



UNIVERSITY OF  
GOTHENBURG

# Pandemic Behavior

Economic Preferences and Perceptions regarding Covid-19

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**Abstract:**

In early spring 2020, Covid-19 spread around the world and dominated the media coverage. It acutely impacted the global economy as countries went into lockdown and health services struggled to administer the situation. The purpose of this thesis is to investigate the relationship between economic preferences and perceptions about Covid-19 and changes in consumption behavior. We argue that understanding these relationships can lead to a better understanding of behavioural effects of Covid-19 and potential future pandemics. Using a web-survey we elicit measures of risk attitude, altruism, reciprocity, trust and influence of media in a student sample. We also elicit measures on anxiety, subjective probabilities regarding the risks of Covid-19 and changes in consumption behavior. This study aims to answer a series of relevant research questions using different regression models. The results show that economic preferences are important predictors of perceptions regarding Covid-19 but seem to have no statistically significant effect on changes in consumption behavior. Higher risk tolerance and trust in government information are associated with lower levels of anxiety, while altruism and higher influence of media are associated with more anxiety. We also find strong relationship between different economic preferences and anxiety about medical and economic consequences, respectively. We find less conclusive evidence of the relationship between economic preferences and consumption behavior. Our results can be used to guide policy-making during pandemics to achieve a better coordination and cooperation in society.

**Keywords:** economic preferences, Covid-19, anxiety, consumption behavior, media influence

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## Acknowledgments

The last few months have been some of the strangest times we have ever experienced. Covid-19 has spread over the world, inflicted casualty and brought on massive lockdowns. Writing a thesis in these circumstances turned out to be remarkably interesting but also hard and demanding, as all formal and informal structures were turned upside down. The road to submitting this thesis included detours, deadlocks and obstacles that we have now overcome. For this, we would like to acknowledge those who made it possible.

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To do something for the first time is never easy, but we have now written a bachelor's thesis in Economics. This is a milestone in both our studies and our lives.

*Magnus Frank Bille and David Olsson*

*Tuesday, 9 June 2020*

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## 1.0. Introduction

On the 11<sup>th</sup> of March 2020, the Director-General of the World Health Organization (hereafter WHO), Tedros Adhanom, declared Covid-19 a pandemic. By that time there were over 118,000 reported cases in 144 countries (WHO 2020a). Government responses to the pandemic have varied between countries, but in general the responses became more stringent and more homogenous over the course of the pandemic (Hale et al. 2020). The first case was verified in Sweden on the 31<sup>st</sup> of January (Folkhälsomyndigheten 2020). Sweden famously opted against a lockdown, becoming a symbol of an alternative way of handling the pandemic, and received both criticism and appraisal for its decision. The importance of individual behavior during the pandemic is evident in the pleads by politicians for social compliance, and with more freedom more responsibility lies on the individual citizen.

Social compliance includes following government advice or restrictions, such as social distancing, avoiding panic buying and increase sanitation. Thus, individuals' actions have an effect on social welfare to reduce the spread of the virus, and it is not realistic to expect everyone to exhibit the same level of compliance with the rules suggested or imposed during the pandemic. The variability in individual actions might be related to the variability in how people perceive the pandemic. This can include emotions, such as anxiety, and subjective probabilities of getting infected or being hospitalized as well as individual beliefs about how the rest of society thinks and feels about Covid-19. Finally, these perceptions might be linked to inherent individual and economic preferences of people.

For example, more risk seeking people might be less worried about the pandemic and people with higher prosocial behavior might want to actively participate in reducing the spread of the virus. So, this might lead different people exhibiting different levels of social compliance. Moreover, economic preferences could also be important in explaining how peoples' consumption behavior have changed due to the pandemic. For example, more risk averse people might engage in panic buying or bunkering, while people with higher prosocial behavior might decrease their consumption in stores to reduce the spread of the virus.

The aim of this study is to explore a possible link between individual economic preferences and perceptions about Covid-19 and consumption behavior during the pandemic. Due to the lack of an established theoretical framework on the subject, this study will have an exploratory focus.

At the time of writing, the current literature on economic preferences and Covid-19 is still limited. However, some early studies have shown that economic preferences are associated with beliefs about the economy (Bu et al. 2020, Binder 2020) and with compliance to government advice (Müller & Rau 2020, Wong & Jensen 2020). There is a limited amount of research on how economic preferences are associated with anxiety and change in consumption behavior in a pandemic situation. Understanding how economic preferences are related to anxiety and consumption behavior during the pandemic is important to determine appropriate policy responses, as well as effective communication strategies. Social compliance could be affected by anxiety or the subjective probability of contracting the virus. The outbreak of Covid-19 has already dramatically affected the global economy, with surging unemployment, bankruptcies, and volatile stock markets around the world. These macroeconomic outcomes depend in part on individuals' consumption behavior. Understanding the determinants of e.g. anxiety and consumption behavior during the pandemic could be crucial for a comprehensive understanding of the crisis.

Our thesis aims to investigate some possible determinants. Considering this, the thesis will explore two main research questions in particular:

- i) How are economic preferences related to anxiety about Covid-19?
- ii) How are economic preferences related to changes in consumption behavior?

In addition to the main research questions, we also address several other questions such as: Are economic preferences associated with the perception of how well the Swedish government is handling the pandemic? How is influence from media associated with perceptions and consumption behavior? Is there a difference between how worried people are and how they perceive anxiety among others? Are there any differences between men and women regarding perceptions and consumption behavior?

In order to provide insight to these questions, this thesis uses data from a web-survey conducted in April 2020, in which 260 respondents participated. Our sample consists of students at the School of Business, Economics and Law at the University of Gothenburg. We elicit measures on risk preference, prosocial behavior (viz. altruism and reciprocity), trust and self-assessed influence of media. The elicitation of these measures is based on the methodology and formulation presented by Falk et al. (2018) and the Global Preference Survey (hereafter GPS, see

3.2.1 for details). In accordance with the aim of this study, our survey also elicits measures of perceptions about Covid-19, e.g. anxiety, and of subjective probabilities and consumption behavior during the pandemic.

The analysis begins with examining possible associations between the variables. Associations are presented based on the explanatory variables, in the following order: i) prosocial behavior, ii) risk attitude and iii) trust and media influence. The result show that economic preferences are associated with perceptions about Covid-19 and to a lesser extent to consumption behavior. Additionally, we see that qualitative measures of preferences are better predictors to our dependent variables than quantitative hypothetical choice experiments. Then, we investigate the relationships between the independent and dependent variables in 11 different regression models.<sup>1</sup> The results show that economic preferences are significant predictors of perceptions about the pandemic, which is not the case for consumption behavior. Lastly, we discuss the outcomes of the empirical analysis and possible policy implications as well as recommendations for further research.

The findings of this study ties into the research on economic preferences in general, and in particular to research on economic preferences and pandemics. This study is, to the best of our knowledge, the first survey study examining the relationship between economic preferences, anxiety and consumption behavior during Covid-19.

The pandemic continued to be active and affect society throughout the thesis process. When we started planning our study, Sweden had just had its first confirmed case (Folkhälsomyndigheten 2020a). When we conducted our web-survey Covid-19 was classified as a pandemic (WHO 2020a) and all education at the School of Business, Economics and Law had to be online (University of Gothenburg 2020b). When we submitted this thesis there were around 6 million confirmed cases and 367,166 deaths globally (WHO 2020b) and Sweden had 43,196 confirmed cases and 4,499 deaths (Folkhälsomyndigheten 2020b).

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<sup>1</sup> In this case, regression models refer to regressions on different variables, and not different regression techniques.

The remainder of the thesis proceeds as follows: Section 2. provides a literature review and behavioral predictions, Section 3. describes the data and the methodology, Section 4. presents the results, Section 5. provides a discussion and finally Section 6. concludes.

## 2.0. Literature Review and Behavioral Predictions

Previous literature suggests that that economic preferences can predict a variety of economic and social domains of individual behavior, e.g. health, educational, financial and labor-market domains as well as self-reported life satisfaction (see Heckman et al. (2019) for a detailed review). During the period we conducted this study, Covid-19 was still an active pandemic and there was limited amount of the research on the relationship between economic preferences and the pandemic, and published literature was even more scarce. However, there were already a few behavioral economic studies and working papers which investigated this relationship.

This section will proceed as follows: 2.1. will present previous research on economic preferences with a focus on Covid-19, such as i) prosocial behavior, ii) risk preference and iii) trust and media. In section 2.2, we review the literature on anxiety and perceptions about Covid-19 including consumption behavior.

### 2.1. Literature on economic preferences

**Prosocial behavior.** Altruism can be defined as a selfless concern about other people and reciprocity as the inclination for positive conditional cooperation with others, and both can be seen as types of prosocial behavior.<sup>2</sup> Existing literature suggests possible associations of altruism and reciprocity with some relevant concepts to our context. For example, a recent study, which aimed to investigate the predictions made by so called SIR-models<sup>3</sup> on the pandemic, showed that altruism and reciprocity are negatively related to mobility during the pandemic. The study used data from Google Trends together with preference measures from the Global Preference Survey and concluded that the effect of government lockdown measures was muted in places where altruism and reciprocity are high, due to the fact that people already changed their behavior to comply with government advice (Alfaro et al. 2020). This might suggest that people with a higher degree of prosocial behavior are more concerned about well-being of others and

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<sup>2</sup> We define prosocial behavior as a broad range of behaviors with the intention to benefit (at least in part) other people than oneself, see Batson & Powell (2003) for a detailed explanation.

<sup>3</sup> Mathematical models used in epidemiology to investigate the spread infectious diseases, it stands for *Susceptible, Infectious, or Recovered*.

therefore take active measures to decrease the spread of the virus by decreasing their mobility. Altruism and trust have also previously been showed to be important to public health, namely regarding public goods such as vaccinations. Both general trust (Rönnerstrand 2015) and altruism (Shim et al. 2012) increases the willingness and the acceptance of immunization. Suggesting that those groups are more considerate of the general benefit of vaccination.

In addition to this, there are also studies which focus on variables that can be seen as proxies for prosocial behavior, such as social responsibility.<sup>4</sup> For instance, recently, Müller & Rau (2020) found that compliance (e.g. social distancing) during the pandemic is positively associated with patience and social responsibility, and negatively associated with risk attitude. We conjecture that prosocial behavior could also be associated with perceptions and behaviors during Covid-19.

**Risk preference.** Intuitively, risk preference, or risk attitude, can be defined as the natural inclination of people towards taking risks. We would like to note that elicited risk attitudes in our survey might be affected by the atmosphere due to Covid-19, and therefore might not reflect the inherent risk attitude an individual might exhibit. There is some supporting evidence for our conjecture, e.g. Dohmen et al. (2017) found that risk preferences are not stable over time and Filip & Voinea (2011) states that economic crises might affect risk attitudes (see also Andersen et al. 2019). As previously mentioned, there is a limited amount of research investigating the associations between risk attitudes and various types of pandemic behavior. However, Bu et al. (2020) found that more exposure to Covid-19 correlates with a higher risk aversion and pessimistic beliefs regarding the economic situation. In addition to this, Binder (2020) found that greater concern about the pandemic is associated with both higher inflation and unemployment expectations. Shou et al. (2013) states that people who are risk averse are more likely to engage in panic buying and bunkering.

