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Public opinion on responsibility and insurance policy for health outcomes under inequality of opportunity

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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Abstract

This study examines the effects of framing on attitudes towards responsibility for health outcomes and health insurance policy. A survey was conducted among Dutch citizens, presenting them with two cases: one about a smoker who develops lung cancer and one about an obese person who develops type 2 diabetes. Respondents were randomized into a control group, a behavior group that contains additional information about behavioral causes of the smoker's and the obese person's choices and a genetics group that does the same with genetic attributions. Both treatments were found to decrease support for a differentiated insurance system that lets the smoker pay more, but were ineffective regarding the obesity case and also did not influence perceived responsibility of the smoker and the obese person for developing their respective diseases. The treatment with genetic attributions was most effective. Both treatments also interacted with different political orientations, having the reverse effect on more right-winged and conservative respondents in some cases.

1 Introduction

According to the Dutch Centraal Bureau voor Statistiek (2011) or Central Bureau of Statistics, over half of the Dutch population believes smokers and heavy drinkers should pay more for health insurance. In the Netherlands there is a mandate for every citizen to buy health insurance and the premium of the basic bundle is the same for everyone. There are, however, many people who believe the premium should depend on the number of voluntary health risks that each person takes. Persaud (1995) examines the complexity of the question whether smokers should have different rights regarding access to health care than non-smokers and concludes that, at least in a health care system like the one in the UK, denying smokers health care would go against the principles of that system. Nevertheless, in 2017 a local health committee in the UK banned smokers and obese people from non-urgent surgery until they quit smoking or lost weight (CNN, 2017). Whether voluntary health risks should alter the insurance premium someone pays is still highly debated.

A closely related problem surrounded by debate is health inequality. There is a large causal effect of a worse social-economical position to worse health outcomes (Beck, 2001). Well-educated people have a life expectancy of up to six years higher than that of lowly-educated people (Mierau, 2021). Risk factors like obesity and smoking are more prevalent among people with low education levels than among those with high education levels. Obesity numbers have been rising over the past 20 years among all education levels, but sees the strongest increase in the lowly-educated. Similarly, smoking numbers have been dropping for a long time for all education levels, though they have dropped the fastest for the highly-educated (Mierau, 2021). This problem has recently been highlighted by the Corona pandemic. Large crises, like the corona pandemic, seem to hit harder among people with a lower social-economic position. For example, during the pandemic people in poor neighborhoods had a larger chance of dying (Visser et al., 2021). The measures that were taken to contain the virus also had a larger impact on inhabitants of poor neighborhoods (Smeets et al., 2021).

People's opinion on the fairness of these health outcomes and the responsibility people carry for their health outcomes under inequality of opportunity may play a large role in their opinion on public health policy (Lynch and Gollust, 2010). Furthermore, public policy regarding an issue is hugely affected by the public opinion on that issue (Burnstein, 2003). Policy is even affected more by public opinion than public opinion is affected by policy (Page and Shapiro, 2014). This is also true for health care policy. The British National Health Service Act and the American Medicare Act were shaped by public opinion, which did not only determine the broad policy objectives, but also formed specific decisions (Jacobs, 1993).

Therefore, if policymakers want to push a certain policy, it is critical to understand the forming of public opinion on an issue. Many articles that will be discussed section 2 of this paper show the importance of framing, so presenting a subject from a certain perspective, for the way individuals regard that subject. The most commonly studied frames in the context of inequality of opportunity that will

also be used for the purposes of this paper are a “behavior” frame and a “genetics” frame: the former attributes risky health behavior to environmental and social influences, the latter to genetic predisposition. They represent the two sides of the familiar debate of nature versus nurture.

Understanding how the framing of risky health behaviors as inequality of opportunity influences public perceptions of responsibility is crucial for shaping attitudes towards individual responsibility for health outcomes. This knowledge can have implications for how society views and treats individuals with health challenges. If certain health conditions are seen as a consequence of systemic disadvantages, framing may lead to increased empathy and reduced stigmatization for those experiencing such health challenges, which may eventually lead to policy change or the prevention of policy change in an unwanted direction.

The main research question of this paper is: does the framing of causes of behavior risky to health as inequality of opportunity affect public opinion on responsibility for health outcomes and insurance policy? This research expands on the existing literature with its specific emphasis on comparing a behavior and a genetics frame, the acknowledgement of possible political effects and an exploration of why respondents make their choices. As will become clear from the theoretical background in section 2 of this paper, several studies look at the effects of genetics frames or behavioral frames, but very few perform an in-depth comparison of the two in this particular context.

Section 2 of this paper discusses the literature related to the research question. In section 3 the research method as well as the plan for the data analysis are explained and section 4 shows the results. Finally section 5 gives a summary of the findings and section 6 discusses interpretations of the results, policy implications, limitations and recommendations for further research.

2 Theoretical background

Public opinion of fairness of and responsibility for health outcomes under inequality of opportunity

As insurance policy is essentially about redistribution of income from the healthy to the sick, or from the lucky to the unlucky, and the discussion presented in section 1 is about whether there is some merit to their unluckiness, this section will present some of the research done on income redistribution under inequality of opportunity.

Several studies have shed a light on public opinion of fairness of *income* outcomes under inequality of opportunity. According to Alesina and La Ferrara (2005), people are more likely to be in favor of redistribution of income when they believe that the United States does not offer everyone equal opportunities. However, people may not be well equipped to estimate and interpret the effect of unequal opportunities. Capellen et al. (2017) find that people barely distinguish between situations when luck determines 90% of an outcome of earnings and when luck determines 0% the outcome, as in both situations they assign almost just as much to the high earner when asked to redistribute between a low

and high earning worker, even though these percentages are always made clear. They even assign more money to the high earner when his or her earnings are for a small part due to luck, than when they are solely based on merit. Similar results were found by Andre (2021). Participants had to distribute money between two workers, one who worked very hard and who did not, because he was strongly discouraged by circumstances. The researcher concludes that the participants hold the one who did not work hard fully responsible for his actions. They do so since they base their judgment on the only thing they know for certain: one worker works hard and the other does not, even though it was explained to them that one of the workers did not work hard because of external factors.

Do people show similar behavior towards *health* outcomes under inequality of opportunity? In line with the research listed above, the conviction, or lack thereof, that people are responsible for their own health outcomes is likely to strongly influence beliefs about fairness of health outcomes (Wikler, 2002; Stone, 2006). The majority of people finds perceived inequalities in health care unfair, which is mainly about access, but only about a third finds health status, so health care outcomes, unfair (Lynch and Gollust, 2010). Lynch and Gollust (2010) also found that the more unfair people find health outcomes, the more likely they are to be in favor of government provision of health insurance. This is supported by Mata and Hertwig (2018) who find that, as the perception of personal responsibility increases, respondents exhibit greater support for individual accountability regarding treatment expenses.

This study will focus on perceived responsibility for health outcomes, as perceived fairness and responsibility have been shown to be related (Lynch and Gollust, 2010) and this term seems more suitable than fairness in the context of health status. According to Mata and Hertwig (2018), as the perception of personal responsibility increases, respondents exhibit greater support for individual accountability regarding treatment expenses. This paper will also explore the connection between perceived responsibility for disease and support for an insurance system that differentiates on the basis of risky health behavior.

Framing effects on public opinion of responsibility for health outcomes

This section will evaluate the effects of framing on the public opinion on responsibility for health outcomes. Specifically, the frame of inequality of opportunity will be discussed. When we think about what could constitute an unequal opportunity in the context health, two main options come to mind: environmental differences and genetic differences.

In the criminal courts there is already a large debate going on about the implications of genetic and environmental causes of criminal behavior. When evaluating causes of criminal activity, people are more likely to indicate environmental causes than genetics (Gajos et al., 2014). The provision of genetic or environmental explanations of criminal behavior causes people to evaluate perpetrators differently, seeing them as less in control of their behavior when genetic explanations are given (Cheung, 2015). Dar-Nimrod and Heine (2011) discuss the idea of genetic essentialist biases, meaning that people

overweigh genetic causes of a plethora of human conditions (like race, gender, criminality and obesity) when presented with them. These genetic attributions make people believe the conditions are more immutable and determined.

