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STUDIEPROGRAM: MØAHOV_1 Master Thesis	OPPGAVEN ER SKREVET INNEN FØLGENDE SPESIALISERINGSRETNING: ØKONOMISK ANALYSE ER OPPGAVEN KONFIDENSIELL? NEI (**NB**! Bruk rødt skjema ved konfidensiell oppgave)

TITTEL:

MINDSET, EDUCATION AND INCOME. Predictors of a growth mindset.

ENGELSK TITTEL:

MINDSET, EDUCATION AND INCOME. Predictors of a growth mindset.

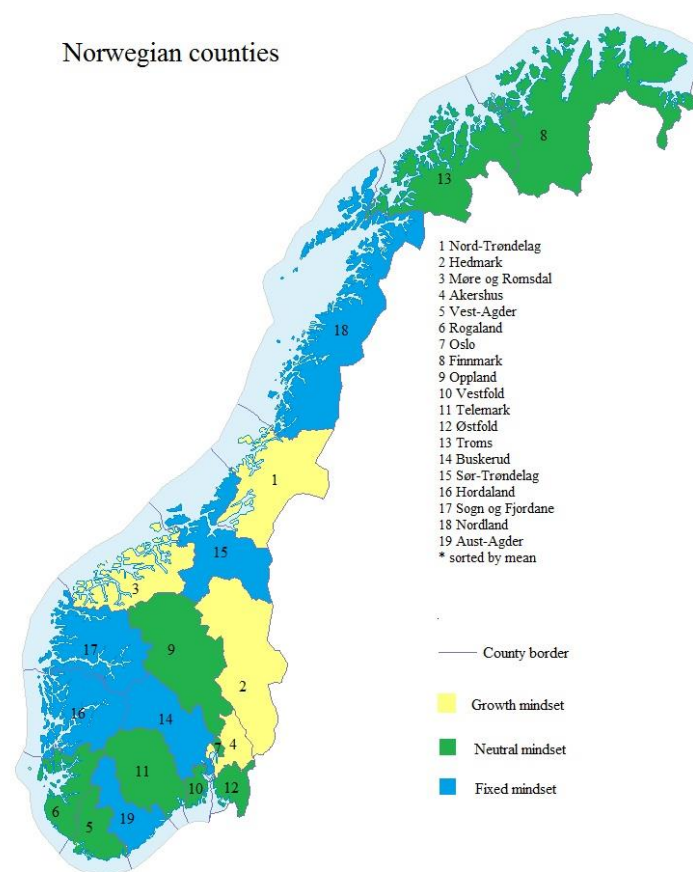| FORFATTER(E)		VEILEDER: Mari Rege
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MINDSET, EDUCATION AND INCOME

PREDICTORS OF A GROWTH MINDSET

15.06.2017

Kandidatnummer 1074 og kandidatnummer 1079

Norwegian counties

1 Nord-Trøndelag
2 Hedmark
3 Møre og Romsdal
4 Akershus
5 Vest-Agder
6 Rogaland
7 Oslo
8 Finnmark
9 Oppland
10 Vestfold
11 Telemark
12 Østfold
13 Troms
14 Buskerud
15 Sør-Trøndelag
16 Hordaland
17 Sogn og Fjordane
18 Nordland
19 Aust-Agder
* sorted by mean

—— County border

Growth mindset

Neutral mindset

Fixed mindset

PREFACE

Our thesis came to life when consulting Mari Rege for ideas for a master thesis. For Linda it represents the completion of the Master's degree in Economic Analysis, and Elisabeth was given the opportunity to write the thesis in her first year of Master in Economic Analysis after completing 60 credits during her first semester. The process has been inspiring and educational for us, and we hope we will be fortunate enough to get to use what we have learned throughout our career.

First of all, we would like to thank Mari Rege for being our tutor. Through your informative guidance we have learnt how to utilize the dataset to its full potential, and your constructive criticism have taught us how to find and benefit from literature and studies performed by researchers. Our thesis would not have become this product without your guidance. We would also like to thank Ingeborg Foldøy Solli for providing us with the dataset and background information about the set. Further we would like to thank Bjørnar Laurlia for giving us some insight in Stata, and available online resource sites, and Roar Teige at NorStat for extensive background information on the survey. Finally, we would like to thank everyone that has contributed with constructive criticism and suggestions to improve the thesis.

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ABSTRACT

Mindset is your beliefs about abilities, intelligence, personality and other fundamental qualities. In this thesis we explore the research question: "what are important predictors of a growth mindset?" Finding these predictors is important to determine better ways of teaching, handling employees and understanding the interaction between people. Using ordinary least squares, OLS, we investigate a dataset based on an online survey conducted by NorStat in 2016 among 1000 respondents. Our most important findings are that age and education level seem to be highly significant predictors of mindset, where being young and holding a high education seem to predict a growth mindset. Our findings suggest that income do not seem to be predictive of a mindset.

Keywords: Mindset, education, income, risk, fixed, growth, society.

1. INTRODUCTION

Individuals are dependent on money in today's modern society, and to earn high wages it gets more and more necessary to hold a high education. Mindset is your beliefs about abilities, intelligence, personality and other fundamental qualities. These beliefs are shown to have an impact on resilience (Yeager & Dweck, 2012), motivation (Haimovitz, Wormington, & Corpus, 2011) and ability to handle challenges (Dweck, 1999, 2006), which are important characteristics for success in school and throughout a working career. Thus it is important to investigate whether or not education and income have a predictive effect on our mindset. If we find a predictive effect, we may also see a reversed effect; that mindset may predict the individual's education and income, making it important to explore mindset to better our chances of doing well in school and earn good wages.

In this thesis we mainly look into how education and income can predict the individual's mindset. We will also show how different risk measures may predict the mindset, and comment on potential predictive effect from the background variables. Through investigating predictors of a growth mindset, we may help build a better foundation for developing guidelines for schools, better learning outcome and teaching, make managers more capable and target consumers more efficiently. These are examples of how raising the awareness of mindsets may contribute to positive outcomes for the society. It will be interesting to see if we will find similar relationships as studies from other countries. We assume that we will, to some extent, but that culture and inequalities in the public administration, for example in health system, can bring on differences.

Studying mindset in relation to education in children has become quite common, but studying mindset in relation to education and income for adults is less common. Our research problem, "what are important predictors of a growth mindset?" is interesting, and the topic of growth and fixed mindset is quite new in a Norwegian setting. As far as we know we are the first to perform a study on such predictors in the adult population in Norway. The topic is important for determining better ways of teaching, handling employees and understanding the interaction between people.

First and foremost, we investigate if education, income and willingness to take on risk can predict a growth mindset. Extensive international research suggests a relationship between education and mindset (Blackwell, Trzesniewski, & Dweck, 2007; King, 2012) and we want

to investigate if we can find the same results in the Norwegian population. International studies have also found a positive relationship between education and income (Barrow & Rouse, 2005, 2006). If mindset and education are related, and education and income are related, we expect to find a relationship between mindset and income, either directly or through education. Even though research on mindset's role in educational outcome and education's factor for wages exists, we have not been able to find any studies describing the direct relationship between mindset and income. Further, mindsets' relationship to risk preferences is important to investigate because we expect that individuals with a high risk tolerance may become overconfident and thus take too high risks regarding both monetary incentives and life expectancy. If this is the case, their choices may be costly for society.
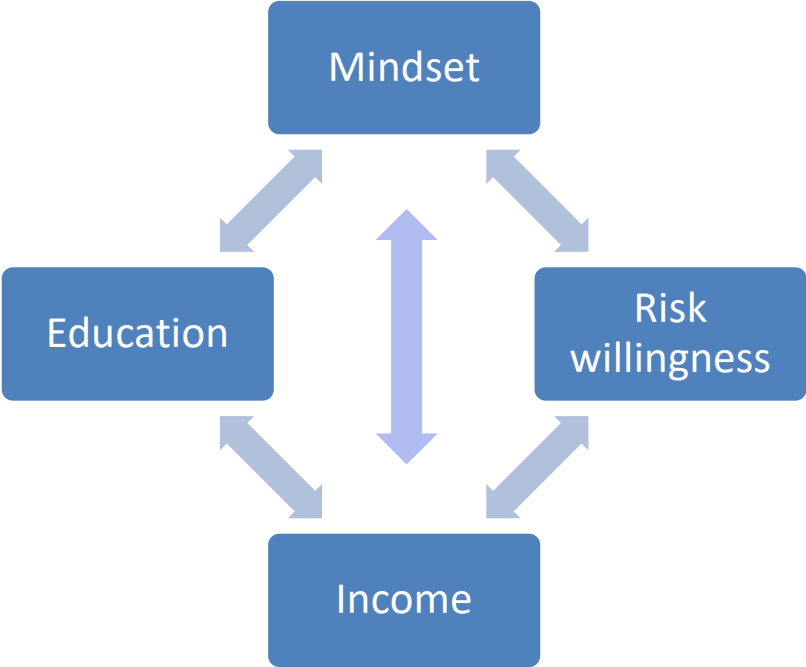

Figure 1, relationships between variables. The figure illustrates the expected relationships between mindset and education, mindset and income, mindset and risk willingness, education and income, and income and risk willingness.

Further, we look into whether or not the background variables gender, age, city size, number of children under 18 in the household, and religion can predict a growth mindset as well.

Our main variables of study are education, income and willingness to take on risk, and from these we define our hypotheses;

- Hypothesis 1: Growth mindset is positively correlated with education.
- Hypothesis 2: Growth mindset is positively correlated with income.

- Hypothesis 3: Growth mindset is positively correlated with willingness for risk regarding money
- Hypothesis 4: Growth mindset is positively correlated with willingness for risk regarding life.

Our findings suggest that high education and young age are highly significant predictors of a growth mindset. Living in a small city/countryside, not being religious and being willing to take on risk regarding life expectancy seem to be significant predictors of a growth mindset as well, though less significant. Based on research we claim that finding what predicts a growth mindset is important for educational outcome as well as for social and business economics.