Literature also suggests that risk attitudes might be associated with optimism: e.g. Dohmen et al. (2018) find that pessimistic people tend to focus on the potential negative outcome while optimist focus on the potential positive, this can lead to divergent answers between the groups. Results regarding the relationship between risk attitudes and gender are mixed. Overall, women

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<sup>4</sup> Social responsibility refers to the concept in ethics that an individual has an obligation to act for the good of society or the world at large.

seem to exhibit more risk aversion than men, both in university samples (e.g. Croson & Gneezy 2009, Vieider et al. 2015a) and in global representative studies (Falk et al. 2018) yet, the degree of aversion varies, and some studies find no gender difference (Niederle 2014). We conjecture that risk attitude could be associated with anxiety, consumption behavior and subjective probabilities.

**Trust and media influence.** Trust can be defined as a belief of reliability (Falk et al. 2018) rather than a preference, but it is significant to various economic behaviors (Arrow 1972, Evans & Kreuger 2009) and to macroeconomic factors, e.g. growth, of countries (Knack & Keefer 1997). Uslaner (2002) investigates the multifaceted concept of trust and describes, among other things, two types of trust, namely generalized and particularized trust. Generalized trust is the belief that most people can be trusted while particularized trust is the notion that only some people can be trusted. General trust has also been showed to correlate with other types of trust, i.e. with political trust (Rothstein & Stolle 2008, Harris et al. 2010) and with trust in media (Tsfati & Ariely 2014).

We conjecture that trust, both general and particularized, can be important predictors of perceptions and behavior during the pandemic. A study conducted during Covid-19 investigated the relationship between trust in government, risk perception and social compliance in Singapore. The results show that while the trust for government was high, adherence to government advice (e.g. social distancing) was not as high, due to a low risk perception in general (Wong & Jensen 2020). However, other studies found that political trust is positively associated with social compliance during the pandemic (Bargain & Aminjonov 2020). We also conjecture that how influenced a person is by media could be important to their perception of the pandemic. At least to our attention there seems to be a lack of research on the latter relationship.

## 2.2. Literature on anxiety and consumption behavior

It is important to note that anxiety is a large and multifaceted term. It can refer both to different types of anxiety (e.g. *trait or state anxiety*), to different medical conditions and to varying degrees of such (Endler & Kocovski 2001). Perceived threat or anxiety about coronavirus have been shown to be negative associated with risk preference (Müller & Rau 2020). Gu et al.

(2017) suggest that anxiety and risk preference might be affected by a *framing effect*.<sup>5</sup> They argue that the association between anxiety and risk preference might be a result of framing effect and anxiety, due to the hypersensitivity of anxious people to emotional information (Gu et al. 2017). Studies suggest that pathologically anxious people exhibit more risk aversion, but not increased loss aversion (Charpentier et al. 2017). Fetzner et al. (2020) found in an experiment that framing of information about the mortality rate of Covid-19 significantly impacted participants' beliefs about economic outcomes due to the pandemic. Secondly, the study finds a large heterogeneity in beliefs about both the mortality and the contagiousness of the virus, and most people strongly overestimated both aspects in relation to official and scientific data.

Some researchers at the Stockholm School of Economics have already reflected on the potential role of *pluralistic ignorance*<sup>6</sup> during Covid-19. They brought up the example of social distancing, which is one component of social compliance. In an example, they conjectured that it could be that most people agree that social distancing is the right thing to do, but because they do not see other people practicing social distancing they believe that others must feel differently and therefore do not speak up when observing people not practicing social distancing (Stockholm School of Economics, 2020). We argue that in addition to risk attitudes, both prosocial behavior and trust could be associated with anxiety about the pandemic. We also think that these preferences can have an impact in the way peoples' consumption behavior has changed during the pandemic. Andersen et al (2020) finds a significant decrease in consumption spending following government restrictions due to Covid-19 in Denmark. Chronopoulos et al. (2020) show that consumption in the United Kingdom has decreased substantially during the outbreak of the

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<sup>5</sup> The framing effect refers to the phenomena that people are more (less) likely to choose options worded in a positive (negative) emotional way, see Tversky & Kahneman (1981).

<sup>6</sup> First- and second-order beliefs are fundamental components of theory of mind, see Robalino & Robson (2012) for an explanation of the application in economics. In experimental economics and game theory a player's first-order beliefs are defined as the player's beliefs about e.g. the uncertainty of the game, the second-order beliefs are the player's beliefs about the other players' first-order beliefs. Due to asymmetric information it is possible for us to hold erroneous second-order beliefs (Weinstein & Yildiz 2007). When this false perception of the first- and second-order belief is put in the context of norms it is called *pluralistic ignorance* (Katz & Allport 1931). A famous historic example of this is that during the last years of the Soviet Union, many people opposed the regime but thought that the general support was high (Kuran 1991). More recently a study showed that the support for female work force participation among young men in Saudi Arabia was much higher than what those men thought the support was (Bursztyn et al. 2018). Related to this is the concept *preference falsification*, which means that the views expressed by people are influenced by the social acceptability of those views, and that the real views may be different (Kuran 1997). Crucial to this is also the concept of *third-order-inference* in which policies often are created with the aim to be supported by a majority of people. Problems can arise when decisions are made on false views on what the majority believes (Correll et al. 2017).

pandemic. However, the changes in consumption varies with regions, age, gender and with the date. Younger people spend more on consumption, but they also decreased their spending on dining and drinks more rapidly than older people. There was an increase of consumption for groceries and basic products in the two weeks following the statement by the WHO classifying Covid-19 as a pandemic. This is consistent with bunkering, panic buying and stockpiling. Fetzer et al. (2020) investigated the relationship between perceptions of Covid-19 and economic sentiments. Firstly, the study finds an increase of search terms on Google correlated with economic pessimism (e.g. recession, stock market crisis) and of panic reactions (e.g. survivalism, conspiracy theory) correlated to the spread of the virus.

### **3.0. Data and Methodology**

This section will proceed as follows: We start by presenting our survey design and descriptive statistics. Then, proceed by describing our key variables. Next, we discuss the econometric models and tests used in this study and concluding by providing a methodological critique.

#### **3.1. Survey design and descriptive statistics**

The data was collected through an anonymous web-survey that was conducted during the period of 20<sup>th</sup> and the 27<sup>th</sup> of April. Initially, the study was intended to be carried out to a representative sample with interviews. However, due to complications of Covid-19 it was not possible. Instead a web-survey was sent to students at the School of Business, Economics and Law. Studies have shown that the preferences of students differ from those found in a representative sample (e.g. Falk et al. 2013, Cappelen et al. 2015). The scope of the study was therefore changed to study the relationship between economic preferences and Covid-19 among students. Before we sent the survey to our actual sample, we conducted an informal pilot study with some friends and family (N=8). This gave us the opportunity to see if there were some formulations or questions that had to be changed. In addition to changes in formulations of some questions, we also clarified that the sure payment always stayed the same in the hypothetical choice experiment to elicit risk attitude.

Students were sent an e-mail with an invitation to participate in an online survey, in total 2528 invitations were sent. These e-mail addresses were collected from the internal system of the University of Gothenburg. These e-mail addresses belong to people who are registered at the School of Business, Economics and Law, but this could also include people who study part-

time or have interrupted their studies. The 260 respondents represent a participation rate of about 10.3 %. In the invitation, respondents could choose to do the survey in English or in Swedish. Due to consideration of language bias and low participation from non-Swedish speaking students the English survey answers were discarded. The average duration of the survey was 5-7 minutes.

We follow the recommendations made by the Swedish Research Council, and the data we collected is anonymous. Respondents were also informed that their answers would be anonymous. Apart to the issue of data anonymity, we do not consider that our study is subject to any major issues of research ethics as stipulated by the Swedish Research Council (Swedish Research Council, 2017). The survey was incentivized through a potential win of 200 SEK from a random draw from the participants. Respondents could freely choose to be a part of the draw, by submitting their e-mail address in a separate form, so that we could not connect their e-mail address to any answers. These e-mail addresses were deleted after the draw. We incentivized our study with a draw to lessen the effect of altruism on survey participation. The amount was chosen to be enough to increase participation, but not so much that people would do the survey just to be a part of the draw and in this way answer carelessly or untruthfully. A draw was also more economically viable for us than e.g. paying all participants.

In order to limit the potential variation in perception of Covid-19 due to time and rapidly updated news, we limited the collection of the survey to one week. The first case was verified in Sweden on the 31<sup>st</sup> of January. In late February there was an extensive outbreak in northern Italy and by mid-March the Ministry of Foreign Affairs discouraged from traveling abroad. (Resumé 2020). On the 22<sup>nd</sup> of March the Prime Minister of Sweden held a speech to the nation (Regeringskansliet 2020). On the 17<sup>th</sup> of March the Principal of University of Gothenburg decided to close all education at campus (University of Gothenburg 2020b), and the day before a decision was made to cancel all tests in examination halls in favor of other means of examination (University of Gothenburg 2020a). Generally, the media reported on both the medical and the economic consequences of the pandemic, but during the week we conducted our survey there were no new major decisions made regarding Covid-19 in Sweden.

In total, 260 respondents participated in the study. The response rate (see Appendix B) shows that 84,23% of the respondents submitted their answers in the first day. The demographics of the respondents are presented in Appendix C, below are the gender statistics:

Table 1: Demographics of the sample

	Participants
Female	165
Male	92
Non-binary	3
Total	260

In our sample 63,5% are women, 35,4% are men and 1,2% do not identify as either men or women, and the median age is 22. According to the official statistics from the School of Business, Economics and Law (2020), there are 51% women at the school. Several studies have shown that women are more likely to participate in studies (Smith 2008), but we cannot assume that our results are free from gender bias. In order to check for selection bias, we resent the survey to non-respondents in mid-May, and in total 90 new respondents participated. We find similar distributions of gender (67,4% women) and age (median: 23 years) in this group as in our sample. See Appendix C for respondents in the second group and Appendix B for the response rate.

The survey was structured as follows. The first part of the survey consisted of sociodemographic questions. The second part consisted of items eliciting measures for the chosen economic preferences, trust and influence of the media. The third part consisted of questions about the respondent’s perception of Covid-19. The fourth part consisted of questions about savings and consumption behavior. Lastly, participants were asked to state some subjective probabilities. For all survey questions, see Appendix E.

### 3.2. Variables

The survey collected a large amount of data, but due to the scope of our research and the time limitation some variables were discarded from the study. These included sociodemographic variables, savings behavior, qualitative measure for time preference, measures on the change of daily routines and more. The full list of variables can be seen under Appendix D. The following section will present and discuss the variables that are relevant to the research questions in our study, and the elicitation of them.