The wide spread use of genetic attributions in criminal courts suggests a link between genetic causes of behavior and moral responsibility for that behavior. According to Appelbaum (2019) different results are found across studies. Some indicate a reduction the moral responsibility individuals ascribe to behaviors when they are presented with genetic causes of those behaviors, whereas others find no significant effects. It is speculated that these differences across studies can be attributed to the different behaviors that are examined or to people's internally conflicting beliefs about genetics and moral responsibility: so called genetic determinism could relief people of their responsibility, as their actions are determined by their genes and they therefore cannot help them, while genetic essentialism dictates that people's genes reflect their true self and they can therefore be held responsible for actions that are aligned with their genome. Just like criminal behavior, mental illnesses are seen as more immutable when associated with genetic causes: the public recommends mental hospitalization and medication more often, but this increase is not seen in recommendations to see a therapist (Phelan et al., 2006). In light of these findings regarding genetic attributions of behavior the following hypotheses are formulated: Framing a person's behavior that is risky to health as due to genetic influences makes respondents less likely to say that person should pay higher insurance costs (H1) and evaluate that person's responsibility for their worse health status as lower (H2).

Less data is available on the effects of a behavioral or environmental frames on public opinion regarding responsibility for disease and policy implications. Lundell et al (2013) found that the public's views on causes of general diseases and responsibility for them are highly nuanced, although personal choice is often said to outweigh environmental causes. Niederdeppe et al. (2013) gave respondents one of three narratives that emphasize societal causes and solutions for obesity, but differ in the degree to which personal responsibility is acknowledged. Only the narratives with low and moderate acknowledgement of personal responsibility made respondents more supportive of societal attributions of obesity and policy change. Niederdeppe et al. (2015) contradicted this with their finding that neglecting personal accountability in narratives that highlight the social determinants of obesity could diminish the effectiveness of policy messaging. Gollust et al. (2009) study the effects of different frames used in articles about diabetes on public opinion of health policy, distinguishing between a social determinants frame, a genetic predisposition frame, a behavioral choices frame and a frame with no causal explanation. All frames were found to increase agreeance with the frame in question being a factor in the causation of diabetes type 2. According to Coleman et al. (2011) a frame that includes social attributions of responsibility for health as well as disease prevention strategies increases support for public policy changes. On the basis of these studies the following is predicted: Framing a person's behavior that is risky to health as due to behavioral influences makes respondents less likely to say that

person should pay higher insurance costs (H3) and evaluate that person's responsibility for their worse health status as lower (H4).

The above mentioned paper by Gollust et al. (2009) there was a significant difference found between republicans and liberals: republicans were more likely to disagree with the social determinants frame than liberals. When shown different pieces of information about causes of health disparities, liberals were more likely to feel angry than Republicans (Gollust & Cappella, 2014). Republicans felt the least anger when shown a piece that explicitly included the factor of personal choice and responsibility. Based on these limited findings the following hypothesis is posited: The effect of both a genetics and a behavioral frame differs for different political orientations (H5).

In this study participants are presented with two cases: one about an obese person who develops diabetes type 2 and one about a smoker who develops lung cancer. Canadians (pre-Corona pandemic) identify smoking, obesity and unprotected sex as the largest health risks out of thirty choices (Krewski et al., 2007). Smoking, obesity and problematic alcohol use are the leading causes of disease in the Netherlands (Rijksoverheid, n.d.). The smoking and obesity case are therefore not only relevant, but also familiar to the public which may help them articulate their opinions. Moderately and extremely overweight people were found to be less responsible for changing their situation than smokers by health professionals (Harvey & Hill, 2001). A survey by the Scottish government (2023) also found that smokers were blamed more for smoking than overweight people were blamed for their weight by the general public. Though there is no data on the exact difference of treatment effects between these two cases, the following is expected: Both the genetics frame and the obesity frame have a different effect on public opinion regarding responsibility for disease and insurance policy for the smoking case than for the obesity case (H6).

3 Method

Survey structure

A questionnaire was made in Qualtrics and used to gather data first-hand. Figure 3.1 gives a schematic display of the survey structure.

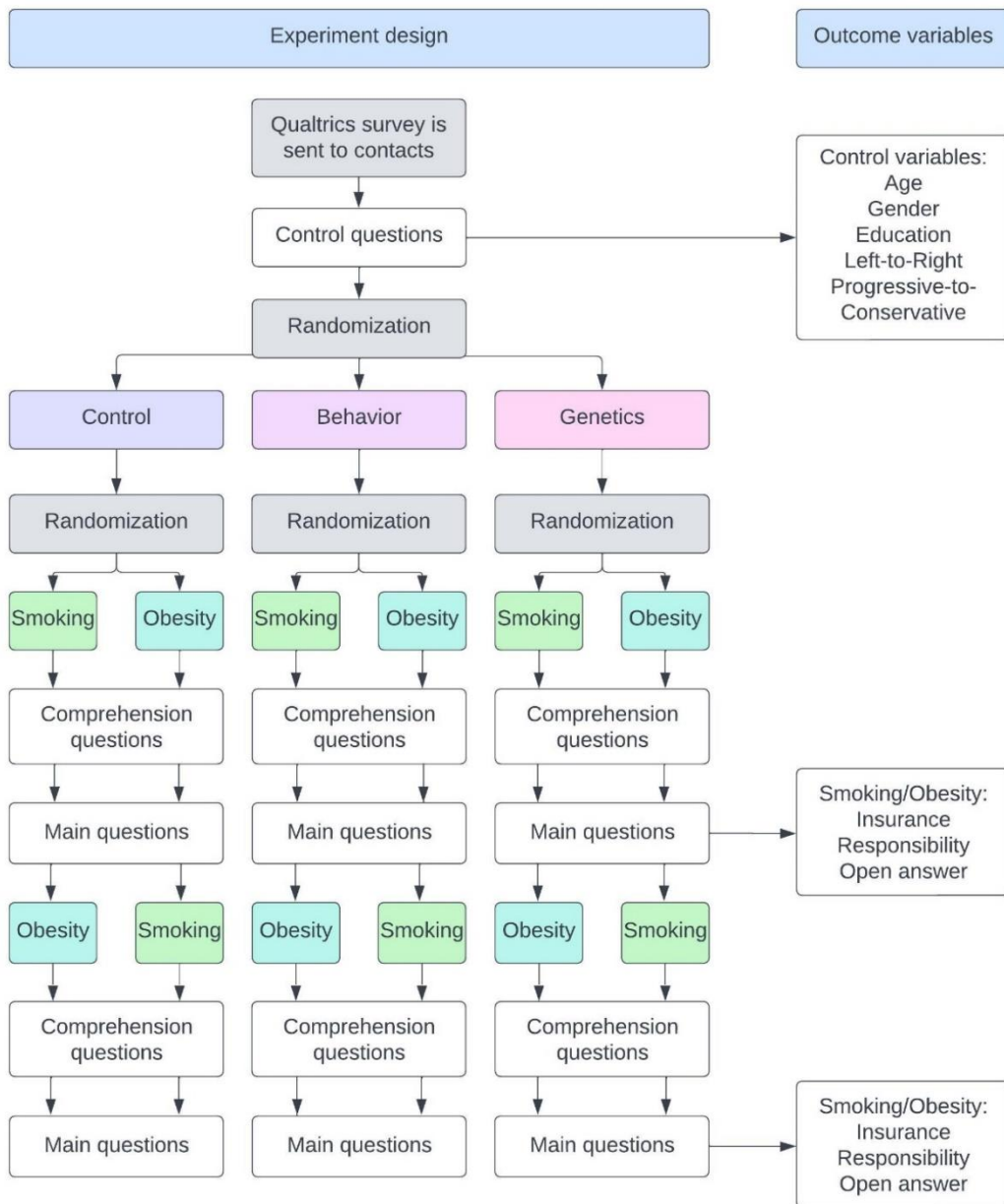


Figure 3.1 Scheme of experimental flow

The questionnaire then presents two cases for respondents to consider. In the first case a person has smoked for a long time and then develops lung cancer. In the second case a person is obese and then develops diabetes type 2. Three different versions of the questionnaire were randomized: the Control, Behavior and Genetics. The questionnaires are completely the same, except for the information that is given before each of the two cases. Table 3.1 shows what information was given for each case in each one of the treatments. Having two different cases and three different treatments means there are six different pieces of information given. In the Control survey, only information was given about the relationship between smoking and lung cancer, and between obesity and diabetes type 2 (American Lung Association, 2022; Al-Globan et al., 2014; Nguyen et al., 2011; Diabetes.co.uk, 2022). This was

done since the questions will be meaningless if the respondents do not know about the increased risks of developing these diseases because of smoking and obesity. Nothing was said about the parents of the person in the Control cases. In the Behavior survey, the respondents were given the same information as in the Control as well as additional information about the behavioral and environmental effects of having parents who smoke/are obese on people's susceptibility to smoking/obesity (Okoli & Kodet, 2015; Unger et al., 2001; Story et al., 2002; Klesges et al., 1991; Bahreynian et al., 2017).