Chapter 2 presents the different mindsets as well as how mindset is related to social and business economics. In chapter 3 we look into education, income, risk preferences and background variables. Chapter 4 describes our chosen method, an online survey performed by NorStat and analyzed by us using ordinary-least squares, with its weaknesses and strengths. We also present a list of the variables used in our regressions, and the econometric models used. In chapter 5, we present and discuss our findings. The importance of the findings is discussed in chapter 6, before we draw a conclusion and discuss topics for further research in chapter 7.

2. MINDSET

Carol Dweck and colleagues have done extensive research on mindset and have developed a theory of fixed and growth mindset, where individuals holding a fixed mindset believe abilities, intelligence and personality are fixed traits that cannot be developed further. A fixed mindset also seems to bring forth helpless responses to failure, shame and a tendency to give up when tasks become challenging. These reactions are directly connected to their interpretation that failure is a validation of their limited intelligence or ability. People holding this mindset are more occupied by appearing to be smart than learning (Dweck, 1999, 2006; Feldman & Elliott, 1990) and tend to judge other people's behavior harshly, especially for severely negative behavior (Erdley & Dweck, 1993). Individuals holding a growth mindset, on the other hand, believe abilities, intelligence and personality are changeable through effort. Growth mindset individuals also tend to be triggered by challenges and see failure as a temporary setback and a signal that they need to work harder. They do not ascribe failure to

them as a person, but to effort. Contrary to individuals holding a fixed mindset, these individuals are more occupied by learning than looking smart (Dweck, 1999, 2006; Yeager & Walton, 2011). Thus teaching students a malleable theory of intelligence might increase motivation and better school outcome (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012).

Already from an early age children show characteristics of growth and fixed mindsets. At 3 years old children seem to self-evaluate their behavior relative to success or failure by showing signs of shame and pride (Lewis, Alessandri, & Sullivan, 1992). Studies performed among children of school age have shown similar results as studies done with toddlers; children receiving praise for effort show the same responses to failure as growth mindset people by not connecting failure to them personally, but to low effort. Due to the children's belief that intelligence and ability are traits that can be developed they choose learning goals over performance goals and focus on developing their abilities further (Blackwell et al., 2007; Feldman & Elliott, 1990; Mueller, Dweck, & Kruglanski, 1998), this finding seems to be valid also for undergraduate students (Rhodewalt, 1994). A general agreement is that teaching our young children a growth mindset is important for helping students meet challenges during their studies. By teaching students that intelligence and ability is changeable, we give them the tools they need to overcome these challenges with effort, patience and help from others (Yeager & Dweck, 2012).

GROWTH MINDSET	FIXED MINDSET
Learning is more important than looking smart	Looking smart is more important than learning
I can develop my intelligence and abilities through effort	If I fail, it is because my abilities are fixed
I am triggered by challenges	I give up when facing a challenge
Intelligence and ability are changeable	Intelligence and ability are fixed
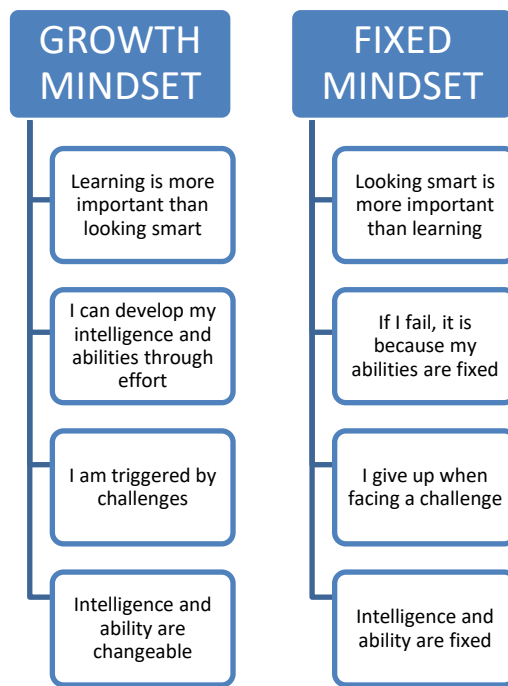
Figure 2, Fixed vs growth mindset. The figure presents examples of how individuals with fixed and growth mindset might argue in different settings.

The two mindsets are essentially the same as entity and implicit theories, and throughout this thesis we will use the terms fixed and growth mindset, also where other researchers have used entity and incremental mindset, respectively. When looking at the differences between a fixed and a growth mindset, it seems clear to us that the outcome of these two mindsets must be quite different, both for school and working life.

Over the years, economists have fluctuated between making decisions based on error-correcting rules, and decision making based on processed forward-looking information (Baddeley, 2013; Bénabou & Tirole, 2016). Historically, economists made decisions based on experiences and known information at the time of the decisions. They continued doing what had proved to be a success, and corrected their decision-making if an error had occurred. In 1944, John von Neumann and Oscar Morgenstern introduced the game theory, focusing on rational expectations. At the time, their mathematical framework limited the occasions were the theory was applicable, leaving it mostly unused the first three decades. The last four decades, the game theory has been an important tool when analyzing an agent's behavior (Ross, 1997). Lately, behavioral economists have valued the adaptiveness in human cognition like confidence in own abilities and moral self-esteem when making decisions (Bénabou & Tirole, 2016). Additionally, the technological development the world has seen the last

decades, enable the economists to thoroughly investigate historical data which can give some guidance to what might happen if a similar situation occurs sometime in the future.

Behavioral economists try to understand behavior by looking at the interaction of economic approaches and behavioral psychology. They have found that the interaction between cognition and personality affects certain socio-economic phenomena, like wages, education and crime (Baddeley, 2013). Before making the final decision, all costs, benefits and risks involved, both for self-view and world-view, are considered (Bénabou & Tirole, 2016). This information interpretation process is guided by the individual's mindset which affects their behavior (Yeager & Dweck, 2012). The individuals' mindsets have been shown to affect important issues of the world of economics; from education to management, productivity and wellbeing. For example, how mindset affects income through education, and how the mindset affects health and crime through income. We claim that there also is a direct relationship between income and mindset, and thus mindset may have an effect on health and crime through this relationship.

Education does not only take place at school and at home, but also at work as on-the-job training or as specialization in a field connected to previous studies and present work. Thus it is important for employers to address the issue of mindset. In most cases, the costs associated with investing in knowledge is carried by the individual student, but sometimes when adults are returning to school or undergo on-the-job training, this is done in collaboration with the adult's employer. Both the employee and the employer benefit from employees studying. The employee increases his/her human capital, and the firm can use the knowledge gained to increase profits. However, firms should never take for granted the willingness of the employee's to utilize their human capital within the firm (Rouse, 2010). Hansson et al. (2004) claims that future growth and prosperity is a product of the aggregated human capital. However, measuring the returns on investments in human capital is hard, but not impossible. In 2004, Bassi et al.(2004) studied historical data from 388 U.S. based companies and found a relationship between investments in human capital and the firms' stock prices the following year. If a firm invests in human capital, it suggests that the management holds a growth mindset (at least to some level). If they do not believe in the malleability of the intelligence, there would not be any reason to invest in further studies as this would be a waste of capital and time.

Education seems to make us more productive (Hægeland & Klette, 1997), which is positive for school outcome and work. Lazear and Gibbs (2014) claim that the number of years of education is a signal of the individual's productivity. On the other hand, the individual's returns to education is dependent on multiple factors, like the student's effort, the quality of the school and the quality of the teaching (Card & Krueger, 1992). We predict that inhibiting a high education yields increased wages, and the outlook of higher wages motivates the individuals to aim for higher education, causing wages to be a motivator for productivity. We expect that more productive people have more of a growth mindset. The belief that high education yields increased wages is supported by several researchers who find a positive relationship between number of years of education and wages (Barrow & Rouse, 2005, 2006; Borjas, 2013; Li, Liu, & Zhang, 2012; Walker & Zhu, 2011).

Several researchers also claim a relationship between parents' income and education, and children's' education level (Ben-Halima, Chusseau, & Hellier, 2014; Chesters, 2010; de Walque, 2009; Pfeffer, 2008) causing intergenerational effects of education and income. Thus, investigating the relationship between education, income and mindset is important for the long run as well as the short run impacts.

Haimovitz, Wormington, & Corpus (2011) argue that students with a growth mindset are less likely to show declining motivation than students with a fixed mindset. Transferring this finding to a work situation it seems that holding a growth mindset may help motivation, and according to Baddeley (2013), motivation is connected to economic and financial decision making, for example by workers' effort levels. Workers adapt to the surroundings and change their behavior which affects their effort at work.

Further, we assume that high levels of education in a society will boost the economy through higher wages, causing better health outcomes, less crime and generally making citizens more engaged and productive. Several researchers have found a positive correlation between education and future income (Barrow & Rouse, 2005, 2006; Borjas, 2013). Lochner (2011) confirms our expectations regarding income and health when he states that with higher wages the individual can purchase better health insurance and costly treatments if needed. This is clearly more applicable for countries like the US than for Norway which have universal healthcare, but it may be valid also in Norway. Lochner also introduces the probability that more educated people may take less risk with their health, like using seat belts, choosing healthier diets and engaging in more physical exercise. Mental health problems is expected to

increase over the next decade (Murray & Lopez, 1997a; Murray & Lopez, 1997b). Being cautious of these choices might reduce the costs related to accidents and health care. In 2016, the Norwegian government paid 437 billion NOK in social benefits (Statistics Norway, 2017c). King (2012) finds that growth mindset individuals are more likely to induce higher wellbeing, higher self-esteem and to experience other positive results of life events. We expect individuals experiencing a high degree of wellbeing to be in better health, have higher motivation, be more productive and that feeling content and earning fair wages may reduce the incentives to do crime. Machin and Meghir (2004) supports our expectations regarding income and crime when they imply that education may be a factor to reduce crime through heightened wages and productivity. This indication is also supported by the findings of Harlow (2003) which states that 68 percent of inmates in prisons in the USA had not received a high school diploma by 2003. Statistics Norway reports that four out of ten inmates in Norway have completed no more than primary school (Statistics Norway, 2004), and correctional services cost Norway approximately 4 billion NOK a year (Kriminalomsorgen, 2016; Statistics Norway, 2013). Interestingly, inmates in Norway are given the opportunity to study while imprisoned (Kriminalomsorgen, 2017), indicating that the correctional services in Norway values education as a tool to decrease the probability of performing new crimes when released. If our expectations that education and income are positively correlated to a growth mindset are confirmed, then raising awareness of the different mindsets from an early age may be more important than previously acknowledged as this may contribute to decrease criminal activities and the connected costs for the society.