#### 3.2.1. Measures of economic preferences

Measuring economic preferences with incentivized experiments is often considered the preferred method in experimental economics literature. Studies have shown that behavior in incentivized experiments can predict actual economic behavior (e.g. Meier & Sprenger 2010, Sutter et al. 2013). However, it is often both expensive and time consuming to conduct these kinds of experiments, so many studies use survey questions instead of incentivized tasks. The reliability of self-assessments in surveys have been questioned, although studies have shown that qualitative survey questions do predict behavior in incentivized experiments (Dohmen et al. 2011, Falk et al. 2016) and in real-life economic outcomes (Jaeger et al. 2010, Barasinska et al. 2012). Many of these studies are made in high income countries such as Germany, often in university environments, and a later validation study of the GPS from Kenya showed that self-assessment measures had less predictive power in poor and low educated samples (Bauer et al. 2020). However, we argue that our sample is more in line with the previous mentioned studies.

Falk et al. (2018) aimed to study the variation of some key preferences globally. The study introduced a survey module which measures different economic preferences using both qualitative self-assessments and quantitative hypothetically incentivized tasks. The survey module measured altruism, trust, risk aversion, time discounting, positive and negative reciprocity. An ex ante experimental validation study (Falk et al. 2016) aimed to establish the validity of the measurements in the survey. The subjects were students at the University of Bonn in Germany and the study found that the measures of economic preferences in the survey do predict decisions in incentivized experiments. Falk et al. (2018) is widely referenced and the GPS has been used in other studies (e.g. Falk & Hermlle 2019, Potrafke 2019). The results show that economic preferences vary with gender, cognitive ability and age on an individual level. Preferences also varies between countries, but not as much as the within-country variation (Falk et al. 2018).

Our survey makes extensive use of the methodology of the Falk et al. (2018), because the formulations used have already been validated in an arguably similar environment to our study (Falk et al. 2016). We use the exact formulation used by the GPS in Sweden (See Appendix F), for the items regarding risk attitude, altruism, reciprocity, generalized trust as well as for math skills. Due to both time constraints and our scope of research certain measures of the GPS were not elicited (e.g. negative reciprocity, time preference) in our survey. The items in our survey eliciting other measures (e.g. consumption behavior, perceptions about Covid-19 and particularized trust) are unique to our survey (See Appendix F).

Falk et al. (2016) reason that quantitative measures that involves monetary stakes, such as a hypothetical choice experiment might be better predictor to financial behavior and less predictive with other types of behavior. Self-assessments with abstract framings have been shown to be good predictors of behavior in incentivized experiments and of various real-life choices. One example of this could be that self-assessed willingness to take risks is associated with cigarette smoking (Dohmen et al. 2011). Our study makes uses of both types of measurements, because it is interesting to see if there is a difference in predictions between the two measures.

**Risk preference.** Risk preference was measured on two items in the survey. Firstly, by a qualitative self-assessment where respondents graded their willingness to take risks in general on an 11-point Likert scale. This measurement has been shown to be a good predictor on actual risk-taking behavior (e.g. Jaeger et al. 2010, Dohmen et al. 2011, Lönnqvist et al. 2015, Vieider et al. 2015b). Secondly, a quantitative multiple price list game with hypothetical choices between a lottery and a guaranteed payment using so called staircase method (Cornsweet 1962) was also used to measure risk. In this item respondents were asked to choose between a draw with an equal chance to receive 6000 SEK and 0 SEK, or a fixed payment of 3200. Depending on how the respondent answered they get a new question where the fixed payment is different. Every respondent is asked five questions in total and is assigned a risk attitude value between 1 and 32 depending on their answers. See Appendix G for the schematic of the survey item.

**Altruism.** Altruism is measured on two items in the survey. The first part was a qualitative subjective self-assessment question which asked the respondent to state their willingness to give to charity without expecting anything in return on an 11-point Likert scale. The second part was a quantitative hypothetical first mover experiment (a dictator game), which asked the respondents to suppose that they were given 18000 SEK. They were then asked how much of

this they would donate to a charity, with allowed amounts ranging from 0 SEK to 18000 SEK. The amount given is used as a measure for altruism.

**Reciprocity.** The measure for positive reciprocity is also elicited with two items in the survey. In the first item the subjects were asked to answer how well the statement “*when someone does me a favor, I am willing to return it*” described them as a person. The answer was given on an 11-point Likert scale. The second item was a hypothetical second mover experiment in which the respondents had to imagine a scenario in which they were lost in an unfamiliar area. After asking for directions, a stranger helps and takes them to their destination. In the scenario, it cost the stranger 360 SEK to help – and the respondent can then choose to give one out of six gifts (varying from 90 SEK to 540 SEK) or to give nothing at all. The price of the gift is used as a measure.

**Trust and media influence.** The survey measured both general trust and some forms of particularized trust. The measure for general trust is based on one item, in which the respondents answered on an 11-point Likert scale how well the statement “*I assume that people have only the best intentions*” described them as a person. This measure has been widely used (Falk et al. 2018). In addition, four questions aimed to elicit more particularized trust of the respondents. These questions asked the respondents to state their trust towards the statements made about Covid-19 by the following: i) the media, ii) government agencies, iii) experts and iv) friends and family. The answers were given on an 11-point Likert scale. These items will in later parts of the thesis sometimes simply be presented as e.g. trust to the media, due to ease of discussion. While trust towards the statements made by an institution may be different from trust to that institution in general, we argue that these may be correlated and that our measure might even function as a proxy to general trust in the respective institution. However, it is worth noting for the reader that the variables in fact measured trust to statements about Covid-19 made by these different groups.

### 3.2.2. Dependent variables

The study elicited different measures that respond to beliefs or behavior in response to Covid-19. Firstly, the respondents were asked whether or not they were a part of a riskgroup. The possible answers were: i) *yes*, ii) *no*, and iii) *not sure*.

**Anxiety and perceptions about Covid-19.** In total five items in the survey elicited some measure on the respondents' perceptions about Covid-19. The first of these asked the respondent how anxious they are about Covid-19. Then we asked the respondents how worried they think people in general are about the pandemic. We asked the respondents how worried they are about the medical and the economic consequences of Covid-19, respectively. Lastly, one item measured how well the respondent think that Sweden is handling the pandemic. All these five questions were measured on an 11-point Likert scale.

**Subjective Probabilities.** Three items in the survey asked the respondents to rate what they thought the probability of three scenarios were on a scale from 0 to 100, where 0 meant impossible and 100 guaranteed. The survey asked for the following probabilities: i) that the economy would recover within one year, ii) that the respondent would get sick in Covid-19, and iii) that the respondent would have to seek medical care as a result of Covid-19.

**Consumption behavior.** The respondents were asked five questions on how Covid-19 had affected their consumption. The first question asked how the respondents had changed their total consumption, then they were asked how their consumption in physical stores and their online consumption, respectively, had changed. One item also asked how the respondents planned to change their consumption after the pandemic is over. These four questions were all measured on 5-point Likert scales. One item asked whether the respondents had been bunkering due to Covid-19. This was a dummy variable, with yes or no answers.

### 3.2.3. Other variables of interest

The survey also elicited other measures, not included in the categories above. These variables included sociodemographic information. The respondents were asked to state their age and their gender, additional sociodemographic information was also elicited but eventually discarded, as previously mentioned. Respondents were also asked to assess themselves on an 11-point Likert scale regarding the statement "*I am good at math*". This item is used as a proxy to cognitive abilities in our analysis. This is problematic for two reasons. Although one can argue that self-assessed quantitative math skill is not a perfect measure of cognitive ability in general, previous research shows that there is a strong association (Borghans et al. 2016). Secondly, there is also evidence that subjective assessments correlate with measured abilities (Marsh et al. 2005, Ackerman & Wolman 2007). This formulation and measurement are also employed by Falk et al. (2018).

### 3.3. Econometric models

Firstly, we explore the correlation between our variables of interest using Spearman's rank correlation and association tables with chi-square statistic. Then we proceed with regressions which are motivated by the research questions. In total, we constructed 11 different regression models, using different regression techniques, e.g. ordered probit, fractional response and logistic regressions. These models fall broadly into two categories: i) regressions on anxiety and perceptions about Covid-19, and ii) regressions on consumption behavior during Covid-19. These categories also broadly respond to our research questions, and so they will be presented in these categories. The significant results are reported with  $p$ -values of either 0.01, 0.05 or 0.1.

### 3.4. Methodological critique

We use a student sample from the School of Business, Economics and Law at the University of Gothenburg, and we argue that it is not possible to infer the results of our study to students in general and even less to the Swedish population in general. Students at the School of Business, Economics and Law may differ from students in their perceptions of Covid-19 and students as a group may differ from the general population in Sweden. We also consider that the results might vary between countries. The e-mail with the invitation to the web-survey stated that the survey was about Covid-19 and behaviors. It is possible that we have some level of selection bias due to this, in that people who are interested in the topic might be more prone to participating. In addition, since the e-mail invitations were not sent anonymously by us, some respondents might participate out of personal reasons, e.g. to help us. However, to control for this potential selection bias we sent another invitation to non-respondents in mid-May and found that the two sample groups were similar in terms of demographics. We also find that our sample might have a gender bias, since our sample contains more women than our target population. This is however consistent with research that suggest that women are more likely to participate in surveys (Smith 2008). To conclude, while we cannot disprove some level of selection bias, we do not think that it will significantly affect our results.

The variables on economic preferences are all validated by Falk et al. (2016) in an arguably similar sample, but other measures used in this study (i.a. media influence and particularized trust) have not been validated in an experimental study. We also note that many of our variables are self-assessments on an 11-point Likert scale, and while these kind of qualitative measures have been validated and used frequently in research (e.g. Falk et al. 2018), we still believe that

the reader should note this. For example, anxiety is intrinsically a subjective thing, and is difficult to measure. However, we argue that for this reason a self-assessment is a good option because what we are interested in is the level of anxiety that the participants feel themselves. It is also impossible for us to elicit what level of anxiety is “rational” in this situation, and therefore we refrain from comments on that topic. Due to the fact that the information available about Covid-19 varied over time, we cannot claim that our results will necessarily hold true in another time, e.g. after the pandemic. Regarding our dependent variable on perceived anxiety among others, that is the second-order belief of anxiety, it is not possible for us to know what group of people the respondent is referencing. The question did not include any reference to a specific group of people (e.g. students) and there is reason to believe that different groups in society could exhibit different levels of anxiety. Therefore, it is difficult to elicit any measure of pluralistic ignorance of the general population. However, we still think it is interesting to investigate the question within the framework of our study. Regarding the measurements of subjective probabilities, we discard the answers of 27 participants. Respondents were asked to write the probability on a scale from 0 to 100, but the discarded respondents all answered in words, e.g. “low probability” or “highly likely”.

We also investigate issues of multicollinearity in our data. By running our 11 different models with OLS regressions we examine the variance inflation factor (VIF) to see the severity of multicollinearity in our models. The variance inflation factor only examines the relationship between the independent variables in a regression, so it does not matter whether our regressions fulfil the assumptions of OLS. We also consider the possibility of omitted variable bias in our study, which is something we cannot completely control for without an instrumental variable. Crucially, we do not comment on the magnitude or the effect sizes of the coefficients in our regressions, due to the fact that we use ordinal data in form of Likert-scales and it can be hard to interpret what the magnitudes represent. We also conjecture that the magnitudes of coefficients could vary over time, but that the general direction of associations might be more stable. Different people might react differently strongly to e.g. emotionally coded information in the media, and when this is decreased over the course of the pandemic, these people might be less anxious. The intuitive relation behind preferences and perceptions, might be stable over time, e.g. that risk tolerant people might be less worried. Instead of commenting on magnitudes, we comment on the sign of the coefficients, viz. if they are positive or negative, as well as the statistical significance of the results.