Similarly, the Genetics survey contained the same information as in the Control and additional information about the genetic effects of having parents who smoke/are obese on people's susceptibility to smoking/obesity (Hiroi & Agatsuma, 2005; Pampel et al., 2015; Bierut, 2011; Loos & Bouchard, 2003; Llewellyn & Wardle, 2015). In short, the Behavior and Genetics survey test whether people react more with behavioral or genetic factors that increase susceptibility to smoking and obesity. In all three versions of the survey, the same questions are asked regarding these cases. After the case specific information is given, they needed to answer either one or two questions to show that they had read the information carefully. These questions needed to be answered correctly before they could move on with the survey.

Then respondents were asked if they think the persons in the two cases should pay “higher”, “the same amount” or “lower” insurance costs than someone who does not smoke/is not obese. As there is no research available that asks participants about insurance policy in the same context as is intended in this paper, the amount of insurance costs is chosen as an outcome variable that is simple and in line with the Dutch health care system. Among American citizens perhaps a study could have asked participants about health care costs, but as Dutch citizens have an insurance mandate and do not directly pay for health care, insurance costs are closest to health care costs.

Participants were also asked to explain their answer to the question about insurance in an open question box. These answers were analyzed using the coding software Atlas.ti. Each answer was labeled with a preliminary code that best reflects the reason respondents give. Then the codes were bundled into new codes with a more general description. This process was repeated a couple of times, until only 7 codes remained.

At the end of each case the respondents were asked how responsible they think the person in the case is for developing lung cancer/type 2 diabetes. The possible answers are in the form of a Likert scale from “not at all responsible” to “very responsible”. This question was saved for last to prevent any priming effects it may have on respondents. For the same reason, the order of the two cases was randomized in all three versions of the survey. This means that respondents were randomly presented with either the smoking case first and then the obesity case, or first the obesity case and then the smoking case.

Table 3.1

Information given in the questionnaire per case and treatment group

Information given in all 3 treatments		
	Smoking	Obesity
	Research shows that women who smoke are about 13 times more likely to develop lung cancer and men who smoke are even 23 times more likely to develop lung cancer.	Research shows that obesity increases the risk of developing type 2 diabetes by up to 80 times and that 80-85% of the risk of developing type 2 diabetes is caused by obesity.
Treatment	Treatment specific information	
	Smoking	Obesity
Control	<i>Consider a person who is a long-term smoker. This person develops lung cancer.</i>	<i>Consider a person who is obese. This person develops type 2 diabetes.</i>
Behavioral	Research also found that second-hand smokers, so people who are often close to other people who smoke, are more likely to start smoking, more likely to develop nicotine dependence and less likely to start smoking. If people perceive that it is socially acceptable to smoke, this can also make them more susceptible to smoking. It is therefore more likely that you will become a long-term smoker if your parents also smoke than if they do not. <i>Consider a person who is a long-term smoker. The parents of this person also smoke. This person develops lung cancer.</i>	Research also shows that parents strongly influence the eating behavior of children. The food that is provided while growing up largely determines attitudes and preferences towards food that can last a lifetime. There is a strong relationship between the weight of parents and the weight of their children. Children are therefore far more likely to become obese if their parents are also obese. <i>Consider a person who is obese. The parents of this person are also obese. This person develops type 2 diabetes.</i>
Genetics	In order to become a long term smoker, a person needs to start smoking and become addicted. Research has found that in both of these processes genes play a large role. This means that you can inherit certain genes from your parents that increase your susceptibility to smoking. It is therefore more likely that you will become a long term smoker if your parents also smoke than if they do not. <i>Consider a person who is a long-term smoker. The parents of this person also smoke. This person develops lung cancer.</i>	Research also shows that genes play a large role in becoming obese. Genes that regulate energy expenditure, food intake and appetite, among others, have been found to contribute to the development of obesity. People can inherit these genes from their parents. Children are therefore far more likely to become obese if their parents are also obese. <i>Consider a person who is obese. The parents of this person are also obese. This person develops type 2 diabetes.</i>

A link of the survey was shared to my contacts and contacts of my contacts and should reach people of all ages, all educational levels and all over the Netherlands. It is possible for people to start filling out the survey and get back to it later if they click the link again. The data was then exported from Qualtrics to Stata to perform the analysis.

Data analysis

All of the data analysis was performed in Stata. As the Insurance variable is binary, a logistic regression was used for all measurements regarding the Insurance variable. In equation (1) the effect of the treatments on the probability that a respondent answers “higher” vs “the same amount” is estimated. $Pr(\text{SmokingHigher})$ is defined as the probability a respondent answers “higher” to the insurance question in the smoking case. The same equation was used for the obesity case where $Pr(\text{SmokingHigher})$ is replaced by $Pr(\text{ObesityHigher})$. Treatment is a categorical variable that takes the value 1 for Control, 2 for Behavior and 3 for Genetics.

$$(1) \quad Pr(\text{SmokingHigher}) = \alpha + \beta_0 \text{Treatment} + \varepsilon$$

In equation (2) several control variables are added to equation (1), namely age, gender, education, political orientation from left to right and political orientation from progressive to conservative. For the obesity case $Pr(\text{SmokingHigher})$ is replaced by $Pr(\text{ObesityHigher})$.

$$(2) \quad Pr(\text{SmokingHigher}) = \alpha + \beta_0 \text{Treatment} + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{Education} + \beta_4 \text{LeftToRight} + \beta_5 \text{ProgressiveToConservative} + \varepsilon$$

Equation (3) was used to estimate the effect of two interaction variables, on the probability that respondents answer “higher” to the question about insurance policy in the smoking and obesity case. These interaction variables are $\text{LeftToRight} * \text{Treatment}$, which represents the interaction between the political orientation from left to right and the treatment group, and $\text{ProgressiveToConservative} * \text{Treatment}$, which similarly displays the interaction between the political orientation from progressive to conservative and the treatment group. Again, for the obesity case $Pr(\text{SmokingHigher})$ is replaced by $Pr(\text{ObesityHigher})$.

$$(3) \quad Pr(\text{SmokingHigher}) = \alpha + \beta_0 \text{Treatment} + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{Education} + \beta_4 \text{LeftToRight} + \beta_5 \text{ProgressiveToConservative} + \beta_6 \text{LeftToRight} * \text{Treatment} + \beta_7 \text{ProgressiveToConservative} * \text{Treatment} + \varepsilon$$

The responsibility variable contains answers on a Likert scale from 1 to 5. This variable was treated as continuous and therefore an ordinary least-squares linear regression was used for all measurements regarding the responsibility variable. Equation (4) estimates the effect of the treatments on the perceived responsibility the person in each case carries for developing their respective diseases.

For the obesity case Responsibility(lung cancer) in equation (4), (5) and (6) is replaced by Responsibility(type 2 diabetes).

$$(4) \quad \text{Responsibility}(\text{lung cancer}) = \alpha + \beta_0 \text{Treatment} + \varepsilon$$

In equation (5) the same control variables as seen in equation (2) are added to equation (4).

$$(5) \quad \text{Responsibility}(\text{lung cancer}) = \alpha + \beta_0 \text{Treatment} + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{Education} + \beta_4 \text{LeftToRight} + \beta_5 \text{ProgressiveToConservative} + \varepsilon$$

Finally equation (6) gives the OLS regression the same interaction variables as seen in equation (3) added to equation (5).

$$(6) \quad \text{Responsibility}(\text{lung cancer}) = \alpha + \beta_0 \text{Treatment} + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{Education} + \beta_4 \text{LeftToRight} + \beta_5 \text{ProgressiveToConservative} + \beta_6 \text{LeftToRight} * \text{Treatment} + \beta_7 \text{ProgressiveToConservative} * \text{Treatment} + \varepsilon$$

4 Results

Data

Out of all 187 respondents, there was one person in the Behavior treatment who answered “lower” to the Insurance question for the obesity case. This observation was removed, so the Insurance variable could be treated as binary, having a value of 0 for “the same amount” and 1 for “higher”, leaving a total of 186 respondents. The variable Responsibility takes values from 1 to 5, where 1 is “Not at all responsible” and 5 is “Very responsible”.

Table 4.1 shows how many observations are in each treatment group and what percentage of the total they contain. The size of the treatment groups differs slightly as respondents were randomly assigned to a treatment by Qualtrics.

Table 4.1

Number of observations in the sample per treatment group

Treatment	Observations	Percentage of total
Control	55	29.57
Behavior	68	36.56
Genetics	63	33.87

Table 4.2 shows descriptive statistics of the sample. When participants are asked for their education level, they can choose from “High School”, “MBO”, “HBO” and “WO”. As respondents are all Dutch, or at least overwhelmingly so, this presentation of the answers is believed to give more

accurate results. The variable education takes the value 1 for “High School”, 2 for “MBO”, 3 for “HBO” and 4 for “WO”. The variable Left to Right contains respondents assessment of their own place on the political spectrum, where 0 is extremely left and 10 is extremely right. Likewise, the variable Progressive to Conservative takes the value 0 for extremely progressive and 10 for extremely conservative. For both questions no one chose 10, which is why the observed maximum equals 9.