The theory of a fixed and a growth mindset may also have an impact on how well managers manage their employees. It seems likely that managers holding a growth mindset will be more open to coaching their employees, believing in their ability to change, and also acknowledging a positive change in their employees' behavior. Indeed, Heslin, Vandewalle and Zedeck's (2005) findings suggest that fixed mindset individuals are less likely to acknowledge a change in an employee's behavior than growth mindset individuals, and Heslin, Vandewalle and Latham (2006) found that managers with a growth mindset were more likely and willing to coach their employees and provide them with suggestions for improvement, than fixed mindset managers. Additionally, their suggestions were of higher quality. Findings from Heslin, Vandewalle and Zedeck (2005) also indicate that it is possible to modify a fixed mindset over a 6-week period.

One may also argue that mindset can affect consumer behavior as well as organizational behavior; how they act, how quickly they change their products, and even what type of product they produce. Mathur et al. (2016) point towards several possible ways implicit person theory may affect how consumers react to developments in technology and how loyal they are to one brand. They argue that consumers holding a growth mindset may be more likely to praise improvements in technology than consumers holding a fixed mindset, but on the other hand, individuals holding a fixed mindset may be more loyal to one brand. Wheeler & Omair (2016) argue that consumers holding a growth mindset may be less likely to forgive transgressions from a manufacturer's side, while consumers holding a fixed mindset may not notice the transgressions at all. In an article Murphy and Dweck (2016) describes how products and brands attract consumers with fixed and growth mindset differently, depending on the product's role of either reinforcing or expanding the consumers identity. They also suggest that brands and companies may form relationships with fixed or growth mindset consumers through the mindset of the organization and their products.

3. PREDICTORS OF MINDSET IN ADULT POPULATION

3.1. Education

Several researchers have found a positive relationship between growth mindset and learning outcome (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012). In light of these researchers' findings, we claim that the individual's mindset, to some degree, can predict schooling outcome, and by that the individual's future. According Statistics Norway only seven out of ten students completed high school in 2011 (Chaudhary, 2011). If our prediction is correct, this shows the importance of teaching our children a growth mindset to create the best base on which to build their future by providing a mindset that helps them cope with the challenges they meet during their studies. Knowledge learnt during early childhood and school is brought into adulthood and to work, thus, mindset is an important point of focus to achieve success at work as well as in school.

Blackwell et al. (2007) states that teaching a growth mindset may increase schooling outcome. We claim that the increased schooling outcome will thus increase the likelihood of obtaining a high education, and as stated by the first hypothesis, we expect a two-way relationship where education also has a predictive effect on the individual's mindset. This may increase the

opportunity cost of education; as long as the individuals find more education beneficial, they will continue to invest in more education, which indicates they believe in the malleability of the mind.

3.2. Income

In our second hypothesis we assume that income is positively correlated with a growth mindset. This assumption is supported by the findings of several studies who claim a relationship between mindset and education (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012), and education and income (Barrow & Rouse, 2005, 2006; Borjas, 2013; Li et al., 2012; Walker & Zhu, 2011). We expect it to be a direct relationship between mindset and income, as well as a relationship between these two through education. We were not able to find studies that address such a direct relationship and thus have no previous research to support this assumption.

3.3. Risk preferences

We also expect a relationship between mindset and risk taking behavior, were willingness to take on risk, both regarding monetary incentives and life expectancy are positively correlated with a growth mindset. Our assumption is that risk-averse individuals are less likely to face challenges and failures than individuals that embrace risk. The risk-averse individuals may act consistently with a fixed mindset, whereas the risk-taking individuals may act consistent with a growth mindset and expect to learn from potential mistakes. We expect that holding a growth mindset in some cases will lead to overconfidence in own ability to change, and a tendency to take on too much risk. To our knowledge, there is only one working paper exploring mindset and risk taking behavior, and none for the Norwegian population. Spaeter et al. (2016) looked at the relationship between self-theories and risk taking in Vietnam, and concludes that self-theories do play a significant role in overconfidence; individuals holding a growth mindset were more likely to be overconfident. However, their findings suggest that if people have a firm idea about whether they have a fixed or a growth mindset, they take more risk than people with not such a firm idea. Nevertheless, we assume that less risk-averse individuals hold more of a growth mindset, because individuals who are not afraid of taking

risk may value challenges and effort, and realize that failure may be an opportunity to gain new knowledge.

3.4. Background variables

In 2016 28 percent of men had completed a higher education compared to 38 percent of women. Still women have lower gross income than men. Women work more part-time, and represent public sector to a higher degree than men, this may be at least some of the explanation to the wage difference (Statistics Norway, 2016a, 2017a, 2017b). We expect both higher education and higher income to be positively correlated with a growth mindset. Hence, the influence of higher education and lower income on the gender variable "female" depends on which of these factors dominates the other.

The number of highly educated individuals was a lot lower 30-35 years ago (Statistics Norway, 2017a, 2017b), and if education is positively correlated to growth mindset, older age may indicate more of a fixed mindset. Thus, younger individuals will, through education, hold more of a growth mindset. On the other hand, we assume that when growing older, individuals gain experience and see first-hand that intelligence and ability is changeable, and learn to manage challenges and failures in a good manner. According to Dweck's theory of growth and fixed mindset, individuals with a growth mindset believe in the malleability of intelligence and ability, and will benefit from the challenges they face, while the individuals with a fixed mindset do not believe in the malleability of intelligence and ability, and will not benefit to the same extent (Dweck, 1999; Yeager & Dweck, 2012). Thus, older age will indicate more of a growth mindset then younger age.

We have not found any studies addressing a relationship between city size and mindset, number of children in the household under 18 years old and mindset, or religion and mindset. However, we expect city size and number of children in the household under 18 years old to be positively correlated with growth mindset, due to the constant external stimuli. Further we expect religion to be negatively correlated with growth mindset, due to strong traditions and guidelines.

3.5. Map

We expect to find explanations to the differences between Norwegian counties using statistics from Statistics Norway on educational level, income level, religious affiliation and the different kinds of businesses within the counties (Statistics Norway, 2014a, 2014b, 2015, 2016b). These statistics provide us with data collected on the different subjects gathered in Norway, enabling us to compare our findings to actual statistics. In addition, some of the largest colleges and universities and their location, and the largest cities in Norway may yield an explanation.

4. METHOD

4.1. Data

We base our investigation on a raw dataset from a quantitative survey performed by NorStat in Norway, in 2016. The data from which will be presented by an ordinary least-squares analysis of the predictive effect of assorted variables on mindset. The dataset was prepared by NorStat, a company specializing in performing surveys. NorStat keeps a panel of about 80 000 members in Norway, evenly distributed between age groups and with slightly more women than men represented in 2016 (53 percent women to 47 percent men). Each member has equal likelihood of being randomly drawn to participate in surveys. Both panel recruitment and management are continuously under ongoing quality assurance routines, certified by either ISO 9001 or ISO 26362 (Norstat, 2016). By using professional expertise to perform the survey, we expect our sample to be a random selection representative for the Norwegian population, and we expect to be able to trust the questionnaire to be concise so the data gathered can imply good measures of mindset.

NorStat prepared the questionnaire for the survey using questions from students and professors at the University of Stavanger including to four statements based on mindset measures previously used in numerous international studies (Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Dweck, 1999; Good, Aronson, & Inzlicht, 2003; Yeager et al., 2016). The survey was conducted over 16 days in 2016 for Handelshøyskolen at the University of Stavanger, HHUiS. 5203 panelists were invited to participate and 1000 panelists (19 percent) completed the survey. During the questionnaire the participants were asked

questions regarding background, mindset, risk, climate and religion. The data connected to the climate questions are omitted from this thesis.

When looking at the mindset statements the participants were asked to rate on a scale from 1 to 6 how much the participant disagrees (1) or agrees (6) with the following statements:

- You have a certain amount of intelligence, and you really can't do much to change it

- Your intelligence is something very basic about you that you can't really change

- Being a "math person" or not is something that you really can't change. Some people are good at math and other people aren't

- When you have to try really hard in a subject in school, it means you can't be good at that subject

Higher value on these four statements all indicates more of a fixed mindset.

The participants in the survey were given two additional statements to measure their mindset. These statements are not, to our knowledge, based on mindset measures previously used in international studies. The participants should rate the statements from disagree (1) to agree (6):

- Generally, I am afraid of trying something if there is a possibility I will fail

- I get up quickly after a defeat. The main thing is that I dared to try and did my best

A higher value on the first of these two statements indicates more fixed mindset, while higher value on the last statement indicates more growth mindset.

To measure monetary risk preferences, the participants were asked to choose between high or low risk in different lotteries. Higher value on the lottery of choice indicates higher risk willingness. As for risk preferences of life expectancy, the participants were asked to choose between living life with the uncertainty of life expectancy or being guaranteed to live until they were 75 years old and dying just after turning 75 years. They were informed that if they chose the latter, they would be given a pill that would make them forget the choice they made, hence they would live as if they did not know they would die at 75 years. Higher value on the choice indicates higher risk willingness.

Based on these data, we have generated the variables listed below. Higher value indicates more growth mindset for all variables.

zGrowth: Mean of mindset statements 1-4, reversed for easier interpretation, and standardized. Measures belief in malleability of intelligence and effort.

zFixedMindsetFailure: Mindset statement 5 renamed, reversed and standardized. Measures the willingness to try something if the possibility of failing is present.

zFixedMindsetRetry: Mindset statement 6 renamed and standardized. Measures the willingness to try again after failing and valuing the effort put into trying in the first place.