## 4.0. Results

This section is structured as follows: the first part presents a summarization of the independent variables and discusses the dependent variable. The second part briefly investigates associations between the variables and gives some insight to the construction of the regressions. The third part will briefly describe our dependent variables. The fourth part will consist of regressions to answer our research questions: i) How are economic preferences related to anxiety about Covid-19? and ii) How are economic preferences related to changes in consumption behavior? The last part will show associations between our two groups of dependent variables. The table below shows summarization of our variables.

Table 2: Descriptive statistics of variables

Variable	Description	Mean	Me- dian	Mod e	STDV	Max	Mi n
subrisk	<i>qualitative risk attitude</i>	5,30	5	7	1,88	10	0
subaltruism	<i>qualitative altruism</i>	6,46	7	8	2,42	10	0
subreciprocity	<i>qualitative reciprocity</i>	8,88	9	10	1,34	10	2
subtrust	<i>qualitative general trust</i>	5,53	6	7	2,31	10	0
math	<i>self-assessed math skills</i>	6,62	7	7	2,11	10	0
risk	<i>quantitative risk attitude</i>	11,33	12	15	6,39	32	1
reciprocity	<i>quantitative reciprocity</i>	254,42	270	360	155,20	540	0
altruism	<i>quantitative altruism</i>	1185,8 5	500	0	1946,0 7	1000 0	0
worried19	<i>general anxiety about Covid-19</i>	5,30	6	6	2,23	10	0
othersworried19	<i>perception of anxiety of others</i>	6,33	6	7	1,75	10	0
mediainfluence	<i>self-assessment of influence of media</i>	5,93	6	7	2,34	10	0
trustmedia	<i>trust to information by media</i>	5,57	6	6	2,21	10	0

trustgov	<i>trust to information by government</i>	7,76	8	8	2,04	10	0
trustfam	<i>trust to information by friends &amp; family</i>	5,05	5	6	2,11	10	0
trustexp	<i>trust to information by experts</i>	7,99	8	9	1,70	10	0
swedhand	<i>perception of how Sweden handles the pandemic</i>	6,98	7	8	1,99	10	0
worriedeco	<i>anxiety about economic consequences</i>	7,90	8	10	2,11	10	0
worriedmed	<i>anxiety about medical consequences</i>	6,63	7	7	2,23	10	0
consumchange	<i>total consumption change</i>	2,39	2	2	0,79	5	1
onlineconsumpchange	<i>online consumption change</i>	3,09	3	3	0,77	5	1
storechange	<i>consumption change in stores</i>	2,27	2	3	0,84	5	1
bunkering	<i>dummy if you are bunkering= 1</i>	0,14	0	0	0,35	1	0
future-conschange	<i>planned change of future consumption</i>	2,99	3	3	0,58	5	1
probeco1year	<i>subjective probability of economic return within one year</i>	32,20	30	0	26,14	100	0
probccovid19	<i>subjective probability to get sick in Covid-19</i>	56,57	50	50	25,02	100	0
probhospital	<i>subjective probability to need medical care due to Covid-19</i>	17,23	10	10	17,67	100	0

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Appendix A presents visualization of the variables. We see that most people have decreased their total consumption and their consumption in stores, but a large proportion have not changed their consumption at all. In general, people have not changed their online consumption. Regarding the variables on perceptions about the pandemic, the results are varied. Anxiety about the economic consequences is skewed to the left, implying a uniform high concern about the economic consequences. The other measures were, at least in part, normal distributed.

#### 4.1. Measures for associations

This section will present associations for the variables used. The significant results are reported with  $p$ -values of either 0.01, 0.05 or 0.1.

##### 4.1.1. Prosocial Preferences

The quantitative and qualitative measures for altruism are correlated to each other (Spearman's  $\rho = 0.372, p = 0.000$ ). Chi-squared tests suggest a significant association between the qualitative self-assessment of altruism and both general and medical anxiety, as well as to the perception of how well Sweden is handling the pandemic. The quantitative measure is significant to the latter two. None of the measures of altruism are significant to any subjective probabilities. Regarding consumption behavior, the only association which is statistically significant is between the quantitative measure for altruism and future change in consumption. We find that women are more likely to be altruistic, but this is only significant for the qualitative measure (Spearman's  $\rho = 0.166, p = 0.008$ ).

Regarding reciprocity, the two measures are correlated to one another (Spearman's  $\rho = 0.143, p = 0.021$ ). Chi-squared tests suggest that the quantitative measure is not significant to any variable about perceptions of the pandemic or subjective probability. The qualitative measurement has statistically significant association with general anxiety, the measures for anxiety about the medical and the economic consequences of the pandemic as well as perception of Sweden's handling. Both measures of reciprocity are statistically significant to change in online consumption, but not to any other measure of consumption behavior. We find statistically significant and positive associations between being female and both measures of reciprocity.

#### 4.1.2. Risk attitude

The quantitative and qualitative measurement for risk attitude is correlated (Spearman's  $\rho = 0.164$ ,  $p = 0.008$ ), but they are not identical. Chi-squared tests suggest that the quantitative measurement for risk attitude does not have any statistically significant association with the measurements of perceptions of Covid-19 nor with any of the subjective probabilities. However, the qualitative measurement has statistically significant association with all measurements of perceptions and with the subjective probability of having to seek medical care due to Covid-19 with  $p = 0.1$  at least. Regarding consumption behavior, the quantitative measurement is not significant to any measurement, while the qualitative has significant associations with consumption in stores and bunkering. Women are more risk averse than men, but this is only statistically significant for the qualitative measurement (Spearman's  $\rho = -0.275$ ,  $p = 0.000$ ).

#### 4.1.3. Trust and media influence

All measurements for trust and the measure for media influence are positively and significantly associated, with one another with the exception for general trust and media influence, which is not statistically significant. We find many significant associations between these measures and perceptions about Covid-19, which are presented in the table below:

Table 3: Pairwise Spearman's rank correlation between trust and perceptions about Covid-19

	General anxiety about Covid-19	Perception of anxiety of others	Anxiety about medical consequences	Anxiety about economic consequences	Perception of Sweden's handling of the pandemic	Subjective probability of getting sick	Subjective probability of economic return within one year	Subjective probability of needing medical care
<i>general trust</i>	0,096	0,041	0,208***	0,047	0,204***	-0,056	0,123*	0,0116
<i>trust to government</i>	0,131**	0,152**	0,183***	0,135**	0,592***	0,078	0,159**	0,009
<i>trust to experts</i>	0,1643**	0,175***	0,235***	0,197***	0,442***	-0,015	0,151**	-0,0365
<i>trust to friends &amp; family</i>	0,227***	0,088	0,330***	0,086	0,239***	-0,051	0,088	0,1563
<i>trust to media</i>	0,186***	0,111*	0,149**	0,160**	0,335***	0,018	-0,030	0,0691
<i>media influence</i>	0,528***	0,095	0,437***	0,136**	0,076	0,075	0,005	0,1561

Concerning consumption behavior, we only find a few significant associations. Firstly, between consumption in stores and i) trust to experts (Spearman's  $\rho = -0.162, p = 0.009$ ), ii) media influence (Spearman's  $\rho = -0.124, p = 0.045$ ) and iii) trust to government agencies (Spearman's  $\rho = -0.136, p = 0.029$ ). In addition, we find an association between trust to government agencies and online consumption (Spearman's  $\rho = 0.126, p = 0.042$ ). Women are consistently positively and significantly associated with all measures of trust and media influence.

From the initial results presented in 4.1, we draw a few conclusions relevant to our regressions. Firstly, the Spearman's rank correlation leads us to believe that the qualitative measurements of economic preferences are better predictors for our research questions than the quantitative measures. As suggested by Falk et al. (2016) qualitative measurements can be better predictors to real-life behaviors and outcomes. Secondly, we will investigate issues of multicollinearity in regard to our measures of general and particularized trust. Thirdly, we will only include the subjective probability for the need to seek medical care due to Covid-19. There are no associations between our independent variables and the subjective probability of becoming sick in the pandemic.

## 4.2. Regressions

In order to further investigate the research questions, we ran regressions to measure the sign and statistical significance of our variables. All regressions were based on the same explanatory variables<sup>7</sup> and the variables *math*, *female*, *age* and *id* are used as control variables. All the following regressions have discarded at least three subjects from the sample, as these individuals did not identify as male or female. The regressions are all presented with standard errors clustered by the variable *id*, but all regressions were also run using robust standard errors as well as bootstrap errors. Models (1-5) and (7-10) were all run, and presented, with ordered probit regression, as the dependent variables are ordinal data from Likert scales. This have been done in other studies with the same type of data that we are using (Müller & Rau 2020). However, we also run models (1-5) with OLS, due to the fact there is some debate over whether or not Likert scale data could be used as ordinal approximations of continuous variables (Sullivan & Artino 2013). All variables will follow the formulation presented below:

$$Y = \beta_0 + \beta_1 \text{subrisk} + \beta_2 \text{subaltruism} + \beta_3 \text{subreciprocity} + \beta_4 \text{subtrust} \\ + \beta_5 \text{trustgov} + \beta_6 \text{trustfam} + \beta_7 \text{trustexp} + \beta_8 \text{trustmedia} \\ + \beta_9 \text{mediainfluence} + \beta_{10} \text{math} + \beta_{11} \text{female} + \beta_{12} \text{age} + \beta_{11} \text{id} + \varepsilon$$

### 4.2.1. Perceptions about Covid-19

We will now investigate the relationship between economic preferences and perceptions about Covid-19 in six regressions models. Table 1 presents ordered probit regressions (Model (1-5)) and fractional response regression (Model (6)).

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<sup>7</sup> These are: qualitative measure of risk preference, altruism and reciprocity; general trust, trust to statements about Covid-19 by government agencies, friends and family; experts and media; self-assessed influence by media.