Table 4.2

Descriptive statistics of the sample used in the study

Variables	Mean	Standard Deviation	Min	Max
Age	42.36	16.19	14	83
Gender	0.44	0.50	0	1
Education	3.46	0.73	1	4
Left to right	4.78	1.99	0	9
Progressive to conservative	4.24	1.88	0	9
Observations	186	186	186	186

Notes: Age is a continuous variable indicating the age of respondents. Gender is a binary variable that takes the value 0 for male and 1 for female. Education takes values 1 for High school level, 2 for the Dutch “MBO”, 3 for “HBO” and 4 for university or “WO”. Left to Right and Progressive to conservative both have values from 1 to 10, 1 being the most left or progressive and 10 extremely right or conservative.

Multiple chi-squared tests were performed to ensure that randomization was successful and so there is no relationship between the treatment group and gender ($X^2(2, N = 186) = 0.62, p = .734$), education ($X^2(6, N = 186) = 3.87, p = .694$), left to right political orientation ($X^2(2, N = 186) = 0.54, p = .764$), progressive to conservative political orientation ($X^2(2, N = 186) = 0.73, p = .693$) and age ($X^2(8, N = 186) = 7.22, p = .513$).

Data analysis

Figure 4.1 shows the means of the Insurance variable and the Responsibility variable with error bars for each treatment group and both the smoking and the obesity case. The differences seem to have the same pattern for both cases, but several Kruskal-Wallis tests demonstrate that only for the smoking case and the Insurance variable there are significant differences among the groups ($X^2 = 4.62, df = 2, p = .099$), not for the Responsibility variable for the smoking case ($X^2 = 1.62, df = 2, p = .44$), Insurance for the obesity case ($X^2 = 3.15, df = 2, p = .21$) or Responsibility for the obesity case ($X^2 = 3.25, df = 2, p = .20$).

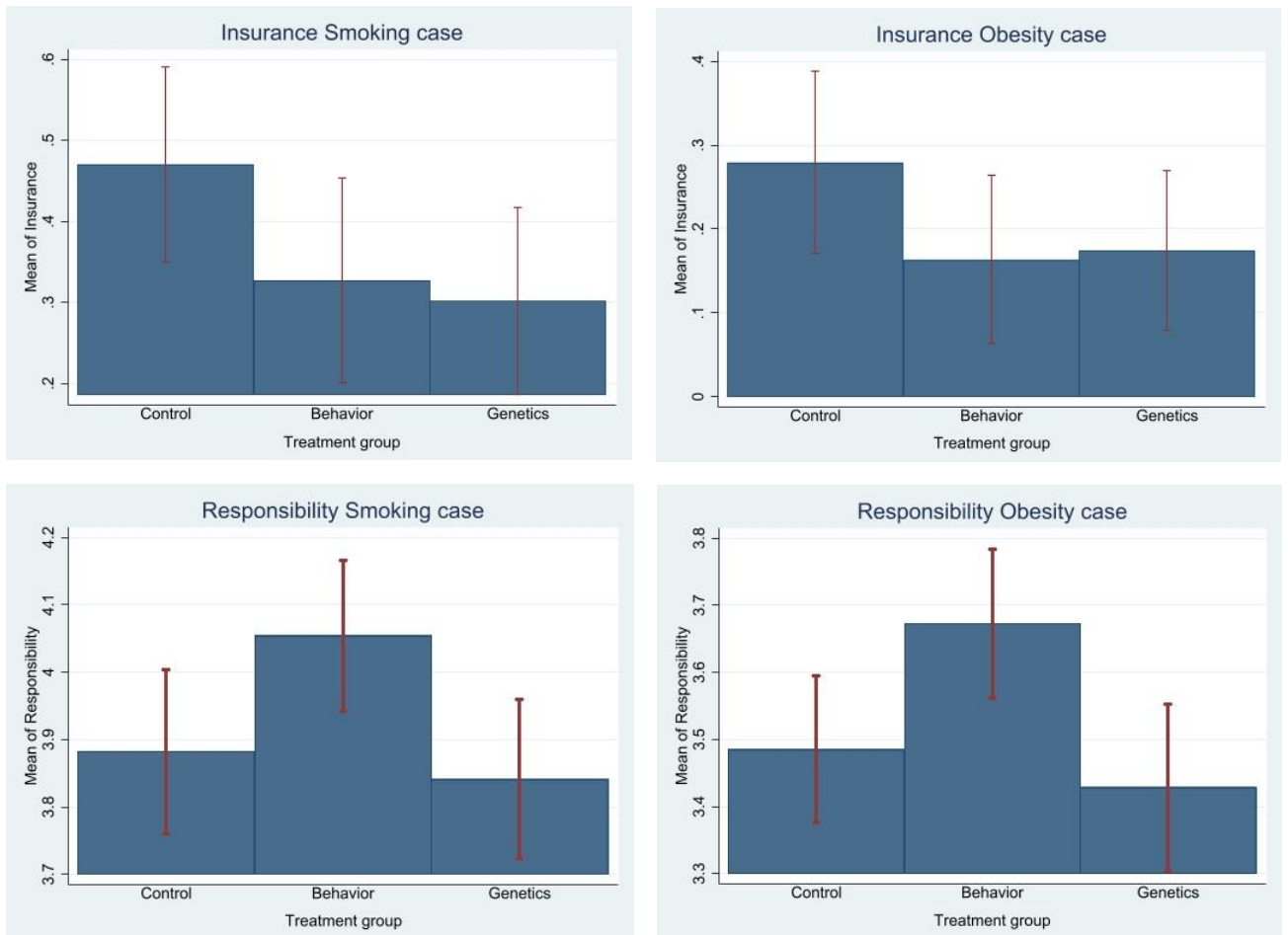


Figure 4.1 Mean of Insurance and Responsibility per treatment group and case with error bars

Table 4.3 shows several logistic regression results with Insurance as the dependent variable. In the third column we see that the Behavior treatment has a coefficient of -0.72 significant at the 10% level for the smoking case. The odds ratio for this coefficient is $1/e^{0.72} = 0.49$, meaning the behavior treatment causes 0.49 times lower odds of participants choosing “higher” as their answer to the question about insurance policy. Similarly, the genetics treatment has a coefficient of -0.83 with $p < 0.05$ for the smoking case with an odds ratio of $1/e^{0.83} = 0.44$. So for the smoking case, the genetics treatment has a larger and more significant impact. For both treatments the coefficients are not significant regarding the obesity case, which supports H6. Therefore H1 and H3 can be accepted for the smoking case, but not for the obesity case: both treatments make respondents less likely to say that the smoker should pay higher insurance costs.

None of the control variables have significant coefficients for the obesity case either. For the smoking case, age has a coefficient of -0.03 with $p < 0.05$ and an odds ratio of $1/e^{0.03} = 0.97$, so for every 1-unit increase in age, the odds of the respondent answering “higher” decrease by a factor of 0.97. This does not seem like much, but an increase in age of 30 years, for example a 50 year old versus a 20 year old respondent, will thus cause $0.97^{30} = 0.40$ times lower odds of the respondent answering “higher”.

Left to Right has a significant positive coefficient for the smoking case of 0.28 with $p < 0.01$ and odds ratio $e^{0.28} = 1.32$. Therefore an increase of 9 units in the variable Left to Right, which represents a respondent on the far right of the political spectrum versus one on the far left, increases the odds of answering “higher” with a factor $1.32^9 = 12.43$. We do not see the same effect for the variable Progressive to Conservative. In fact, the coefficient is negative, though not significant. When the interaction variables are added in the fifth and sixth column, it becomes clear that this effect of the Left to Right variable is largely caused by respondents in the behavior treatment. For this treatment the interaction coefficient with Left to Right is 0.48 with $p < 0.10$ and an odds ratio of 1.62. This supports H5, namely that the treatment effects differ across political orientations, but only for the behavior treatment. The coefficient of the interaction with the genetics treatment is not significant, neither are the coefficients of the interaction variables of the treatment group and Progressive to Conservative. Again, in the sixth column none of the coefficients are significant for the obesity case.