Fylke (counties): Dummy for county. Taking the value 1 if respondent lives in the respective county, 0 if not.

HighEduc: Dummy for number of years of education. Taking the value 1 if respondent has completed minimum three years of college / university (bachelor, master, PhD), 0 if not.

MediumInc: Dummy for gross annual household income. Taking the value 1 if gross annual household income is between NOK 300.001 and NOK 800.000, 0 if not.

HighInc: Dummy for gross annual household income higher than NOK 800.001. Taking the value 1 if gross annual household income is higher than NOK 800.001, 0 if not.

female: Dummy for female. Taking the value 1 if respondent is female, 0 if not.

zage: Reported age, standardized.

Urban: Dummy for city size larger than 5.000 inhabitants. Taking the value 1 if the respondent lives in a city with more than 5.000 inhabitants, 0 if not.

NoChildren: Dummy for 0 children under 18 years old in the household. Taking the value 1 if the household does not have any children under 18 years old, 0 if any children under 18 years old.

Religious: Dummy for being religious. Taking the value 1 if the respondent is religious, 0 if not.

Doubting: Dummy for being in doubt on religion. Taking the value 1 if the respondent is in doubt, 0 if not.

zRisk1: Risk-question 1 renamed and standardized. Measuring the willingness of risk with money at stake.

RiskLife: Risk-question 2. Measuring the willingness of risk when life is at stake.

Several of the independent variables are not normally distributed, but because we have a large sample size, n=1000, we can justify an approximation of the central limit theorem. A violation of the central limit theorem does not influence the assumptions of unbiasedness and best linear unbiased estimators, but may influence the t- and F- statistic. Our approximation of the central limit theorem however, is enough to say that possible t and F statistics are straightforward.

4.1.1. Strengths

Although using an external company to prepare and perform the survey does have some weaknesses, the positive about using them usually outweighs the weaknesses.

NorStat has massive experience with collecting information and has good routines for drawing random samples representative for the Norwegian population. It would be hard for two students to draw a sample of a population of the same magnitude. We would most likely have had to settle for a smaller population. Using an objective company makes sure respondents information are kept confidential. The company's experience in the field, and the fact that the company collaborated with professors at a recognized university in Norway, gives the dataset credibility.

NorStat works hard to limit the weaknesses of their products. Self-recruitment is not an option and incentives are modest and not monetary, so the respondents do not increase their wealth by taking part in the surveys. Also, no respondents are allowed to do more than 0,5-1 survey per month (Norstat, 2016). Upon this we make the assumption that we have a random sample.

Last, by using an online questionnaire, the respondents have to answer the questions without any interference of an interviewer biasing their answers.

4.1.2. Weaknesses

Even though our questionnaire is made by professionals our method does have some weaknesses.

First, the individuals creating the questionnaire have made several questionnaires previously, but maybe not in this field. We have no guarantee that they completely understood the purpose of every question or that they were able to produce the questions and list alternative answers so the dataset gives the intended answers.

Second, our sample is drawn from a panel group already registered at NorStat. If we are unlucky, the group may have similar traits, e.g. everyone has a Bachelors' degree. If so, we do not have a random sample, and the OLS slope estimators will be biased.

Third, respondents participating in too many surveys may grow tired and not focus 100 percent on the questions asked. Also, an uninteresting topic, or the layout of the questionnaire may draw the focus away from the questions and lead the respondents to not give well considered answers.

Fourth, as the survey was performed online, no one was around to clarify any questions that may have come up. We do not know if some of the respondents had questions regarding some of the questions asked, causing them to choose other answer alternatives than they might have if they knew the intention of the question. We were also not able to add questions to the questionnaire since the survey was completed when we were offered the dataset, restricting our research problem and questions to fit the original questionnaire.

Fifth, we also find the possibility of bias in our regressions if we do not carefully choose which variables to control for. Assuming a zero conditional mean may not be a good assumption. If we do not control for factors having a partial effect on growth mindset, and that are correlated with education or income, the result may be spurious correlation, and we have an omitted variable bias. An omitted variable bias will yield a too small variance of the OLS slope estimators. Including an irrelevant variable in the model will yield a too high variance of the OLS slope estimators. It will not lead to bias, but may yield a less efficient estimator, which again leads to larger confidence intervals and the hypothesis tests will be less accurate. If we are not careful when choosing variables to include in our regressions, we might find that the regressions inhibit heteroskedasticity. This does not lead to bias in the

OLS estimators, but it will make the variances biased. As the variance is a factor in the standard errors, the standard errors from a heteroskedastic sample cannot be used to create confidence intervals, t- and F- statistics, or LM statistics. Finally, the variance may also be influenced by a high correlation between two or more independent variables; multicollinearity. If the variance is wrong, we will not have a correct standard deviation from which we compute the t-, F- or LM statistics. The values of these statistics influence the significance level of the coefficient of the variable.

Sixth, due to the limitations in time, and since we are using an existing dataset gathered in 2016, we have to limit our research questions to the topics included in the questionnaire used in the survey. We also have to find questions that are economically relevant, as much of today's literature are written from a psychological point of view.

And last, after investigating the dataset, we have found that our sample does not contain any respondents older than 50 years, leaving out a big part of the Norwegian population.

4.2. Econometric models

From hypotheses 1 and 2, including background variables, the sample regression function of our preferred model will be:

$$(1)\ \widehat{zGrowth} = \hat{\beta}_0 + \hat{\beta}_1 HighEduc + \hat{\beta}_2 MissingEduc + \hat{\beta}_3 MediumInc + \hat{\beta}_4 HighInc + \hat{\beta}_5 MissingInc + \hat{\beta}_6 female + \hat{\beta}_7 zage + \hat{\beta}_8 Urban + \hat{\beta}_9 MissingCity + \hat{\beta}_{10} NoChildren + \hat{\beta}_{11} MissingChildren + \hat{\beta}_{12} Religious + \hat{\beta}_{13} Doubting + U$$

From hypotheses 3 and 4, when including the significant variables from the sample regression function (1), the sample regression function (2) in Table 4 will be:

$$(2)\ \widehat{zGrowth} = \hat{\beta}_0 + \hat{\beta}_1 zRisk1 + \hat{\beta}_2 RiskLife + \hat{\beta}_3 HighEduc + \hat{\beta}_4 MissingEduc + \hat{\beta}_5 zage + \hat{\beta}_6 Urban + \hat{\beta}_7 MissingCity + \hat{\beta}_8 Religious + \hat{\beta}_9 Doubting + U$$

We also do a comparison where we run regressions with education, income and risk willingness, in addition to all background variables, with "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry" as dependent variables.

The background variables of our choice in regression (1) are variables we assume will influence the mindset and that most likely are correlated to education and income. We therefore choose to control for these variables by holding other factors fixed to avoid spurious correlation and obtain a ceteris paribus predictive effect from education and income. From hypotheses 1 and 2 the coefficients of interest are "HighEduc", "MediumInc" and "HighInc", but the regression gives us the opportunity to identify other potential predictors of a growth mindset. The results will be presented in Table 2.

In regression (2) we choose to control for the significant variables from regression (1). The variables that was not significant in regression (1) where omitted from regression (2) because the lack of significance indicate that they do not have a predictive effect on mindset, and including irrelevant variables would possibly yield less efficient estimators. From hypotheses 3 and 4 the coefficients of interest in this model is "zRisk1" (risk regarding money) and "RiskLife" (risk regarding life). We want to see if risk preferences can predict what kind of mindset individuals hold. The results will be presented in Table 4.

In regressions (3), (4) and (5), results presented in Table 5, we want to compare results when using different measures for mindset. Our coefficients of interest are mainly from our hypotheses; education, income and risk preferences, but it is also interesting to see whether our chosen background variables change with dependent variable. The statements that make up "zGrowth" regard developing intelligence and ability through effort, while the statements that make up "zFixedMindsetFailure" and "zFixedMindsetRetry" regard how individuals handle challenges and failure. The literature on mindset indicates that fixed and growth mindset individuals will answer somewhat the same to all these statements, but we want to question this and find out if it is valid for Norway, and also check whether "zGrowth" is the best measurement of mindset.

The models show us the OLS regression line, or sample regression function, used, where the β hats and y hats are estimates. As indicated by the name sample regression function, these models represent the sample obtained, not the population. We assume a random sample of a sufficiently large size and claim that our sample is representative for the population, but it does not provide us with population regression functions nevertheless. As multiple factors can

influence the effect of the different variables, we cannot claim a causal effect from these regressions, only a predictive effect. For example, we cannot claim that more years of education cause more of a growth mindset, as this can be altered by the teaching at the school, support by teachers when the students face challenges and effort by the student. But we can claim a relationship if we find a predictive effect.

We will also run White test and Breusch-Pagan test to check for heteroskedasticity, additionally, we test for normality, multicollinearity and model specification.