Table 4: Ordered probit and fractional response regressions on perceptions about Covid-19.<sup>8</sup>

	General anxiety about Covid-19	Perception of anxiety of others	Anxiety about medical consequences	Anxiety about economic consequences	Perception of Sweden's handling of the pandemic	Subjective probability of needing medical care
Model	1	2	3	4	5	6
risk attitude	-0.127*** (0,039)	0.134*** (0,042)	-0.043 (0,04)	0.142*** (0,042)	0.073* (0,04)	-0.047* (0,028)
altruism	0.073** (0,03)	0.019 (0,028)	0.077** (0,031)	0.028 (0,033)	-0.02 (0,028)	0.02 (0,016)
reciprocity	0.044 (0,59)	-0.027 (0,055)	0.007 (0,057)	0.032 (0,05)	0.088* (0,048)	0.054 (0,038)
general trust	0.007 (0,03)	0.03 (0,035)	0.008 (0,028)	-0.003 (0,035)	0.034 (0,026)	-0.005 (0,019)
trust to gov-	-0.117** (0,054)	0.097** (0,048)	-0.042 (0,052)	-0.008 (0,054)	0.397*** (0,062)	0.035 (0,031)
trust to family	0.039 (0,04)	0.014 (0,041)	0.108*** (0,04)	-0.012 (0,041)	0.013 (0,035)	0.021 (0,027)
trust to experts	0.012 (0,063)	-0.013 (0,063)	0.029 (0,062)	0.053 (0,067)	0.001 (0,058)	-0.077** (0,039)
trust to media	0.019 (0,037)	-0.02 (0,038)	-0.015 (0,038)	0.018 (0,036)	0.089** (0,04)	-0.025 (0,028)
influence	0.312*** (0,043)	0.017 (0,038)	0.196*** (0,034)	0.095*** (0,034)	-0.08** (0,033)	0.008 (0,02)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	257	257	257	257	257	231
Chi2	0	0	0	0	0	0
R2/Pseudo R2	0.1255	0.0346	0.0837	0.0451	0.1327	0.036

*Standard errors in parantheses*

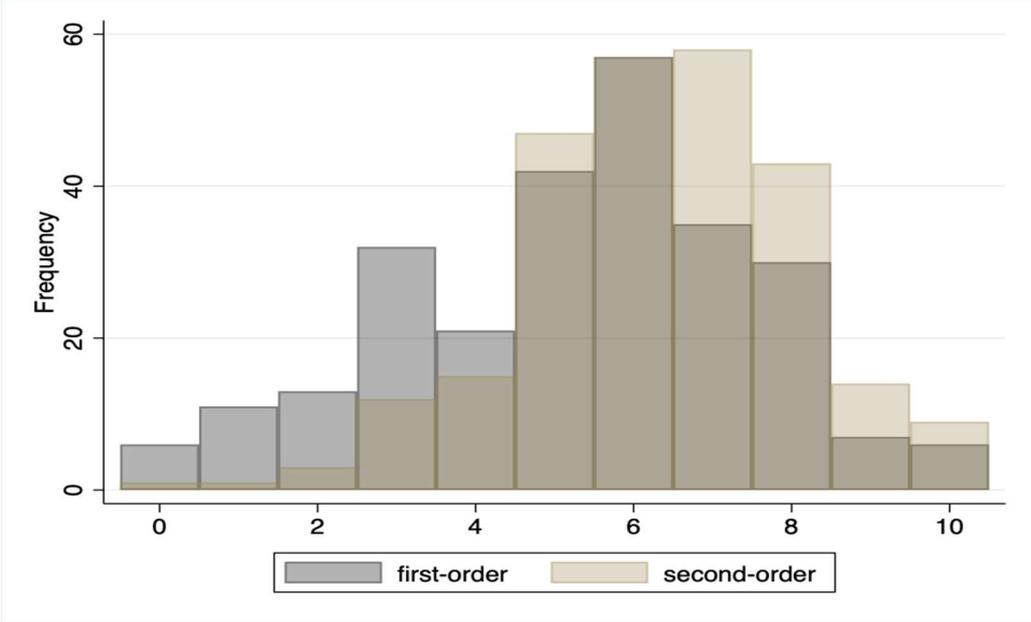
\*\*\* $p < 0,01$       \*\* $p < 0,05$       \* $p < 0,1$

<sup>8</sup> We also ran models (1-6) with robust standard errors and with bootstraps with 50 replications, we found no major difference in the output. The results of models (1-5) are also robust when running OLS. Then we did a variance inflation factor-test after the OLS, and find that no severe multicollinearity. We also run model (1) with the measures for trust separately in order to investigate multicollinearity and find no major changes to our output. See Appendix G for the STATA-output for the tests mentioned.

Model (1) show the measurement for general anxiety about Covid-19. The results show that coefficients for risk preference and trust in government are negative, meaning that higher risk tolerance and trust in the governments is associated with lower levels of anxiety. Higher levels of altruism and media influence means higher levels of anxiety. In model (2) we see that more risk tolerant people and people with high trust in government are more likely to state higher levels of anxiety for people in general. This is the same two variables that are negatively related to anxiety in model (1). The next two regressions focus on two sides of anxiety due to the pandemic: the medical and the economical. We find in model (3) that altruism, media influence and trust in family and friends all have a positive and statistically significant coefficient to anxiety about the medical consequences of Covid-19. Model (4) show that risk tolerant people and people who claims to be more influenced by the media are more likely to exhibit higher anxiety about the economic consequences.

Model (5) show that people who have high trust for the information about Covid-19 given by government agencies are more likely to think that Sweden is handling the pandemic well. Risk and reciprocity also have positive coefficients, but less statistical significance. Lastly, we can see that while higher trust in media has a positive coefficient, but that media influence has a negative coefficient. Model (6) emphasize that trust in experts lowers the subjective probability of the need to seek medical care due to Covid-19. Risk also has a negative effect, and in addition we see that math skills also has a negative effect. Regarding pluralistic ignorance, we see that people in our sample are less anxious than what they believe people are in general. Figure 1 illustrates this, where first-order represents the measurement of individual anxiety and second-order represents the stated anxiety among people in general.

Figure 1: Distribution of first- and second-order beliefs about anxiety



However, the readers should note the following. The question that asked the respondents to state how anxious they think people are in general did not refer to any specific group of people. Therefore, we cannot deduce any evidence of pluralistic ignorance since anxiety in our sample and among people in general might significantly differ. However, we still think it is interesting to present our finding.

In conclusion, we see that economic preferences are important predictors of perceptions about Covid-19.

4.2.2. Consumption behaviour and Covid-19

Next, we will investigate the predictive power of economic preferences on the subjects stated changes consumption due to Covid-19. Table 2 presents ordered probit regressions (Model (7-10)) and a logistic regression (Model (11)).

Table 5: Ordered probit and logistic regressions on consumption behavior due to Covid-19.<sup>9</sup>

Model	Consumption change <b>7</b>	Online con- sumption change <b>8</b>	Consumption change in sto- ress <b>9</b>	Future con- sumption change <b>10</b>	Bunkering <b>11</b>
risk attitude	0,007 (0,042)	-0,068* (0,042)	0,063 (0,045)	0,007 (0,046)	-0,295** (0,125)
altruism	0,002 (0,03)	0,03 (0,03)	-0,027 (0,03)	-0,019 (0,03)	0,001 (0,086)
reciprocity	0,041 (0,056)	0,102* (0,059)	0,034 (0,06)	-0,076 (0,065)	-0,113 (0,161)
general trust	-0,006 (0,033)	0,027 (0,034)	0,049 (0,036)	0,007 (0,035)	0,032 (0,089)
trust to government	0,064 (0,049)	0,142*** (0,055)	0,014 (0,051)	-0,015 (0,048)	-0,182 (0,134)
trust to family	0,028 (0,036)	-0,01 (0,039)	0,013 (0,036)	0,005 (0,039)	-0,019 (0,105)
trust to experts	-0,106* (0,057)	-0,134** (0,059)	-0,09 (0,062)	0,059 (0,06)	0,091 (0,169)
trust to media	-0,01 (0,039)	0,005 (0,033)	0,017 (0,037)	0,001 (0,041)	0,154 (0,119)
influence from me-	-0,015 (0,03)	-0,057* (0,033)	-0,045 (0,033)	-0,01 (0,034)	0,115 (0,098)
Controls	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	257	257	257	257	257
<i>Chi2</i>	0,8096	0,0898	0,1353	0,8722	0,1379
<i>R2/Pseudo</i>	0,0135	0,0327	0,0283	0,0143	0,0864
<i>Standard errors in parantheses</i>					
*** $p < 0,01$ ** $p < 0,05$ * $p < 0,1$					

<sup>9</sup> When we run the regressions about consumption (viz. model (7-11)) we found no difference of output when running robust standard errors but some minor output changes to the p-values when running with bootstrap errors in model (7), (8) and (11). We also run model (11) with a probit regression and found no difference in the output. See Appendix F.

The reader should note that the models (7,9,10 and 11) are not statistically significant, and model (8) is only significant with  $p = 0.1$ .

In model (8) we see that trust in government has a positive effect, while trust in experts has a negative effect on online consumption, which is hard to explain. Media influence and risk attitude also have negative effects, while reciprocity has positive effect. Model (7) shows that trust in experts' statements about the pandemic has a negative effect on consumption change, meaning that people who have high trust in experts are more likely to have decreased their consumption. We find no statistically significant effects from preferences on change to consumption in stores in model (9). Model (10) shows that there are no statistically significant effects on future consume changes neither. However, model (11) shows that risk tolerant people are less likely to engage in bunkering.

In conclusion, we cannot comment on the relationship between economic preferences and consumption behavior with any certainty, as the models themselves are not statistically significant.<sup>10</sup>

Next, we will investigate the relationship between perceptions about Covid-19 and consumption behavior. We run a pairwise Spearman's rank correlation between our dependent variables we find the following associations, presented in table 6.

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<sup>10</sup> With the exception of model (8) with a chi-squared result of 0.0898. The models does not change statistical significance when using robust standard errors or bootstrapping, see Appendix F.

Table 6: Pairwise Spearman's rank correlation coefficient between dependent variables

	General anxiety about Covid-19	Perception of anxiety of others	Anxiety about medical consequences	Anxiety about economic consequences	Perception of Sweden's handling of the pandemic	Subjective probability of economic return in 1 year
consumption change	-0,1077	0,030	-0,095	-0,042	0,013	0,008
onlineconsumption change	-0,0227	0,019	-0,005	-0,1312**	0,036	0,080
consumption change in stores	-0,276***	0,057	-0,1885***	-0,014	0,0419**	-0,076
future consumption change	-0,0039	-0,027	-0,011	-0,100	0,003	-0,024
bunkering	0,178***	-0,040	0,109*	-0,071	-0,010	0,138

We see that anxiety is negatively associated with consumption in stores (Spearman's  $\rho = -0.276$ ,  $p = 0.000$ ) and to bunkering (Spearman's  $\rho = 0.174$ ,  $p = 0.008$ ). Anxiety about medical consequences is also associated with consumption in stores (Spearman's  $\rho = -0.189$ ,  $p = 0.004$ ) and with bunkering (Spearman's  $\rho = -0.040$ ,  $p = 0.097$ ). Anxiety about economic consequences is associated with changes to online consumption (Spearman's  $\rho = -0.131$ ,  $p = 0.045$ ). Lastly, we find that subjective probability to seek medical care due to Covid-19 is associated with bunkering (Spearman's  $\rho = -0.138$ ,  $p = 0.036$ ).

## 5.0. Discussion

This study was motivated by two research questions: i) How are economic preferences related to anxiety about Covid-19? ii) How are economic preferences related to changes in consumption behavior? The results show that economic preferences are important predictors to anxiety about Covid-19 and other perceptions regarding the pandemic. However, we cannot confirm that economic preferences are associated with changes in consumption behavior, because only model (8) was statistically significant at  $p = 0.1$ . This could be due to, for example inherent problems with the construction of our regressions or with the data, or due to omitted variables. We can therefore not conclude anything from these results.