Table 4.3

Logistic regression results for the relationship between the treatment and opinion on insurance policy

Variables	Insurance					
	Smoking (1)	Obesity (2)	Smoking (3)	Obesity (4)	Smoking (5)	Obesity (6)
Behavior Treatment	-0.60 (0.38)	-0.68 (0.45)	-0.72* (0.41)	-0.70 (0.47)	-1.90 (1.60)	0.85 (0.77)
Genetics Treatment	-0.72** (0.37)	-0.61 (0.43)	-0.83** (0.40)	-0.63 (0.45)	-1.77 (1.20)	-0.41 (1.22)
Age			-0.03** (0.01)	-0.02 (0.01)	-0.03** (0.01)	-0.02 (0.01)
Gender			-0.25 (0.36)	-0.41 (0.40)	-0.26 (0.36)	-0.46 (0.39)
Education			-0.28 (0.21)	-0.09 (0.26)	-0.31 (0.23)	-0.18 (0.28)
Left to Right			0.28*** (0.10)	0.17 (0.11)	0.08 (0.15)	0.17 (0.16)
Progressive to Conservative			-0.06 (0.10)	-0.14 (0.13)	0.03 (0.15)	0.08 (0.17)
Left to Right*Behavior					0.48* (0.27)	0.18 (0.26)
Left to Right*Genetics					0.19 (0.24)	-0.18 (0.26)
Progressive to Conservative*Behavior					-0.28 (0.28)	-0.60 (0.47)
Progressive to Conservative*Genetics					0.01 (0.23)	0.16 (0.24)
Observations	186	186	186	186	186	186

Notes: This table contains the Stata results of 6 logistic regressions with Insurance as the dependent variable, given by each column. Above each column the case is stated for which the coefficients are found. Insurance is a binary variable that takes the value 0 for “the same amount” and 1 for “higher” as answers to the question whether how many insurance costs the smoker and the obese person from the case should pay relative to people who do not smoke and are not obese. Column (1) and (2) only contain the treatment variables, in column (3) and (4) several control variables are added and in column (5) and (6) 4 interaction terms are added. Age is a continuous variable indicating the age of respondents. Gender is a binary variable that takes the value

0 for male and 1 for female. Education takes values 1 for High school level, 2 for the Dutch “MBO”, 3 for “HBO” and 4 for university or “WO”. Left to Right and Progressive to conservative both have values from 1 to 10, 1 being the most left or progressive and 10 extremely right or conservative. “Behavior” and “Genetics” in the interaction variables depict the two treatment groups. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4.4 shows the results of three OLS-regressions with Responsibility as the dependent variable. With and without control variables, the treatments have no significant effect on Responsibility for both the smoking case and the obesity case. H2 and H4 are rejected: neither treatment makes respondents evaluate the smoker’s or the obese person’s responsibility for their worse health status as lower.

The third and fourth column show that age has a negative coefficient of -0.01 with $p < 0.05$ for the smoking case, but again not for the obesity case, supporting H6. This means that for every 1-year increase in age, the Responsibility variable decreases with 0.01 on average. An age increase of 30 years would mean a decrease of Responsibility of 0.30, which is less than one level. Furthermore, we see that not Left to Right, but Progressive to Conservative has a significant effect on Responsibility for both cases. For the smoking case, the coefficient is 0.09 with $p < 0.05$ and for the obesity case 0.07 with $p < 0.10$. For the smoking case, moving from extremely progressive to extremely conservative on the political spectrum would equal almost a full level increase in Responsibility. The fifth column shows that this is mainly due to respondents in the genetics treatment, as the interaction of Progressive to Conservative with Genetics has a coefficient of 0.20 with $p < 0.05$ and the interaction of Progressive to Conservative with Behavior has an insignificant negative coefficient of -0.09. Therefore, for respondents in the genetics treatment a 5-unit increase in Progressive to Conservative, for example from the political center to extremely conservative, on average increases Responsibility by one full level.

Finally, though the Left to Right variable did not have any significant effects on its own, the interaction between Left to Right and the behavior treatment has a coefficient of 0.18 with $p < 0.10$. This implies that for respondents in the behavior treatment, a 5-unit increase in Left to Right increases Responsibility by almost one level. Again H5 is supported, now regarding a different effect of the treatments on the attribution of responsibility between respondents with different political orientations.

Table 4.4

OLS-regression results for the relationship between the treatment and perceived responsibility

Variables	Responsibility					
	Smoking (1)	Obesity (2)	Smoking (3)	Obesity (4)	Smoking (5)	Obesity (6)
Behavior Treatment	0.17 (0.17)	0.19 (0.16)	0.10 (0.17)	0.13 (0.16)	0.07 (0.58)	-0.29 (0.53)
Genetics Treatment	-0.04 (0.17)	-0.06 (0.17)	0.04 (0.17)	-0.07 (0.17)	-0.27 (0.47)	0.00 (0.45)
Age			-0.01** (0.00)	-0.01 (0.00)	-0.01** (0.00)	-0.01 (0.00)
Gender			0.03 (0.15)	-0.02 (0.14)	0.01 (0.15)	-0.04 (0.14)
Education			0.08 (0.10)	0.02 (0.10)	0.03 (0.11)	-0.02 (0.10)
Left to Right			-0.02 (0.04)	0.01 (0.04)	-0.02 (0.08)	-0.04 (0.07)
Progressive to Conservative			0.09** (0.04)	0.07* (0.04)	0.06 (0.07)	0.09 (0.07)
Left to Right*Behavior					0.10 (0.10)	0.18* (0.10)
Left to Right*Genetics					-0.12 (0.10)	-0.07 (0.11)
Progressive to Conservative*Behavior					-0.09 (0.09)	-0.10 (0.09)
Progressive to Conservative*Genetics					0.20** (0.10)	0.06 (0.11)
Observations	186	186	186	186	186	186

Notes: This table contains the Stata results of 6 OLS-regressions with Responsibility as the dependent variable, given by each column. Above each column the case is stated for which the coefficients are found. Responsibility stands for the perceived responsibility the smoker or the obese person has for developing their diseases and is measured on a Likert scale with values ranging from 1 to 5, with 1 meaning not at all responsible and 5 very responsible. Column (1) and (2) only contain the treatment variables, in column (3) and (4) several control variables are added and in column (5) and (6) 4 interaction terms are added. Age is a continuous variable indicating the age of respondents. Gender is a binary variable that takes the value 0 for male and 1 for female. Education takes values 1 for High school level, 2 for the Dutch "MBO", 3 for "HBO" and 4 for university or "WO". Left to Right and Progressive to conservative both have values from 1 to 10, 1 being the most left or progressive and 10 extremely right or conservative. "Behavior" and "Genetics" in the interaction variables depict the two treatment groups. *p<0.10, **p<0.05, ***p<0.01.

Table 4.5 shows a summary of different reasons that were given in the open question of the survey, that asked why the respondents answered either "the same amount" or "higher" to the question about insurance. In table 4.6 we see how many people in which treatment group and for which case chose each reason. Equality and solidarity were mentioned most as reasons for letting the smoker and the obese person pay the same amount of insurance cost. It was used about the same number of times in the smoking case and in the obesity case, and most often in the genetics treatment. Alternatively, a lot of respondents said that smoking or being obese was a choice, most often in the control group and slightly more for the smoking than the obesity case. The rest of the respondents mentioned external factors that influence the risky behavior or the diseases, how much the smoker and the obese person cost to society to establish how much they should pay, the importance of prevention of smoking and obesity,

the practicalities of insurance system efficiency, and other reasons: freedom, they do not agree with the research, getting sick is enough punishment and they don't know.

Table 4.5

Code groups and their explanations for reasons given by respondents for their answers when asked why they want the smoker or obese person to pay the same amount or higher insurance costs

Reason	Explanation
Personal choice	It is a personal choice to smoke or be obese and you can do something about it if you want to.
External factors	There are external factors like genes, behavioral factors, addiction and other causes of lung cancer and type 2 diabetes.
Equality and solidarity	Equality and solidarity are important in our society, we therefore cannot treat the smoker or obese person differently.
Financial	Smokers and obese people cost more to society and therefore should pay more, or they should not since they die early and cost less.
Prevention	Letting smokers and obese people pay more can prevent obesity and smoking, or we should focus on prevention rather than letting them pay more.
Efficiency	Letting smokers and obese people pay more is not practical and not how our insurance system works.
Other	Other explanations.

Table 4.6

Percentage of occurrence of each code group relative to the sum of all code groups per treatment and case

Explanations	Control			Behavior			Genetics			Total
	Smoking	Obesity	Sum	Smoking	Obesity	Sum	Smoking	Obesity	Sum	
Personal choice	30%	22%	26%	27%	31%	29%	25%	25%	25%	27%
External factors	4%	13%	9%	10%	7%	9%	12%	12%	12%	10%
Equality/Solidarity	26%	27%	26%	32%	37%	34%	41%	41%	41%	34%
Financial	13%	7%	10%	10%	7%	9%	11%	8%	9%	10%
Prevention	13%	10%	12%	12%	6%	9%	4%	3%	3%	8%
Efficiency	8%	8%	8%	5%	4%	5%	3%	5%	4%	6%
Other	4%	13%	9%	4%	6%	5%	4%	5%	5%	6%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Notes: In the column under "Explanations" each code group is given that is explained in Table 4.5. Then for each treatment and each case the percentage of answers that belongs to each code group is given so that all code groups together make up 100%. Next to both cases of each treatment we find a column with the sum of the two cases and on the far right all cases of all treatments are summed together.