5. FINDINGS AND DISCUSSION

5.1. Correlation matrix

Table 1 presents the correlation matrix of our six separate fixed mindset measures, in addition to one combined growth mindset measure. *"FixedMindset1"* and *"FixedMindset2"* are highly correlated as should be expected since they represent the same statement formulated differently. These variables are direct measures of the respondents' attitude toward intelligence and mindset. The matrix also shows high correlation between these two mindset measures and *"FixedMindsetMath"* and *"FixedMindsetEffort"*. The correlation between the first four fixed mindset measures and *"FixedMindsetFailure"* is significant, but not as high as the correlation between the first four fixed mindset measures. The same is observed for the variable *"FixedMindsetRetry"*. *"FixedMindsetFailure"* and *"FixedMindsetRetry"* will not be included in our main regression, but will be used as dependent variables in Table 5 for comparison to our main regression with "zGrowth" as the dependent variable. The correlations between all mindset statements are significant, except for the correlation between *"FixedMindset2"* and *"FixedMindsetRetry"*, thus we claim that the respondents have responded systematically, not randomly.

	zGrowth	FixedMindset1	FixedMindset2	FixedMindsetMath	FixedMindsetEffort	zFixedMindsetFailure	zFixedMindsetRetry
zGrowth	1.0000						
FixedMindset1	-0.8418 *	1.0000					
FixedMindset2	-0.8189 *	0.7709 *	1.0000				
FixedMindsetMath	-0.7431 *	0.4418 *	0.4361 *	1.0000			
FixedMindsetEffort	-0.6447 *	0.3516 *	0.2807 *	0.3667 *	1.0000		
zFixedMindsetFailure	0.3138 *	-0.2380 *	-0.2017 *	-0.2567 *	-0.2626 *	1.0000	
zFixedMindsetRetry	0.1167 *	-0.0947 *	-0.0533	-0.0786 *	-0.1325 *	0.3801 *	1.0000

Table 1: Correlation matrix
"zGrowth": mean of FixedMindset1, FixedMindset2, FixedMindsetMath, FixedMindsetEffort, reversed and standardized. "FixedMindset1": mindset- statement 1. Measures belief in malleability of intelligence. "FixedMindset2": mindset- statement 2. Measures belief in malleability of intelligence. "FixedMindsetMath": mindset- statement 3. Measures belief in malleability of ability. "FixedMindsetEffort": mindset- statement 4. Measures belief in malleability of ability. "zFixedMindsetFailure": mindset statement 5 reversed and standardized. Measures the willingness to try something if the possibility of failing is present. "zFixedMindsetRetry": mindset- statement 6 standardized. Measures the willingness to try again after failing.

5.2. Preferred model

The results of our main regression are presented in Table 2; the first seven columns present the estimated coefficient when regressing one variable without controlling for other background variables. The estimated coefficients of the preferred model are presented in column (8) where we control for all background variables. Missing values are controlled for, but not presented.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HighEduc	0.207 **							0.234 **
	(0.07)							(0.07)
MediumInc		-0.171						-0.162
		(0.11)						(0.11)
HighInc		-0.058						-0.058
		(0.11)						(0.12)
female			-0.106 +					-0.096
			(0.06)					(0.06)
zage				-0.053 +				-0.093 **
				(0.03)				(0.04)
Urban					-0.136 +			-0.194 *
					(0.07)			(0.08)
NoChildren						-0.000		-0.036
						(0.07)		(0.08)
Religious							-0.129	-0.156 +
							(0.08)	(0.08)
Doubting							-0.065	-0.081
							(0.07)	(0.07)
constant	-0.128 *	0.104	0.052	0.000	0.107 +	0.001	0.059	0.240
	(0.05)	(0.09)	(0.04)	(0.03)	(0.07)	(0.05)	(0.05)	(0.15)
r2	0.012	0.004	0.003	0.003	0.006	0.000	0.003	0.034
df_r	997	996	998	998	997	997	997	986

+ p<0.10, * p<0.05, ** p<0.01

Table 2: Main regression

Notes: main regression, using "zGrowth" as dependent variable.
Each column represents a separate regression and reports the estimated variable coefficients with the standard deviations in parenthesis. Missing values of education, income, city size and number of children u18 in the household have been controlled for, but not reported.
"HighEduc": dummy for number of years of education. Taking the value 1 if respondent has completed minimum three years of college / university (bachelor, master, PhD), 0 if not. "MediumInc": dummy for gross annual household income. Taking the value 1 if gross annual household income is between NOK 300.001 and NOK 800.000, 0 if not. "HighInc": dummy for gross annual household income higher than NOK 800.001. Taking the value 1 if gross annual household income is higher than NOK 800.001, 0 if not. "Female": dummy for female. Taking the value 1 if respondent is female, 0 if not. "zage": reported age, standardized. "Urban": dummy for city size larger than 5.000 inhabitants. Taking the value 1 if the respondent lives in a city with more than 5.000 inhabitants, 0 if not. "NoChildren": dummy for 0 children under 18 in the household. Taking the value 1 if the household does not have any children under 18 years old, 0 if not. "Religious": dummy for being religious. Taking the value 1 if the respondent is religious, 0 if not. "Doubting": dummy for being in doubt on religion. Taking the value 1 if the respondent is in doubt, 0 if not.
The findings from our preferred model in column (8) is that "HighEduc", "zage", "Urban" and "Religious" are significant predictors of a growth mindset. They indicate that having completed 3 years or more of a college or university education, being of young age, living in a small city and not being religious predicts more of a growth mindset.

Column (1) shows that high education is highly significant, at a 1 percent level, when assuming a zero conditional mean. The finding is also robust to controlling for background variables in column (8). To have high education increases the mindset measure score by 20.7 percent of a standard deviation, or 23.4 percent of a standard deviation when controlling for other variables. This clearly points towards education being an important predictor of a growth mindset, and we cannot reject Hypothesis 1. The findings of several researchers of a positive correlation between education and growth mindset (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012), and our finding that having completed 3 years or more of a college or university education indicate a growth mindset, supports the suggestion of a two-way relationship between mindset and education. Holding a growth mindset increases the outcome of education, and achieving a higher degree increases the mindset measure of the individual. This finding is reasonable considering fixed mindset individuals hold the belief that they are given a certain amount of intelligence and abilities that cannot be developed further. Most individuals holding this mindset will not value an extra year of education and will probably rather find work that will show their present abilities than investing more time in education. On the other hand, growth mindset individuals may overestimate their ability to develop and thus not emphasize education, thinking they can do well without.

Figure 3 shows that individuals with only Primary School or High School as the highest achieved education scores under mean on growth mindset measure. This is as expected; lower education seems to predict a fixed mindset in the Norwegian population, while a Bachelor or a Master's degree, or equivalent, seems to predict a growth mindset. Surprisingly, our data suggests that holding a PhD seems to slightly predict a fixed mindset, contrary to what we

hypothesized. Taken into consideration the number of observations and the small negative score, the result may not be significant. To investigate this, we regressed Bachelor, Master and PhD on "zGrowth" to see if there were significant differences. The findings indicate that Bachelor and Master are significant predictors of a growth mindset, while PhD does not have a significant predictor effect on mindset. Thus the findings in regards to PhD, in Figure 3, do not seem to be of importance.
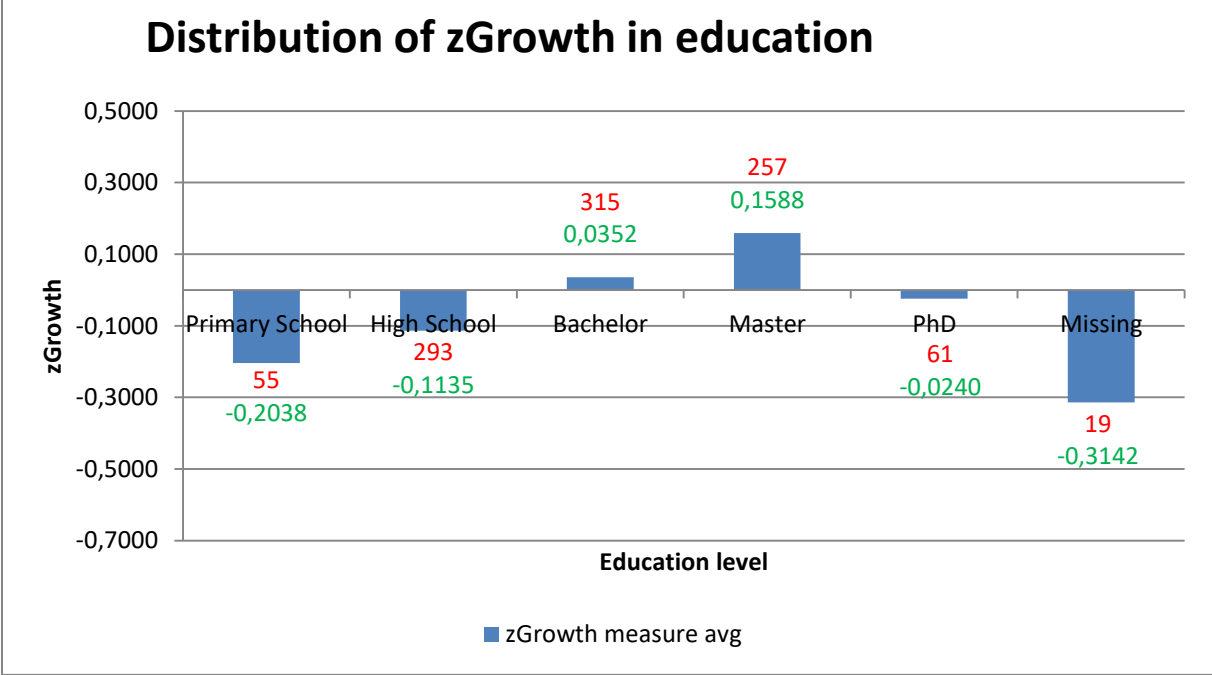

Figure 3, distribution of growth mindset measure in education levels. The figure shows how many observations there are for each education level (red numbers), and also the average mindset measure score ("zGrowth") in each education level (green numbers). Participants holding a low education, Primary school or High school, in addition to participants having completed a PhD, seems to hold more of a fixed mindset. Participants having completed a Bachelor's or a Master's degree seem to hold more of a growth mindset. Primary school and PhD have considerable fewer observations than the other education levels, indicating that the results from these variables may not be representative for the population. PhD, in addition, has a very small negative mindset measure score.

