
		(0.213)
Primary school		*ref.*
Secondary level2		0.375
		(0.742)
High school		0.0146
		(0.687)
University level		-0.0687
		(0.684)
_cons	-1.638***	-3.387**
	(0.117)	(1.278)
N	976	951

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.16: Binary logistic regression models for the outcome dResstop with prescription drugs as the subcategory

	(1) dResstopPDrugs	(2) dResstopPDrugs
dControlPDrugs	1.172***	1.154***
	(0.173)	(0.179)
dRecoverPDrugs		0.0904
		(0.201)
SocialprobPDrugs		0.136**
		(0.0449)
AddictedClose		-0.0161
		(0.0291)
<100.		*ref.*
200.-399.		0.164
		(0.514)
400.-599.		0.172
		(0.503)
600.-999.		-0.183
		(0.494)
>1 mill.		0.112
		(0.505)
Age		0.0585
		(0.0344)
Age2		-0.000747*
		(0.000354)
Male		0.0119
		(0.179)
Primary school		*ref.*
Secondary level		0.0660
		(0.615)
High school		-0.290
		(0.582)
University level		-0.107
		(0.581)
_cons	-0.659***	-2.324*
	(0.105)	(1.040)
N	959	914

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$