5 Discussion

Table 5.1 gives an overview of all hypotheses stated at the start of this paper and the results that were found regarding these hypotheses.

Table 5.1

Summary of results per hypothesis

Hypothesis	Result
H1: Framing a person's behavior that is risky to health as due to behavioral influences makes respondents less likely to say that person should pay higher insurance costs.	True for smoking, not for obesity
H2: Framing a person's behavior that is risky to health as due to behavioral influences makes respondents evaluate that person's responsibility for their worse health status as lower.	Rejected
H3: Framing a person's behavior that is risky to health as due to genetic influences makes respondents less likely to say that person should pay higher insurance costs.	True for smoking, not obesity
H4: Framing a person's behavior that is risky to health as due to genetic influences makes respondents evaluate that person's responsibility for their worse health status as lower.	Rejected
H5: The effect of the treatments differs for different political orientations.	Accepted
H6: Both the genetics frame and the obesity frame have a different effect on public opinion regarding responsibility for disease and insurance policy for the smoking case than for the obesity case	Accepted regarding insurance policy

We see that H1 and H3 are true for the smoking case, but not for the obesity case, which means H6 is accepted too, in line with the research by Havey and Hill (2001) and the Scottish government (2023). External factors are given more often as an explanation for the behavior of the obese person than for that of the smoker in the control group, but not in the behavior and the genetics group. It therefore seems like respondents are more knowledgeable of the possible effects of environment and of genes on people's weight than on addiction.

The fact that the genetics frame has a larger effect on the opinions on insurance policy than the behavior frame is also what was expected, considering the large body of literature on genetic attributions and the overweighing thereof (Dar-Nimrod & Heine, 2011), even though the data on specific comparisons is limited.

Consistent with research by Lynch and Gollust (2010) and Mata and Hertwig (2018), the means of both perceived responsibility for disease and the amount of insurance costs that should be paid lie higher for the smoking case than for the obesity case, implying a connection between the perceived responsibility for disease and opinion on insurance policy. However, this connection is lost when it comes to treatment effects, as both treatments have an effect on insurance policy for the smoking case but not on responsibility, meaning H2 and H4 are rejected. If responsibility is not the underlying variable that makes respondents evaluate insurance policy differently, then what is? Solidary, equality and

external factors are given slightly more often in the genetics and behavior group as reasons for the respondent's choice of insurance policy. It might be that respondents feel more understanding of the smoker and obese person, though they do not think this changes their responsibility for their actions.

H5 was accepted, not really due to the treatments having more effect on leftists and more progressive respondents, but due to the them having a reverse effect on right-winged and conservative respondents in some cases. This could be in accordance with the finding by Niederdeppe et al. (2015) that foregoing any mention of personal responsibility in a behavioral frame undermines its effectiveness, when looking at the interaction effect between more right-winged political orientation and the behavior frame for the smoking case. However, they did not find differences in this outcome between different political orientations, and did not study combinations with a genetics frame, for which we also found a reverse effect for conservatives evaluating the smoking case. Conservative respondents assign higher responsibility to the smoker and the obese person, due to the interaction effect with the genetics frame for the smoker and the behavior frame for the obese person. It is possible that they disagree with the given information about the genetic attributions of smoking and behavioral attributions of obesity, making them react negatively to the frames. More research is necessary to gain a complete understanding of the interactions of different political orientations and understand why the interaction with the behavior frame is found for the smoking case for the political right, but for the obesity case for conservatives.

The results show that older respondents are more likely to assign lower responsibility to the smoker for developing lung cancer and to let the smoker pay the same amount of insurance costs rather than a higher amount. This is possibly due to the fact that the number of people who have never smoked decreases with age (CBS, 2020), although older people are also more likely to have obesity (CBS, 2022) and we do not see the same (significant) effect for the obesity case. In support of this theory, Traina et al. (2019) find that smokers and people who exercise less are less supportive of policy that institutes higher insurance co-payments for self-inflicted disease. Future research should include questions about past risky health behavior of respondents to see if this influences their choices and the treatment effects.

It is clear that, as different outcomes have been found for two different cases, the outcome of this research is not generalizable towards other cases, for example about excessive drinking. It would therefore be useful for further research to explore the public opinion on other behaviors that are risky to health. Nevertheless, the cases that have been discussed in this paper are two of the most relevant and the findings can be valuable as these cases are specifically topic of discussion. If one wants to advocate in favor of smokers and an egalitarian insurance policy, it is important to provide information on the possible causes of smoking behavior and especially genetic attributions.

Some of the limitations of this study are, first of all, that the answers to the open question were only two to three sentences long, which is not much room to give a nuanced opinion. In depth interviews with a focus group could give more insight into the thought process of arriving at a certain preferred insurance policy. The coding of answers is also highly subjective, which means a different researcher could find a different outcome. Second of all, the sample only consists of Dutch people and might

therefore not be representative for other countries. As the survey was shared with my contacts, the study might not even be representative for the Netherlands as a whole, since many of my contacts belong to certain social groups. The respondents all being Dutch also means that some of the survey might have been lost in translation, as many, but not all Dutch respondents can be expected to speak English proficiently. Moreover, the political orientation variables that were used were both of self-reported political orientation, which could be biased. It might also be that some effects were not significant due to the relatively small sample size, so a large scale study could potentially give us more insight. Some of the statistical tests used have shortcomings too. The Kruskal-Wallis tests are not ideal for the binary nature of the Insurance variable, but still found to be more suitable than other possible methods. All effects on the Responsibility variable were measured using an OLS-regression for simplicity of interpretation of the coefficients, while an ordered logistic regression is often used for variables with a Likert scale and could have given the partial effects of each step in the scale. With regards to priming effects, there is no data available on how many respondents were presented with the smoking case or the obesity case first. If the randomization was not fully successful and a large majority of respondents in a certain treatment group was shown one of the cases first, priming of the first case could have affected the outcome variables of the second case and therefore influenced the treatment effect.

Overall the results show that many people lack information on the extent to which health inequality can shape health outcomes in our society and providing them with information in a targeted way has the potential to change their minds and eventually change national policy, or prevent it from changing. Knowing exactly who to target with what specific information requires extensive further research into existing knowledge among citizens, political influences and case specific framing effects.

6 Conclusion

A large part of the Dutch population is in favor of letting people who display risky health behaviors pay higher insurance costs (CBS, 2011), even though risky health behaviors are associated with health inequality and more prevalent in people with lower socioeconomic status (Mierau, 2021). In this paper an experiment is conducted to see whether different pieces of information about predisposition to risky health behavior change the position of Dutch citizens regarding insurance policy and responsibility for developing diseases.

It was hypothesized that framing a person's behavior that is risky to health as due to behavioral or genetic influences makes respondents less likely to say that person should pay higher insurance costs and evaluate that person's responsibility for their worse health status as lower. This hypothesis is found to be true only regarding the case where a smoker who develops lung cancer is evaluated and only the public opinion on insurance policy is affected, not responsibility. The effect is stronger for the genetics frame than for the obesity frame.

Age and political orientation are also found to have an effect. Older respondents are more likely to attribute the same amount of insurance costs and lower responsibility to the smoker. Respondents on the political right attribute higher insurance costs more often to the smoker, caused by an interaction effect with the behavior frame. Conservatives assign higher responsibility to the smoker and the obese person, due to an interaction effect with the genetics frame for the smoker and the behavior frame for the obese person.

These findings are largely consistent with existing literature and show the impact that framing, especially of genetic attributions, can have on the public opinion on health insurance policy. More research is needed to find out how and who to target, as the frames can have the opposite effect in some circumstances.

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Appendix A: survey questions

Start of Block: Intro

Q0 Welcome!

Thank you for your participation in this questionnaire for my bachelor thesis. I am an International Bachelor of Economics and Business Economics student at Erasmus University Rotterdam.

Completing this questionnaire will take about 5 minutes. Your answers will be completely anonymous and will only be used for the purposes of my research. By participating in this survey you consent to the use of the data collected.

Kind regards, Maartje

End of Block: Intro

Start of Block: General questions

Q1 What is your age?

Q2 What is your gender?

Male (1)

Female (2)

Q3 What is the highest education level you have obtained or are currently enrolled in?