In Table 2 column (2) we look at the predictive effect of medium and high income. Surprisingly, income does not seem to have any significant predictive effect on mindset. The lack of significance is still present when controlling for other background variables in column (8). This finding points towards income not being a significant predictor of a growth mindset, and we thus reject Hypothesis 2. Our expectations of income being positively related to a growth mindset build on studies claiming a positive relationship between inhibiting a growth mindset and the individual's educational outcome (Blackwell et al., 2007; Yeager & Dweck,

2012), and statistics showing a positive correlation between number of years spent in school and future wages (Barrow & Rouse, 2005, 2006; Borjas, 2013). However, our expectations were not confirmed. Column (8) suggest both medium and high income have a negative predictive effect on the mindset measure score, respectively -16.2 and -5.8 percent of a standard deviation, but this finding is not significant. It may be that people are reluctant to provide their true income. Also a large part of the Norwegian work force consists of individuals closing in on retirement age. They probably started their work career 30-35 years ago, when the average education level in Norway was a lot lower, almost 69 percent fewer with an education above high school level (Statistics Norway, 2017a, 2017b), and have worked their way up to the rank and income level they have today. Perhaps having a high income without a high education fixes one's mindset, leaving these individuals to believe that they got the job because they initially had the intelligence and ability. Education may also, unintentionally, teach students a growth mindset, so that those with low education miss out of this lesson and tend to have more of a fixed mindset. After inspecting the data, there does not seem to be any clear pattern, at first glance, between education level and income, which might explain why education is highly significant while income do not seem to be significant at all. We will be investigating this more carefully later in the thesis.

Column (3) shows that being female is barely significant, but when controlling for other variables the significance is gone. Thus it seems that the correlation in the single regression is a spurious correlation. When not controlling for other variables one may find effects from variables that in reality are effects from omitted variables, variables which now are in the error term. In this case, it seems that the predictive effect we find in female while not controlling for other variables is in reality effects from other variables, since the significance disappeared when controlling for other variables.

Column (4) displays age as negative and hardly significant before controlling for other variables. When other variables are included age becomes highly significant, at a 1 percent level, indicating that one additional year of age decreases the mindset measure score by 9.3 percent of a standard deviation. Controlling for other variables decrease the coefficient by 4 percent of a standard deviation, from 5.3 to 9.3 percent, and the finding clearly points towards age being an important predictor of a growth mindset. Thus we find that the older an individual is the more fixed mindset the individual is expected to have. This finding might be related to the rapid technological development during the last decades altering the routines at home and at work. It is well known that changing old habits are hard, thus individuals who

had incorporated functional routines prior to the development might find that these changes add to the workload, whereas younger employees might find them not so hard to face since they have grown up parallel to the development. Also, remembering how tasks were solved successfully earlier may influence the willingness to change old routines, contributing to a more fixed mindset. Another explanation may be that growing up with more clear social class division may have influenced 40+ year-olds' mindset. Historically, there used to be more of an attitude towards "knowing where you belong in the society", meaning that if an individual were of lower class, this individual should stick to employment that do not demand higher education and not believe that he/she is as intelligent or gifted as higher class individuals. This may have resulted in several individuals of lower class accepting that they were less intelligent and gifted than individuals from a higher class, without trying to prove otherwise. Finally, if our finding of education having predictive effect on mindset is correct, the intergenerational effects that Ben-Halima et. al (2014), Chesters (2010), de Walque (2009) and Pfeffer (2008) found may have played a larger role for 40+ individuals. Number of highly educated individuals was a lot lower 30-35 years ago (Statistics Norway, 2017a, 2017b) than it is today, and thus assuming that parents had low education and a fixed mindset, the children would also have low education and a fixed mindset. This effect must, though, have had a decreasing effect due to the equalizing politics the Norwegian politicians have implemented the last decades.

But age does not have to have a negative predictive effect on the growth mindset measure. Individuals face challenges they need to deal with every day, which creates an opportunity to learn from first-hand experiences. According to Dweck's theory of growth and fixed mindset individuals with a growth mindset will benefit from the challenges they face, while the individuals with a fixed mindset will not benefit to the same extent (Dweck, 1999; Yeager & Dweck, 2012). Thus, for an individual holding a growth mindset, we expect age to contribute positively to the mindset measure. Also, when growing older, individuals gain experience. If an individual experiences that he/she can develop higher intelligence and ability, and also handle challenges, this may influence the mindset towards a growth mindset. Thus, it may be that older age can, contrary to our finding, predict a growth rather than a fixed mindset.

Figure 4 shows the distribution of growth mindset measure in age. It seems to be a clear pattern indicating that as an individual grows older, the mindset becomes more fixed, and it also seems that this development happens gradually. Number of observations for under 20 and

fifty is a lot lower than for the other age groups, indicating that these might not be significant. The pattern is still quite clear though, even without these observations.
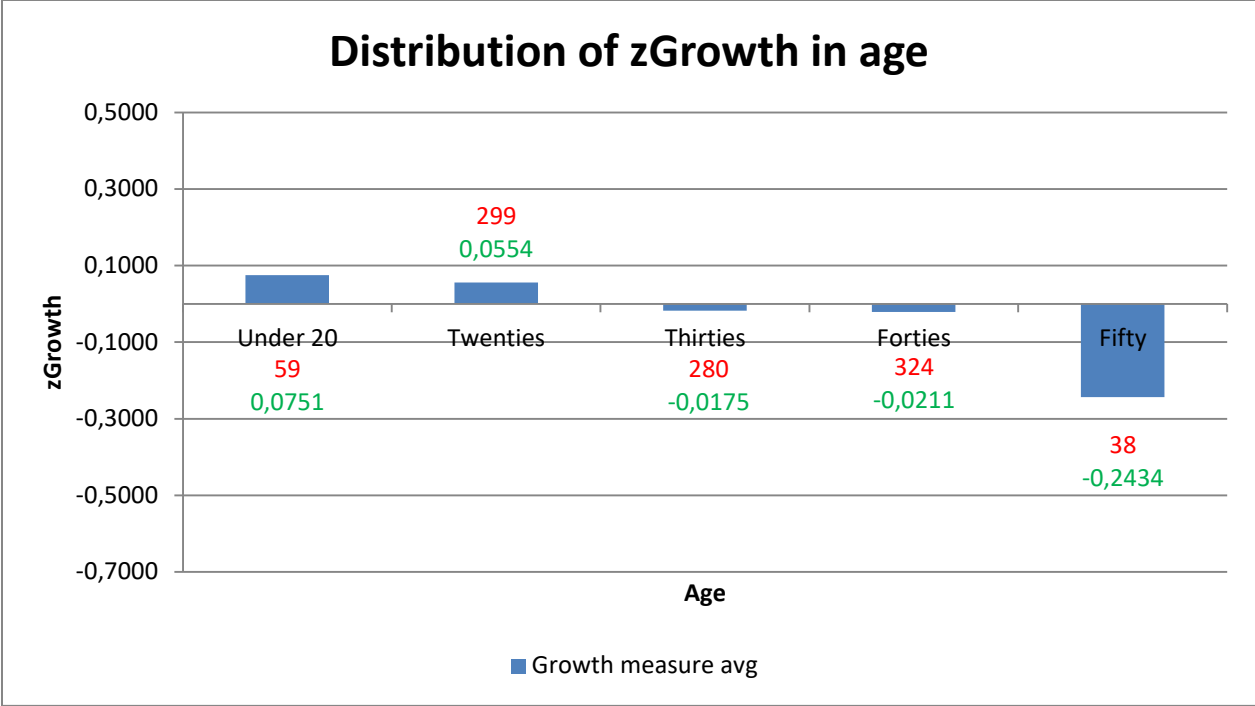

Figure 4, distribution of growth mindset measure in age. The figure shows how many observations there are for each age group (red numbers), and also the average mindset measure score ("zGrowth") in each age group (green numbers). The age groups are divided into decades. It seems that as an individual grows older, the mindset becomes more fixed. From this figure it seems that this development happens gradually. It is worth noticing that number of observations for under 20 and 50 is significantly lower than for the other age groups, and the findings of these may therefore be less important.

Column (5) of Table 2 presents the variable Urban. When not controlling for other variables, the coefficient is barely significant decreasing the mindset measure score by 13.6 percent of a standard deviation, but controlling for other variables increase the significance, to a 5 percent level, decreasing the mindset measure score by 19.4 percent of a standard deviation, as shown in column (8). We expected individuals in urban areas to develop a growth mindset through the exposure of huge amounts of impressions, but our findings indicate the opposite to be true. When living in a large town, the individual interact less with neighbors and other citizens than if the individual lives in a smaller town/countryside. This may be an explanation to our result. Interacting with others forces the individual to respect the opinions and beliefs of other individuals, and forces the individual to adapt to several opinions and beliefs to get along. This is necessary when living in a smaller town/countryside because there are not that many

environments to choose from, possibly opening the mind towards a growth mindset. Also, living in a small town or countryside the individual need to develop more creativity as the individuals will have to use their imagination to a higher degree to find recreational activities due to the limited number of activities provided by others.