Our sample limits the potential inference of the results from the survey to students in general, or to the general population. However, the findings invoke interest to conduct the survey with other samples to see if the associations between preferences and perceptions are the same. It would be highly interesting to conduct the survey at other faculties of University of Gothenburg, as we conjecture that students of different fields may answer differently. It would also be interesting to conduct the survey to a representative sample, to see whether the associations and results found in this study would hold. Therefore, it could also be interesting to study the topic internationally, to see whether the associations are universal. Such insights could potentially help to better understand the effects of the pandemic, and to counter these.

In general, the results show that trust and media influence are important predictors to perceptions about Covid-19. People who claim to be more influenced by media are also more likely exhibit anxiety, and in addition they are more likely to exhibit anxiety about the medical consequences of the pandemic. They are also more likely to believe that Sweden is handling the pandemic poorly. However, higher trust in information about Covid-19 has the opposite effect. This highlights the great importance of media during a pandemic, which has great policy implications. We refrain from suggesting any specific policy recommendations, but we believe that possible policy implications regarding media are twofold. In the short-term it is important for the government to communicate transparent and correct information through the media since it has large influence on people's perceptions. In the long-term it is important that the media is well functioning and exhibits high quality.

People who trust in the information from experts think it less likely that they will need to seek medical care due to Covid-19. The subjective probability of needing medical care due to the pandemic is also negatively associated with risk attitude and cognitive abilities. The real probability cannot be confirmed, but we conjecture that is very low for our sample which consist of young students. Being a part of a risk group could potentially mean a higher probability. Both perceptions about Covid-19 and consumption behavior during the pandemic could be dependent on being a part of a risk group. If there is a relationship between economic preferences and being a part of a risk group, that could invalidate the results of our study. We make use of our measure on being a part of a risk group as a sort of robustness check for this issue. We find no statistically significant association between our explanatory variables and being a part of a risk group, with the exception of media influence (Spearman's  $\rho = -0.119$ ,  $p = 0.091$ ). From this we conclude that being a part of a risk group might influence your perceptions and behavior, but that the inclusion of this variable does not significantly alter our results.

Trust in information about the pandemic from government agencies has a negative effect on anxiety, but a positive effect on the perception of how well Sweden is handling the pandemic. Political trust has been showed to be positively associated with social compliance (Bargain & Aminjonov 2020). Interestingly, it also has a positive effect on the measure for second-order belief of anxiety, meaning how anxious the respondent thinks people in general are.

Previous research (e.g. Falk et al. 2016 and Dohmen et al. 2018) on economic preferences confirm the findings of gender differences in economic preferences in our study. Regarding prosocial behavior, we find that altruistic people are both more anxious but also more worried about the medical consequences of the pandemic. This might highlight that these people might factor in the wellbeing of others to a larger extent. Higher reciprocity increases the perception of how well Sweden is handling the pandemic. The results show that more risk tolerant people are less likely to exhibit anxiety due to Covid-19, this is also found in other studies (Müller & Rau 2020). We also find that risk tolerant people are more likely to perceive more anxiety among people in general.

In our sample we see that people are less anxious than what they think people are in general. Pluralistic ignorance can be important to understand for creating good policies (Correll et al. 2017). We can, however, not conclude that this is proof of pluralistic ignorance, since this

could be due to our sample exhibiting less anxiety than people in general. Yet, we can conclude that economic preferences not only determine anxiety but also perceived anxiety in others. We strongly believe that this could be an interesting topic for further research, as pluralistic ignorance could explain divergent beliefs and behaviors during the pandemic. We also think it would be interesting to do a cross-country comparison between the level of pluralistic ignorance.

## 6.0. Conclusion

To conclude, our findings suggest that economic preferences affects the anxiety of people with a variety of significance. This study provides insight in how economic preferences are associated with perceptions of Covid-19 among students at the School of Business, Economics and Law at the University of Gothenburg. Understanding how citizens think and behave is crucial to the successful handling of a pandemic. This study makes use of standardized measurements on economic preferences together with measurements on a dozen different aspects of Covid-19, grouped in two categories: i) perceptions about Covid-19 and ii) consumption behavior changes due to the pandemic. Our main finding is that economic preference are important predictors to perceptions, but that they are weak in predicting changes to consumption behaviors. On the other hand, we see that perceptions about the pandemic is associated with consumption behaviors.

The results, conclusions and insights that can be drawn from this thesis cannot be inferred on any general population. However, the results may nonetheless provide some insights. Our research adds to the research on economic preferences in general, and in particular to both the literature which uses the methodology of Falk et al. (2018) and to the literature on economic preferences and pandemics. The most specific area of contribution is to research on economic preferences and Covid-19.

This thesis provided answers to some of the questions it aimed to investigate, however, some questions remain. Hopefully, this exploratory study has also narrowed and focused the literature gap. In conclusion, there are many subjects of potential future research that we would like to recommend. Generally, more studies should investigate relationships between economic preferences and perceptions about e.g. events or policies. In particular, we believe that our survey, or a similar survey, should be conducted with different samples than ours. It would be interesting to see if the associations we found will hold true for students at different faculties, to the general population in Sweden and to the general population in different countries. The latter is particularly interesting due to the fact that countries have handled the pandemic differently countries have chosen to handle the pandemic. However, due to the fact that this study was conducted at the height of the pandemic, its results might be hard to replicate.

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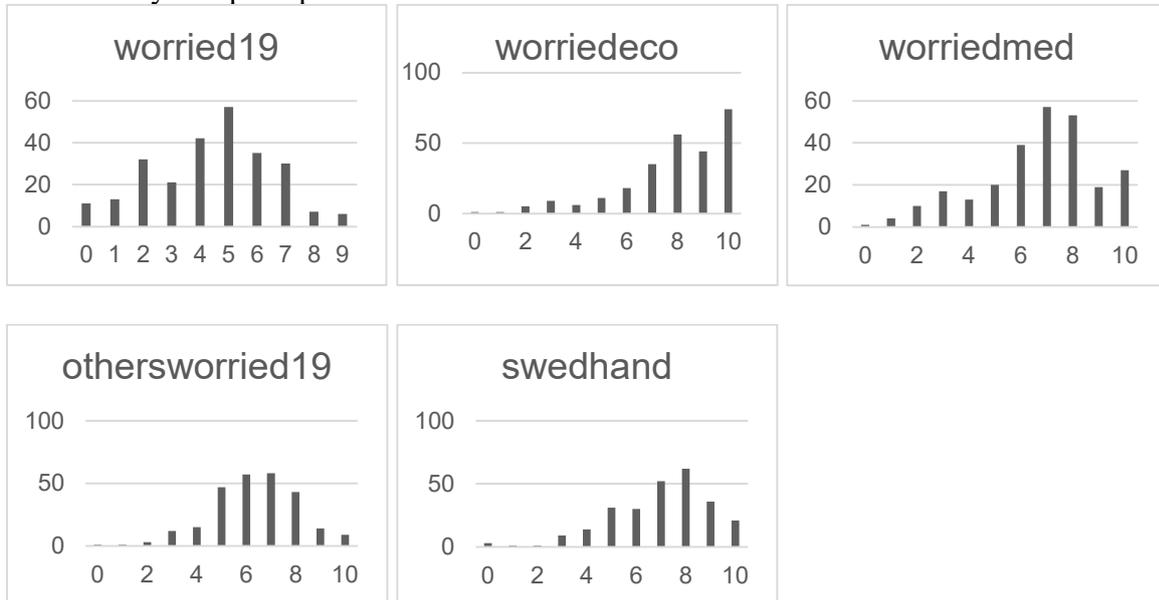
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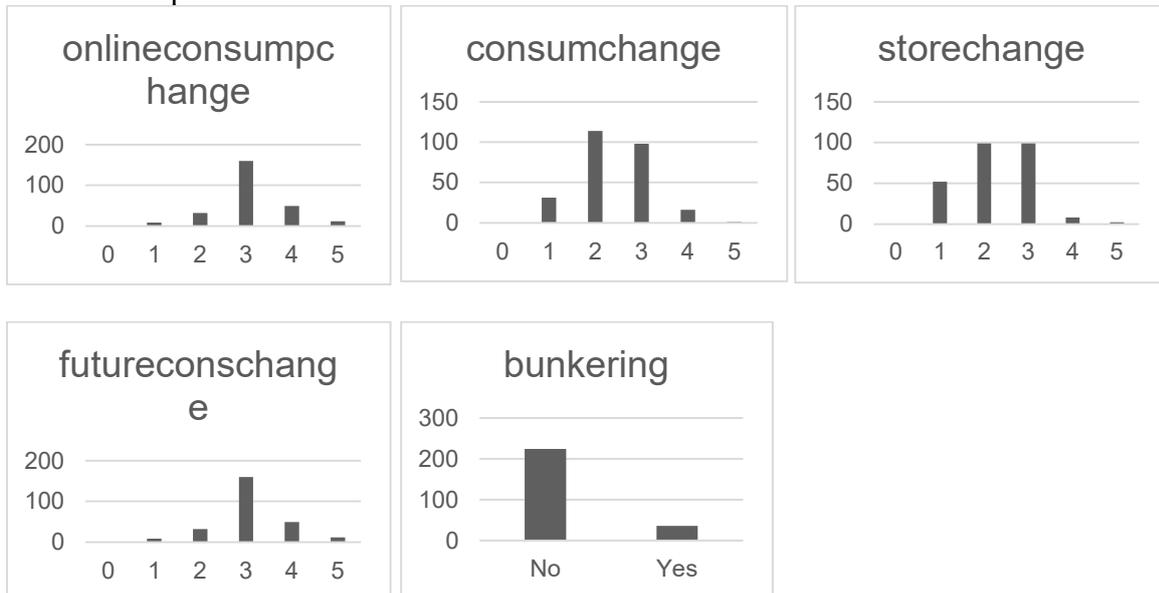
# Appendices