- High school (1)
 - MBO (2)
 - HBO (3)
 - WO (4)
-

Q4 Where would you say you are on the political spectrum? 0 indicates extremely left and 10 indicates extremely right.

- 0 (0)
 - 1 (1)
 - 2 (2)
 - 3 (3)
 - 4 (4)
 - 5 (5)
 - 6 (6)
 - 7 (7)
 - 8 (8)
 - 9 (9)
 - 10 (10)
-

Q5 Where would you say you are on the political spectrum? 0 indicates extremely progressive and 10 indicates extremely conservative.

- 0 (0)
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10)

End of Block: General questions

Start of Block: Smoking control

SC1 Research shows that women who smoke are about 13 times more likely to develop lung cancer and men who smoke are even 23 times more likely to develop lung cancer.

Please answer the following question to show that you have read the text carefully.



SC2 Does smoking increase or decrease the risk of developing lung cancer?

- Increase (1)
- Decrease (2)

Page Break

SC3 Consider a person who is a long-term smoker. This person develops lung cancer.

SC4 Do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke?

- Lower (3)
- The same amount (4)
- Higher (5)

Page Break

SC6 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke? Please answer with 2-3 full sentences.

Page Break

SC7 How responsible do you think this person is for developing lung cancer?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Smoking control

Start of Block: Obesity control

OC1 Research shows that obesity increases the risk of developing type 2 diabetes by up to 80 times and that 80-85% of the risk of developing type 2 diabetes is caused by obesity.

Please answer the following question to show that you have read the text carefully.



OC2 Does obesity increase or decrease the risk of developing type 2 diabetes?

- Increase (1)
- Decrease (2)

Page Break

OC3 Consider a person who is obese. This person develops type 2 diabetes.

OC4 Do you think this person should pay higher, the same amount or lower insurance costs than a person who is not obese?

- Lower (3)
- The same amount (4)
- Higher (5)

Page Break

OC6 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who is not obese? Please answer with 2-3 full sentences.

OC7 How responsible do you think this person is for developing type 2 diabetes?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Obesity control

Start of Block: Smoking behavior

SB1 Research shows that women who smoke are about 13 times more likely to develop lung cancer and men who smoke are even 23 times more likely to develop lung cancer.

Research also found that second-hand smokers, so people who are often close to other people who smoke, are more likely to start smoking, more likely to develop nicotine dependence and less likely to quit smoking. If people perceive that it is socially acceptable to smoke, this can also make them more susceptible to smoking. It is therefore far more likely that children will become a long-term smoker if their parents also smoke than if they do not.

Please answer the following two questions to show that you have read the text carefully.



SB2 Does smoking increase or decrease the risk of developing lung cancer?

- Increase (1)
- Decrease (2)



SB3 Can your parents influence your smoking behavior by smoking themselves, and make it more likely that you will become a smoker?

- No (1)
- Yes (2)

Page Break

SB4 Consider a person who is a long-term smoker. The parents of this person also smoke. This person develops lung cancer.

SB5 Do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke?

- Lower (3)
- The same amount (4)
- Higher (5)

Page Break

SB7 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke? Please answer with 2-3 full sentences.

Page Break

SB8 How responsible do you think this person is for developing lung cancer?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OB1 Research shows that obesity increases the risk of developing type 2 diabetes by up to 80 times and that 80-85% of the risk of developing type 2 diabetes is caused by obesity.

Research also shows that parents strongly influence the eating behavior of children. The food that is provided while growing up largely determines attitudes and preferences towards food that can last a lifetime. There is a strong relationship between the weight of parents and the weight of their children. Children are therefore far more likely to become obese if their parents are also obese.

Please answer the following two questions to show that you have read the text carefully.



OB2 Does obesity increase or decrease the risk of developing type 2 diabetes?

- Increase (1)
- Decrease (2)



OB3 Can your parents influence your eating behavior by providing unhealthy food, and make it more likely that you will become obese?

- No (1)
- Yes (2)

Page Break

OB4 Consider a person who is obese. The parents of this person are also obese. This person develops type 2 diabetes.

OB5 Do you think this person should pay higher, the same amount or lower insurance costs than a person who is not obese?

- Lower (3)
- The same amount (4)
- Higher (5)

Page Break

OB7 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who is not obese? Please answer with 2-3 full sentences.

Page Break

OB8 How responsible do you think this person is for developing type 2 diabetes?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Obesity behavior

Start of Block: Smoking genetics

SG1 Research shows that women who smoke are about 13 times more likely to develop lung cancer and men who smoke are even 23 times more likely to develop lung cancer.

In order to become a long-term smoker, a person needs to start smoking and become addicted. Research has found that in both of these processes genes play a large role. This means that people can inherit certain genes from their parents that increase their susceptibility to smoking. It is therefore far more likely that children will become a long-term smoker if their parents also smoke than if they do not.

Please answer the following two questions to show that you have read the text carefully.



SG2 Does smoking increase or decrease the risk of developing lung cancer?

- Increase (1)
- Decrease (2)



SG3 Can you inherit genes from your parents that make it more likely that you will become a smoker?

- No (1)
- Yes (2)

Page Break

SG4 Consider a person who is a long-term smoker. The parents of this person also smoke. This person develops lung cancer.

SG5 Do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke?

- Lower (3)
- The same amount (4)
- Higher (5)

Page Break

SG7 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who does not smoke? Please answer with 2-3 full sentences.

Page Break

SG8 How responsible do you think this person is for developing lung cancer?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Smoking genetics

Start of Block: Obesity genetics

OG1 Research shows that obesity increases the risk of developing type 2 diabetes by up to 80 times and that 80-85% of the risk of developing type 2 diabetes is caused by obesity.

Research also shows that genes play a large role in becoming obese. Genes that regulate energy expenditure, food intake and appetite, among others, have been found to contribute to the development of obesity. People can inherit these genes from their parents. Children are therefore far more likely to become obese if their parents are also obese.

Please answer the following two questions to show that you have read the text carefully.



OG2 Does obesity increase or decrease the risk of developing type 2 diabetes?

- Increase (1)
- Decrease (2)



OG3 Can you inherit genes from your parents that make it more likely that you will become obese?

No (1)

Yes (2)

Page Break

OG4 Consider a person who is obese. The parents of this person are also obese. This person develops type 2 diabetes.

OG5 Do you think this person should pay higher, the same amount or lower insurance costs than a person who is not obese?

Lower (3)

The same amount (4)

Higher (5)

Page Break

OG7 Why do you think this person should pay higher, the same amount or lower insurance costs than a person who does is not obese? Please answer with 2-3 full sentences.

Page Break

OG8 How responsible do you think this person is for developing type 2 diabetes?

	Very responsible (1)	Somewhat responsible (2)	Neutral (3)	Not very responsible (4)	Not at all responsible (5)
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End of Block: Obesity genetics



Appendix B: Additional figures

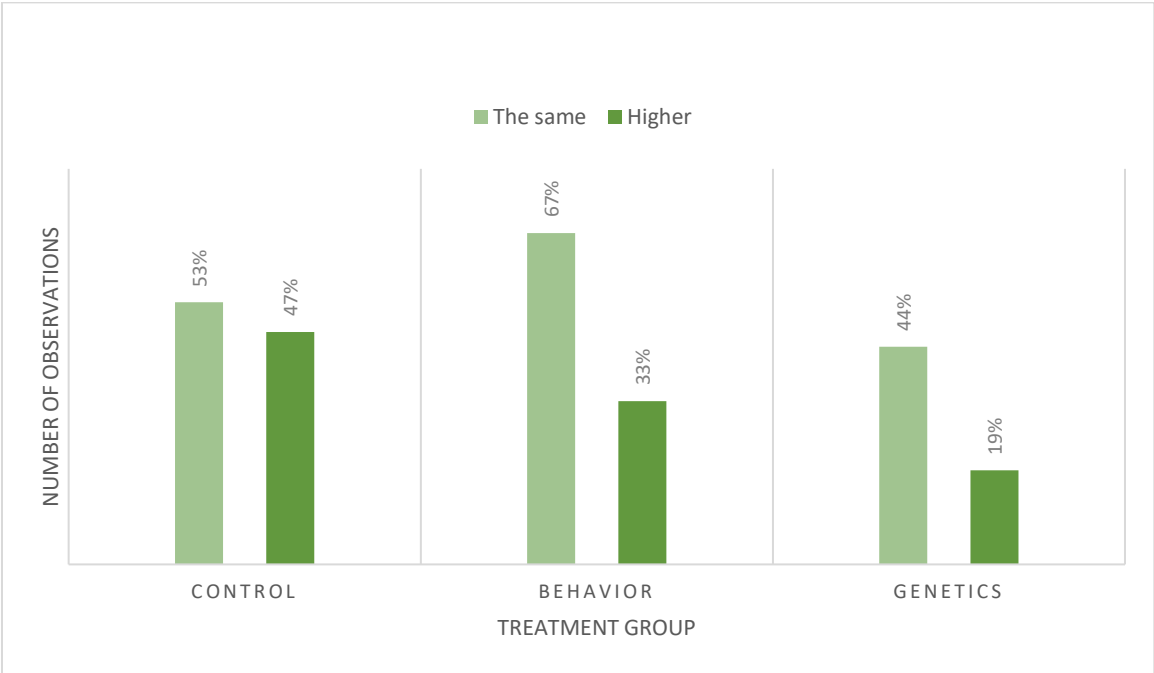


Figure 1.1 Insurance variable per treatment group in percentages for the smoking case