As shown by Figure 5, it seems that our finding may not be so clear after all. Our variable "NonUrban" consist of City/village (2.000 to 4.999citizens) and "Countryside" (less than 2000 citizens), and as the figure shows, both have a distribution of the mean of "zGrowth" towards a growth mindset. This finding indicates that living in a non-urban area seems to suggest a growth mindset. But for the measure of "Urban", consisting of the first three bars in the figure, the result is not so clear. "Oslo" and "City with between 5.000 and 50.000 citizens" have a measure on the growth side, but for "City with more than 50.000 citizens" the distribution is negative from mean of "zGrowth", suggesting a fixed mindset. Average mindset measure for "City with more than 50.000 citizens" are larger than for "Oslo" and "City with between 5.000 and 50.000 citizens", while number of observations are somewhat the same when the two latter are added together. The larger mindset measure for "City with more than 50.000 citizens" may be enough to make our variable "Urban" negative, indicating that people in an urban area hold more of a fixed mindset. It also may be that in cities up to 50.000 citizens, the effect from having to interact with several types of individuals is valid, and that Oslo, as the capitol of Norway experiences enough diversity and changes to develop a growth mindset. Cities larger than 50.000 citizens may experience the city effect of not interacting much with neighbors.
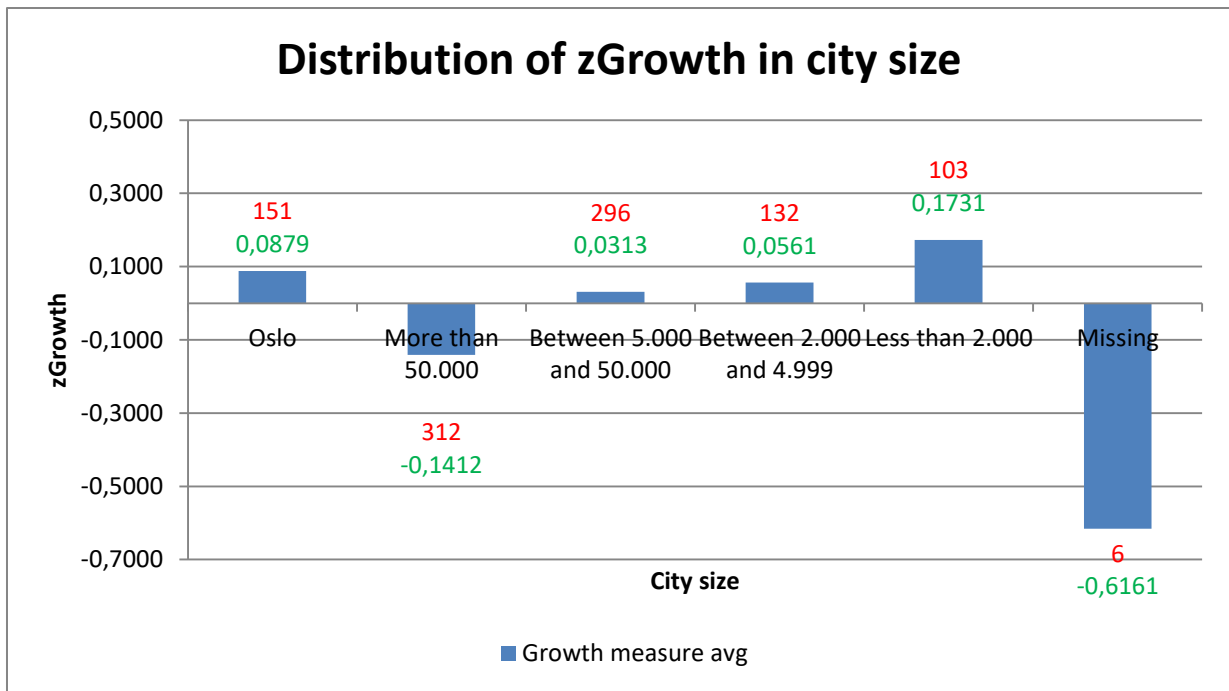
Distribution of zGrowth in city size

Figure 5, distribution of growth mindset measure in city size. The figure shows how many observations there are for each city size (red numbers), and also the average mindset measure score ("zGrowth") in each city size (green numbers). It seems that the smaller the city, the more of a growth mindset individuals hold, with the exception of "Oslo" who also predicts more of a growth mindset. The magnitude of the score in "City with more than 50.000 citizens" may be the reason that the variable "Urban" in Table 2 is negative, indicating that individuals living in urban areas hold more of a fixed mindset than individuals in non-urban areas.

Column (6) present having no children under 18 in the household, which is not significant, neither in the single regression, nor in the preferred model in column (8).

In column (7) we find that being religious or in doubt is not significant, but when controlling for other variables in column (8), being religious becomes barely significant, at a 10 percent level, and is negative. In line with what we expected, being religious seems to fix one's mind, decreasing mindset measure score by 15.6 percent of a standard deviation. The weak significance may be due to the difficult task of defining when an individual is religious, doubting or not religious. Due to this difficulty, we must take into account that our variables for religion may be defined poorly. A second explanation may be that religious people may strive to follow the religions guidelines, which do not change often, while the society changes rapidly, resulting in a tendency for more of a fixed mindset. On the other hand, individuals have free minds and may not act according to the guidelines at all times. Depending on the religion, the level of freedom to act independently varies.

Figure 6 seems to indicate that religious individuals hold more of a fixed mindset, but the number of observations is very different from the lowest to the highest scores on the religious

measure, indicating that it may not be possible to draw a conclusion from the variable "Religious".
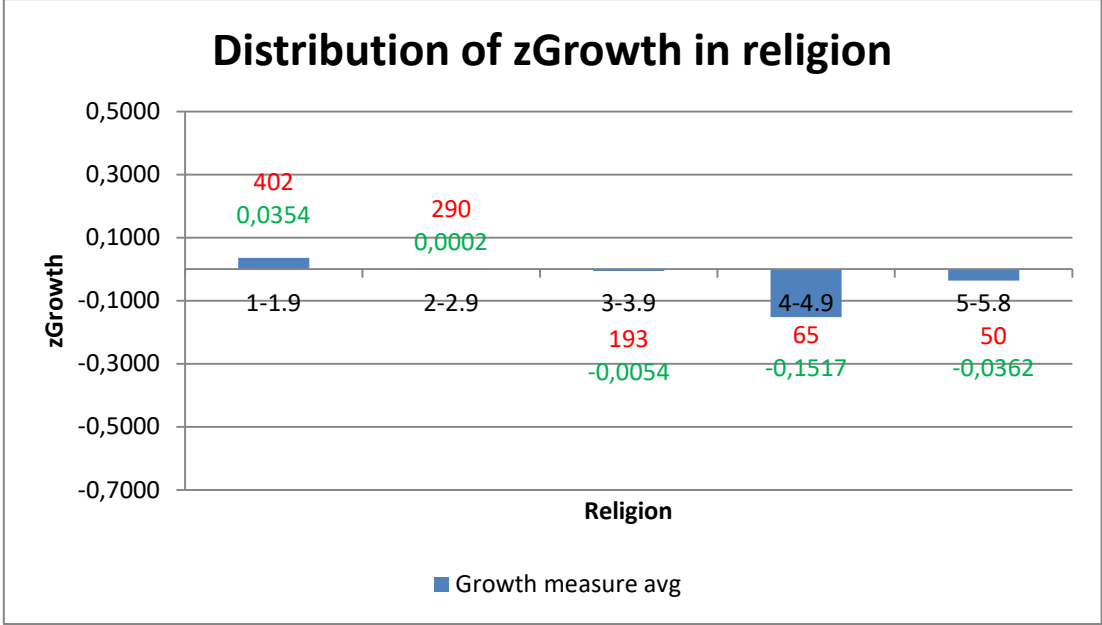

Figure 6, distribution of growth mindset measure in religion. Higher number on the x-axis indicates more religious. The figure shows how many observations there are for each group of religious measure (red numbers), and also the average mindset measure score ("zGrowth") in each group of religious measure (green numbers). The figure indicates that religious individuals hold more of a fixed mindset. The finding is inconclusive though, due to the large difference of observations between the lowest and the highest scores on the religious measure.

When we look at our preferred model in column (8), we find that controlling for background variables do not change the coefficients for education and income significantly. We chose these background variables with the expectation that they may be correlated to education and income, and would have a predictive effect on mindset, and thus would have to be controlled for to avoid spurious correlation. The fact that correlating for background variables does not change the coefficients for education and income significantly indicates that the correlations are too small to yield a significant effect. Our expectations for correlation are that female may be positively correlated to education, because more women undergo higher education than men in Norway (Statistics Norway, 2016a). But being female may on the other hand be negatively correlated to income since men tend to earn higher wages than women on average. Also, income level builds on previous income and tenure. Female workers tend to take longer parental leave than men, causing them to need longer total time to build tenure. We expect age to be positively correlated to both education and income, because the older an individual is, the more time this individual has had to complete an education, and wages tend to increase by experience. Finding a variety in educational opportunities and the highest paid jobs are often located in urban areas, thus urban should be positively correlated to education and

income. We expect that having no children under the age of 18 in the household is positively correlated to both education and income. We assume that it is easier to gain education when having no children to attend to, and one can also devote more time to work. On the other hand, no children under the age of 18 may be negatively correlated to education and income, thinking that an individual may take education and income more seriously when this individual has children to attend to. Our expectation for the correlation between the variable "Religious" and both education and income is that it is negative. A religious individual may think that "God will provide", and thus not emphasize education and income to a high level.

To check for correlation between the independent variables, we made a correlation matrix. This matrix is presented as Table 3, and our findings are:

- Female is positively correlated to education and negatively correlated to income.
- Age is positively correlated to education and negatively correlated to income.
- City size is negatively correlated to education and positively correlated to income.
- Number of children in the household under 18 is positively correlated to education and negatively correlated to income.
- Religion is positively correlated to both education and income.

	Education level	Income level	Female	Age	City size	Children under 18	Religion
Education level	1.0000						
Income level	0.0517	1.0000					
Female	0.0210	-0.0717*	1.0000				
Age	0.0037	-0.1824*	0.0364	1.0000			
City size	-0.0198	0.1000*	-0.0235	-0.0801*	1.0000		
Children under 18	0.0467	-0.1301*	0.0107	-0.0345	-0.0644*	1.0000	
Religion	0.0138	0.0140	-0.0903*	-0.0056	-0.0178	-0.0756*	1.0000

+ $p<0.10$, * $p<0.05$, ** $p<0.01$

Table 3: Correlation matrix. Original variables supplied by NorStat. Presents the correlation between the independent variables in Table 2.

None of the background variables are significantly correlated to education. This may be the explanation for the low change in the coefficient when controlling for background variables. All variables, with the exception of "Religion", are significantly correlated to income, but the correlation is not high, thus it may be that although they are significant, the correlations are too weak to yield a predictive effect from income on mindset. We also find that education and income is hardly correlated, though slightly positive, but not significant. This finding is not in

line with of the findings of several researchers, that education and income are positively correlated (Barrow & Rouse, 2005, 2006; Borjas, 2013; Li et al., 2012; Walker & Zhu, 2011). We found this finding puzzling and somewhat worrying, so we decided to run a correlation between our variables for high income, low income, high education and low education. In this correlation we found that high income and high education are in fact positively correlated, and we found the same for low income and low education. The correlation being small may be the reason that we see no predictive effect from income on mindset. Also, a large part of the workers in Norway are not actively asking for a raise, but rely on the yearly negotiations of the unions to make sure they increase their wages. The unions usually agree on a percentage raise, equal to all workers regardless of educational level.