## Appendix A: Illustrations of variables

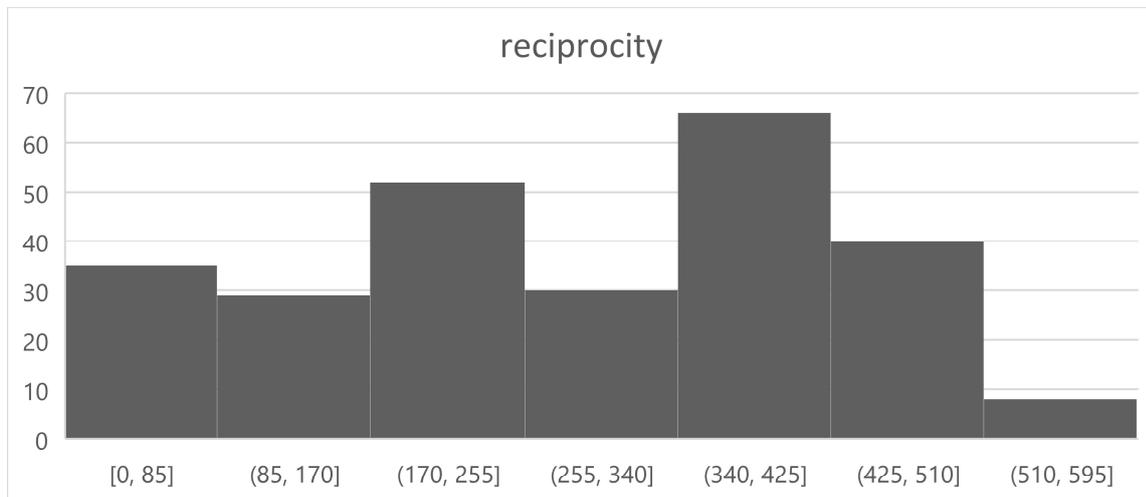
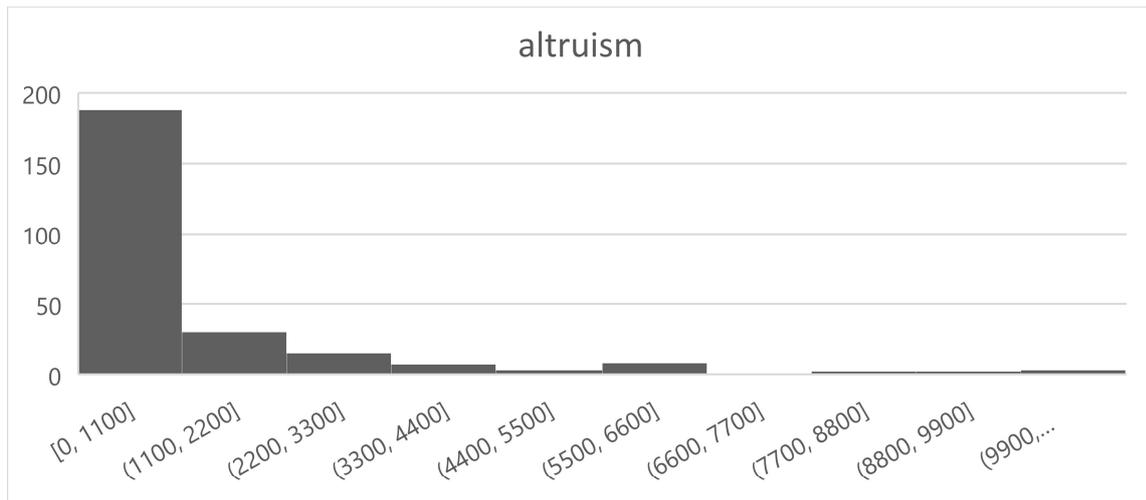
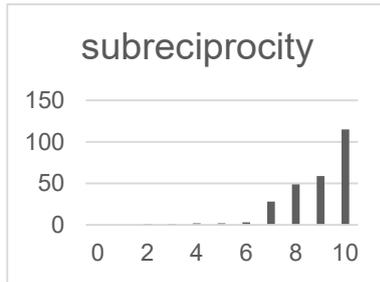
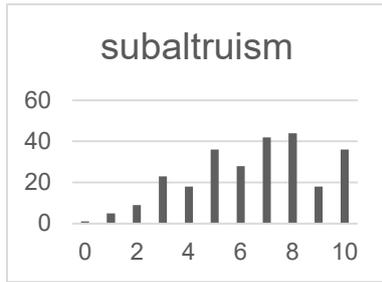
### A1: Anxiety and perceptions about Covid-19



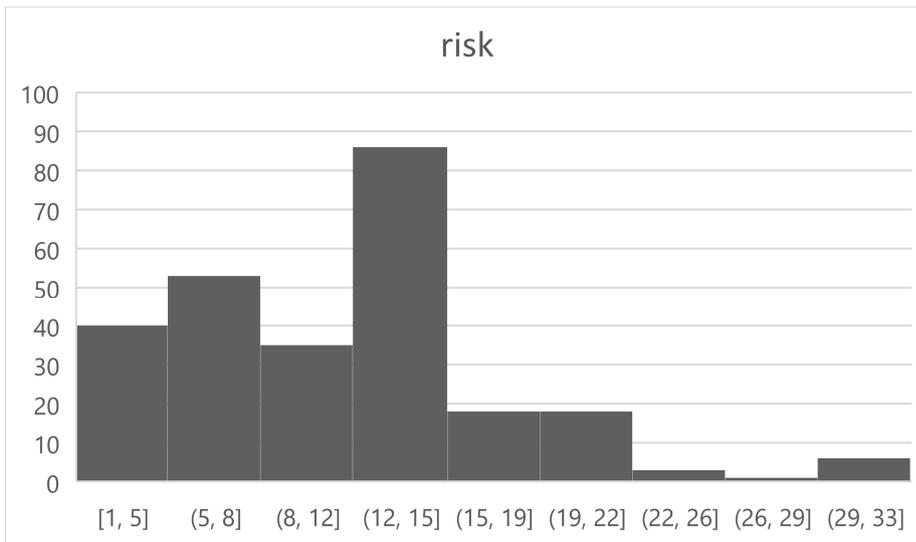
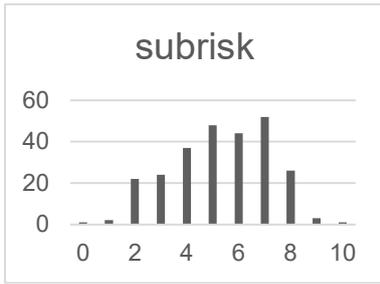
### A2: Consumption behavior



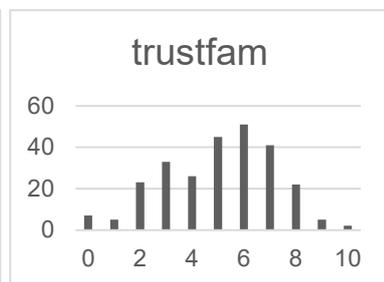
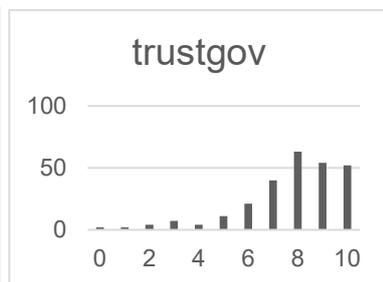
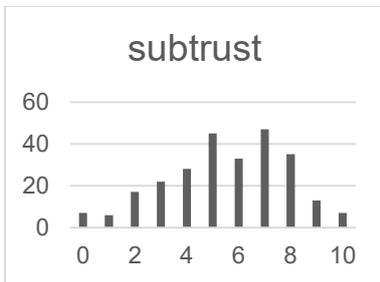
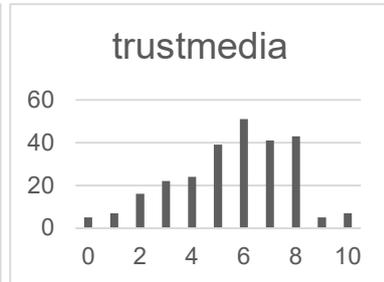
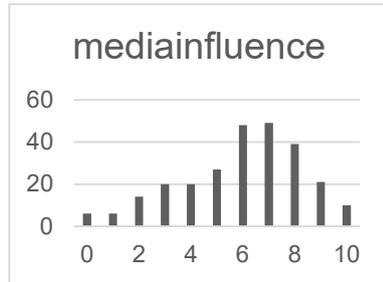
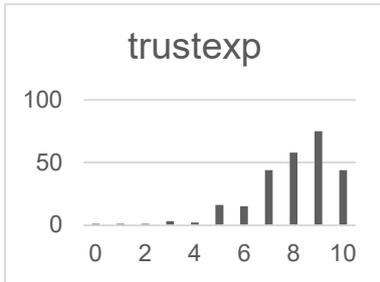
### A3: Prosocial behavior



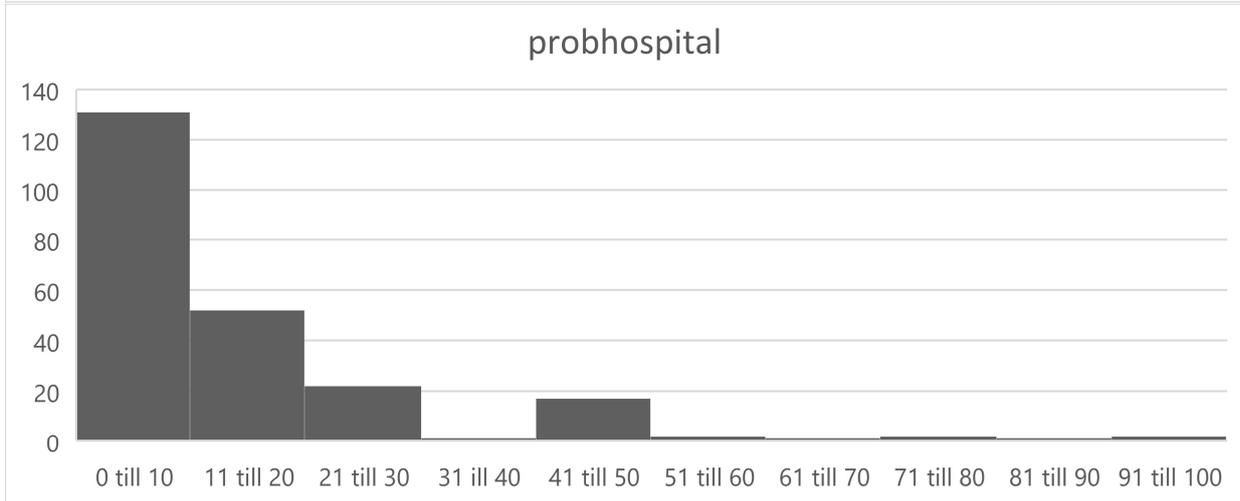
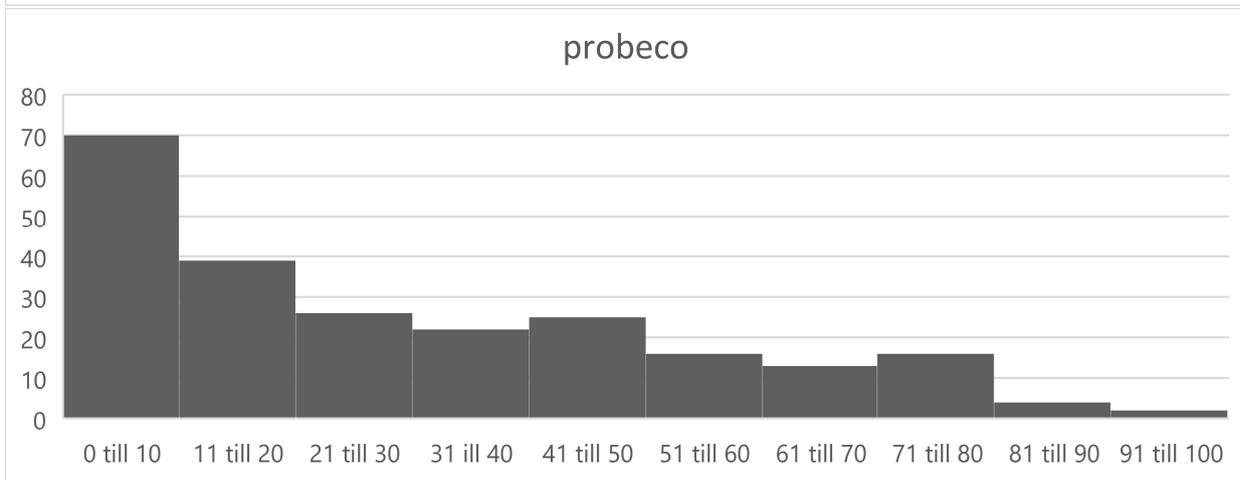
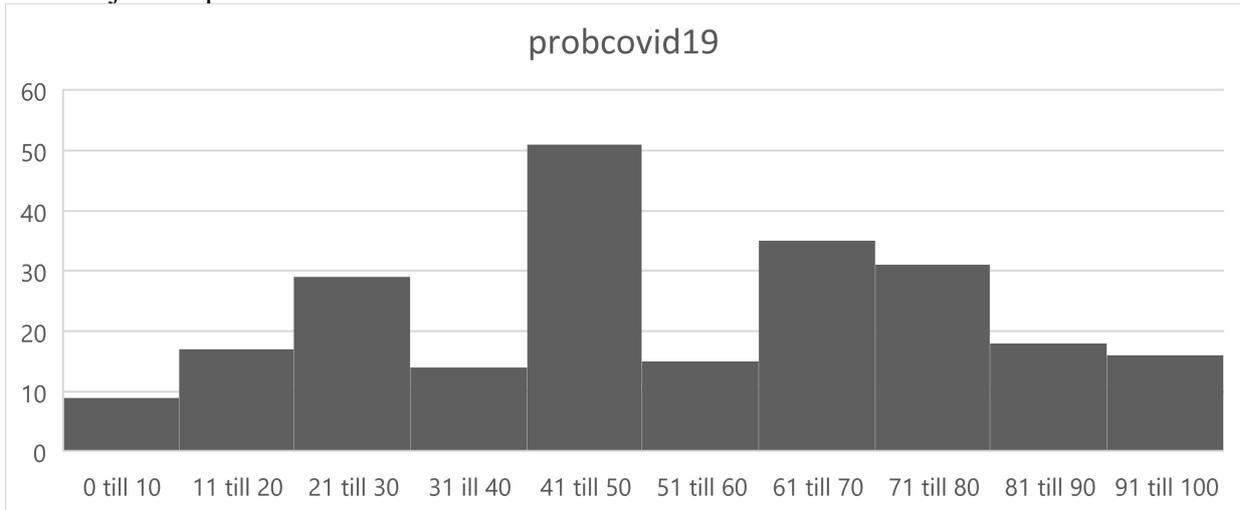
**A4: Risk attitude**