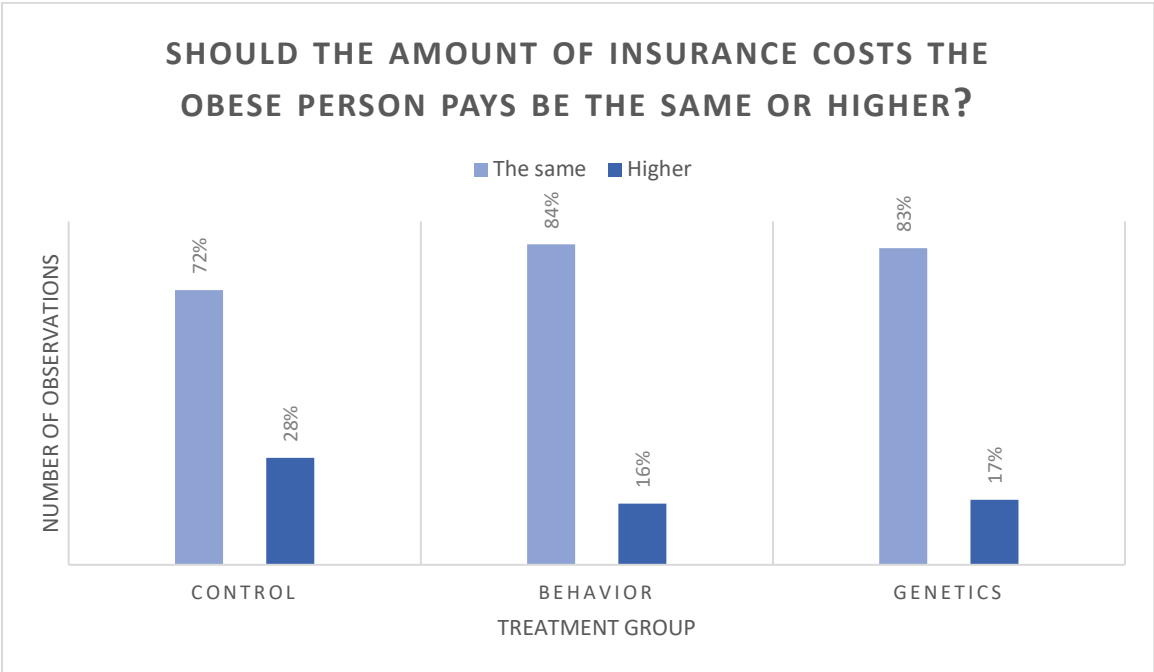


Figure 1.2 Insurance variable per treatment group in percentages for the obesity case

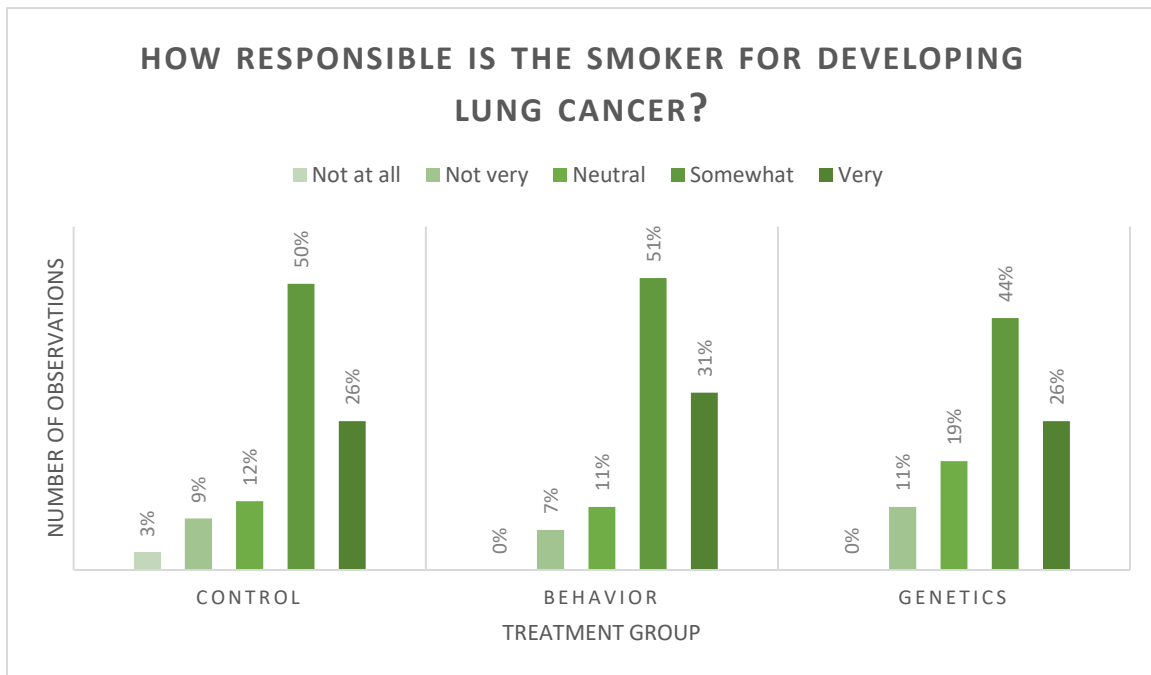


Figure 1.3 Responsibility variable in percentages per treatment group for the smoking case

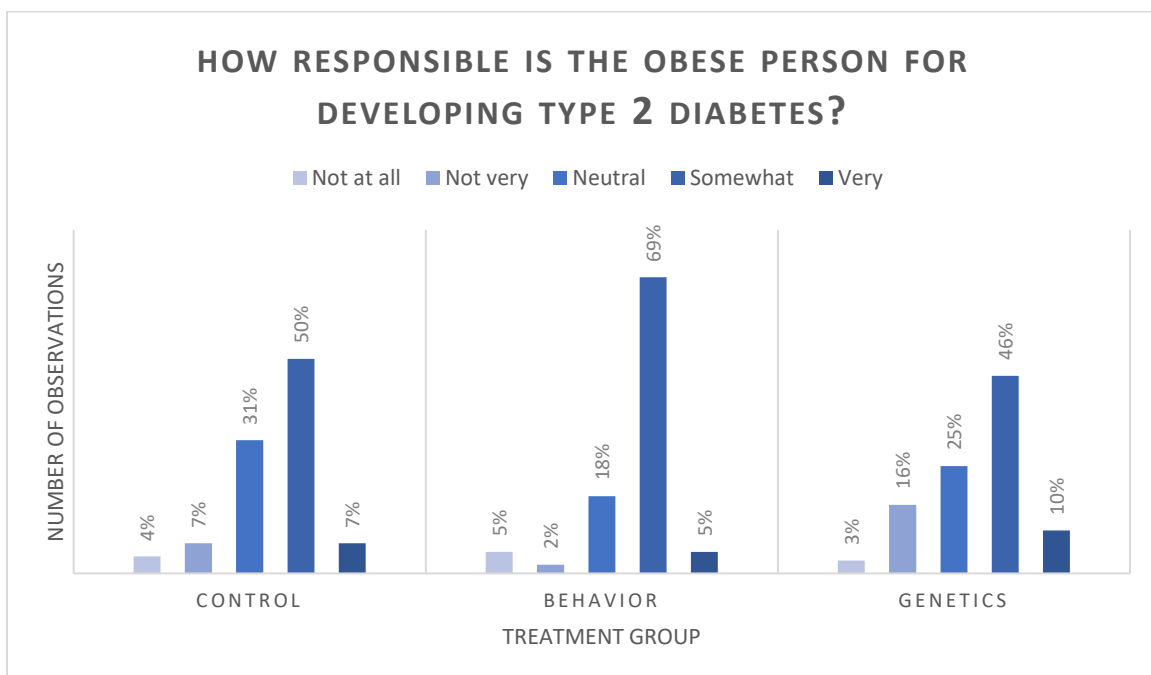


Figure 1.4 Responsibility variable in percentages per treatment group for the obesity case