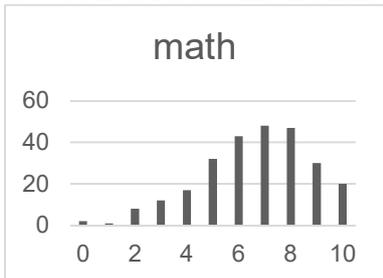
**A5: Trust and media influence**



A6: Subjective probabilities



A7: Self-assessed math skills



## Appendix B: Answer response rate

B1: Sample group of respondents

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Timestamp	Comment	Aggregated answers	Aggregated percentage
2020-04-20 12:19:49	within first hour	110	42,3 1%
2020-04-20 12:51:47	50% of the respondents	130	50,0 0%
2020-04-20 23:32:00	first day	219	84,2 3%
2020-04-21 23:31:27	end of day two	240	92,3 1%
2020-04-22 20:09:55	end of day three	248	95,3 8%
2020-04-23 20:49:56	end of day four	252	96,9 2%
2020-04-24 15:19:55	end of day five	255	98,0 8%
2020-04-25 00:17:00	end of day six	256	98,4 6%
2020-04-26 20:12:50	end of day seven	258	99,2 3%
2020-04-27 16:39:16	end of survey	260	100,00 %

---

## B2: Sample group of respondents

Timestamp	Comment	Aggregated answers	Aggregated percentage
5/11/2020 14:29:06	within first hour	33	37,0 8%
5/11/2020 23:32:43	within first day	70	78,6 5%
5/12/2020 18:46:40	within second day	84	94,3 8%
5/13/2020 14:41:59	within third day	87	97,7 5%
5/14/2020 14:46:08	end of survey	89	100,00%

## Appendix C: Sample and confirmation group descriptives

For all data in both the sample group and confirmation group please see:

[https://docs.google.com/spreadsheets/d/1A-rn7fAgARXQZaQUdDvq0NplzsZo82bA-zfW\\_A1P9doQ/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1A-rn7fAgARXQZaQUdDvq0NplzsZo82bA-zfW_A1P9doQ/edit?usp=sharing)

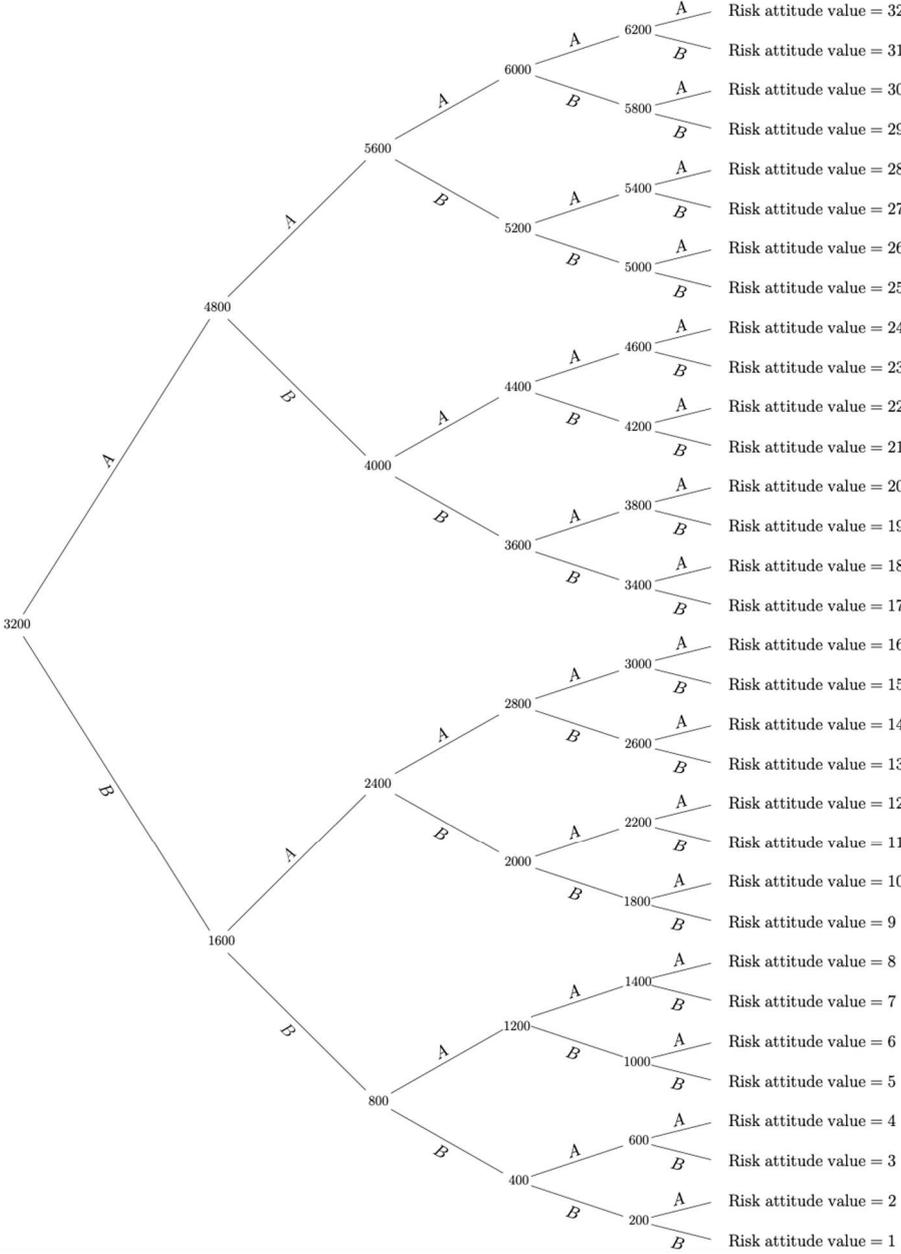
### C1: Sample group descriptives

	Partici- pants	Age						Part of risk group			Work
		Mean	Median	Mode	STDEV	Max	Min	Yes	No	Could not answer	
Total	260	23,84	23	22	3,88	43	18	15	188	57	122
Female	165	23,88	23	22	3,89	41	18	8	123	34	79
Male	92	23,87	23	24	3,85	43	19	7	65	20	43
Non Gender	3	23,76	23	23	3,56	30	22	0	0	3	0

### C2: Confirmation group descriptives

	Partici- pants	Age						Part of risk group			Work
		Mean	Me- dian	Mode	STDEV	Max	Min	Yes	No	Could not answer	
Total	89	23,34	23	21	2,99	35	19	2	68	19	41
Female	60	23,12	23	21	2,64	30	19	1	46	13	27
Male	29	23,79	23	21	3,63	35	19	1	22	6	14
Non Gender	na	na	na	na	na	na	na	na	na	na	na

# Appendix D: Hypothetical choice experiment (Quantitative risk attitude)



Notes: The hypothetical choice experiment is structured as follows. Initially, the respondent is asked whether they would prefer to receive a sure payment of 3200 SEK, or if they would prefer a draw of 50/50 chance to receive 6000 SEK or nothing. In the figure above the numbers represent the sure payment, option B represent choosing the sure payment and option A represent choosing the draw. If the respondent chooses the sure payment, B, they were asked a second question where the sure payment was decreased. If they choose the draw, A, the sure payment the second question was increased. In total, the respondent is asked 5 questions and assigned a “risk attitude value”. This hypothetical choice experiment was presented in Falk et al. (2016) and modelled after the “staircase method” as in Cornsweet (1962).

## **Appendix E: Questionnaire (Swedish and English versions)**

To see both the the surveys, please go to: [https://drive.google.com/drive/folders/1CZY6vpIPsiY7Cs\\_aOWwN6BanRHhyzoCC?usp=sharing](https://drive.google.com/drive/folders/1CZY6vpIPsiY7Cs_aOWwN6BanRHhyzoCC?usp=sharing)

## **Appendix F: STATA output**

To see STATA output, please go to: [https://drive.google.com/drive/folders/1CZY6vpIPsiY7Cs\\_aOWwN6BanRHhyzoCC?usp=sharing](https://drive.google.com/drive/folders/1CZY6vpIPsiY7Cs_aOWwN6BanRHhyzoCC?usp=sharing)