5.3. Additional models

Table 4 reports the estimated results from regression 2, which includes our risk variables. Column (4) presents the estimated coefficients when controlling for all significant variables from Table 2. Income, female and numbers of children under 18 in the household do not have a significant predictive effect on growth mindset, and do not significantly change the coefficient of high education, and are thus omitted from this regression.

In Table 4, column (1) we control only for "zRisk1", and find that risk regarding money is not significant. The coefficient does not change much when controlling for "RiskLife" in column (3), but slightly when controlling for all significant background variables from our preferred model in Table 2, column (8). The sign of the coefficient is negative, and this indicates that individuals with high tolerance for risk regarding money have more of a fixed mindset. However, the variable is not significant at any point, and thus we cannot conclude that risk preferences regarding money have any predictive effect on mindset. We reject Hypothesis 3. This finding is surprising. We expected that individuals with a high willingness of risk regarding money would hold a growth mindset, since it is shown that growth mindset individuals handle failures and challenges in a better manner than fixed mindset individuals. There are also findings that indicate a positive relationship between a growth mindset and overconfidence which lead us to assume that growth mindset individuals are willing to take on more risk, believing that they have higher ability than they in the reality have. On the other hand, fixed mindset individuals are more occupied by looking smart than learning, thus it may

be that by taking risks they hope to win and look smart, resulting in them taking more risks. Maybe are there effects working for both fixed and growth mindset individuals to the same degree, and thus we see no significant difference between these individuals.

In column (2) we present risk regarding life, and find that the coefficient of the variable "RiskLife" is significant and robust to controlling for all variables in column (4), at a 5 percent level. The finding indicates that if an individual embraces risk regarding life, the mindset measure score increases by 25.3 percent of a standard deviation, indicating more of a growth mindset. Thus we cannot reject Hypothesis 4. We assume that individuals taking on more risk regarding life thrive on challenges, handle failure in a better manner and believe they can develop ability through effort, like individuals holding a growth mindset. On the other hand, Lochner (2011) suggest that education may reduce the risk people take with their health, indicating that the variable "RiskLife" should be negative. Column (4) shows that our other variables do not change significantly when controlling for risk.

	(1)	(2)	(3)	(4)
zRisk1	-0.032		-0.033	-0.022
	(0.03)		(0.03)	(0.03)
RiskLife		0.254 *	0.255 *	0.253 *
		(0.10)	(0.10)	(0.10)
HighEduc				0.243 **
				(0.07)
zage				-0.094 **
				(0.03)
Urban				-0.192 *
				(0.07)
Religious				- 0.131 +
				(0.08)
Doubting				-0.053
				(0.07)
constant	0.000	-0.480 *	-0.482 *	-0.423 *
	(0.03)	(0.19)	(0.19)	(0.21)
r2	0.001	0.006	0.007	0.035
df_r	998	998	997	990

+ p<0.10, * p<0.05, ** p<0.01

Table 4: Extended regression
Notes: Each column represents a separate regression and reports the estimated variable coefficients with the standard deviations in parenthesis. Missing values of education and city size have been controlled for, but not reported. In column (4) significant background variables from Table 2, column (8), have been controlled for.

"zRisk1": risk-question 1 standardized. Measuring the willingness of risk with money at stake. "RiskLife": risk-question 2. measuring the willingness of risk when life is at stake. "HighEduc": dummy for number of years of education. Taking the value 1 if the respondent has completed minimum three years of college / university (bachelor, master, PhD), 0 if not. "zage": reported age, standardized. "Urban": dummy for city size larger than 5.000 inhabitants. Taking the value 1 if the respondent lives in a city with more than 5.000 inhabitants, 0 if not. "Religious": dummy for being religious. Taking the value 1 if the respondent is religious, 0 if not. "Doubting": dummy for being in doubt on religion. Taking on the value 1 if the respondent is in doubt, 0 if not.
From the table we find that risk regarding money is not a significant predictor of a growth mindset, but risk regarding life is.

Table 5 presents three regressions with the same independent variables, but with different dependent variables; "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry". Column (1) presents our preferred model with "zGrowth" as dependent variable, including risk variables, column (2) presents the results from the regression with "zFixedMindsetFailure" as dependent variable, and column (3) presents the results from the regression with "zFixedMindsetRetry" as dependent variable, independent variables from our preferred model including risk variables. We found it interesting to see if "zFixedMindsetFailure" and "zFixedMindsetRetry" as dependent variables generated somewhat the same results as "zGrowth". Research show that growth mindset individuals handle challenges and failure in a better manner than fixed mindset individuals (Dweck, 1999, 2006; Yeager & Dweck, 2012; Yeager & Walton, 2011), thus we assume that if highly educated younger individuals hold more of a growth mindset, they would also handle challenges and failure in a better manner than lower educated older individuals, and the results from these regressions should be the same as with "zGrowth" as dependent variable. The correlation between "zGrowth" and "zFixedMindsetFailure" is somewhat lower than between the statements in "zGrowth", but significant. The correlation between "zGrowth" and "zFixedMindsetRetry" is a lot lower, but significant. The correlation being significant, lead us to question whether we should have included the two last statements into our growth mindset variable. On the other hand, the correlation is lower, and the two last statements, to our best knowledge, are not built on internationally validated mindset measures. Thus we wanted to investigate further before concluding. We expected some difference, because the statements regard reaction to failure and challenges, not malleability or effort as the first four statements regard. On the other hand, because research shows that growth mindset individuals handle challenges and failure in a better manner than fixed mindset individuals (Dweck, 1999, 2006; Yeager & Dweck, 2012; Yeager & Walton, 2011), we expected that the results also would be somewhat the same.

Column (1) reports the same independent variables as our preferred model in Table 2, in addition to the risk variables "zRisk1" and "RiskLife". The dependent variable of this regression is "zGrowth". The size of the coefficients has changed slightly from Table 2 and Table 3, but sign and significance level is the same.

Column (2) show that when using "zFixedMindsetFailure" as dependent variable the significance level of "HighEduc", "zage", and "RiskLife" decrease, and "Urban" is no longer significant. Female and doubting becomes significant, and the significance level of religious increases. The findings of this regression hold up our expectation of both somewhat the same results and somewhat different results. But when looking at the last regression in Column (3) when using "zFixedMindsetRetry", we see a large difference in results. All variables significant from the regression in column (1), except from "zage", have lost its significance. "zage" are still significant, but now at a 5 percent level down from a 1 percent level. "female" has become significant at a 10 percent level. As mentioned, the two last statements in the questionnaire are both about failure, but statement 5 is phrased so that high score indicates a fixed mindset, like the first four, and statement six is phrased so that high score indicates a growth mindset. It may be that this has confused the participants to some degree. Together with the low correlation with all the other mindset variables, these may be inferior statements for measuring mindset.

	(1)	(2)	(3)
HighEduc	0.229 **	0.137 *	0.051
	(0.07)	(0.07)	(0.07)
MediumInc	-0.159	-0.066	0.103
	(0.11)	(0.11)	(0.11)
HighInc	-0.049	0.037	0.173
	(0.12)	(0.12)	(0.12)
female	-0.080	0.167 *	0.114 +
	(0.06)	(0.06)	(0.06)
zage	-0.097 **	0.068 +	0.074 *
	(0.04)	(0.04)	(0.04)
Urban	-0.193 *	-0.043	0.010
	(0.08)	(0.08)	(0.08)
NoChildren	-0.047	-0.069	0.042
	(0.08)	(0.08)	(0.08)
Religious	-0.148 +	-0.223 **	-0.047
	(0.08)	(0.08)	(0.08)
Doubting	-0.072	-0.145 +	-0.101
	(0.07)	(0.07)	
zRisk1	-0.018	0.019	0.016
	(0.03)	(0.03)	(0.03)
RiskLife	0.252 *	0.174 +	0.028
	(0.10)	(0.10)	(0.10)
constant	-0.245	-0.332	-0.191
	(0.24)	(0.24)	(0.24)
r2	0.041	0.038	0.029
df_r	984	984	984

+ p<0.10, * p<0.05, ** p<0.01

Table 5: Comparison using different dependent variables
Notes: Each column represents a separate regression and report the estimated variable coefficients with the standard deviations in parenthesis. Column (1) using "zGrowth" as dependent variable. Column (2) using "zFixedMindsetFailure" as dependent variable. Column (3) using "zFixedMindsetRetry" as dependent variable. Missing values of education, income, city size and number of children u18 in the household have been controlled for, but not reported.
"zGrowth": mean of mindset statements 1-4, reversed and standardized. Measures belief in malleability of intelligence and effort. Higher value indicates more growth mindset. "zFixedMindsetFailure": mindset statement 5, reversed and standardized. Measures the willingness to try something if the possibility of failing is present. Higher value indicates more growth mindset. "zFixedMindsetRetry": mindset statement 6 standardized. Measures the willingness to try again after failing. Higher value indicates more growth mindset. "HighEduc": dummy for number of years of education. Taking the value 1 if respondent has completed minimum three years of college / university (bachelor, master, PhD), 0 if not. "MediumInc": dummy for gross annual household income. Taking the value 1 if gross annual household income is between NOK 300.001 and NOK 800.000, 0 if not. "HighInc": dummy for gross annual household income higher than NOK 800.001. Taking the value 1 if gross annual household income is higher than NOK 800.001, 0 if not. "Female": dummy for female. Taking the value 1 if respondent is female, 0 if not. "zage": reported age, standardized. Urban: dummy for city size larger than 5.000 inhabitants. Taking the value 1 if the respondent lives in a city with more than 5.000 inhabitants, 0 if not. "NoChildren": dummy for 0 children under 18 years old in the household. Taking the value 1 if the household does not have any children under 18 years old, 0 if not. "Religious": dummy for being religious.

Taking the value 1 if the respondent is religious, 0 if not. "Doubting": dummy for being in doubt on religion. Taking the value 1 if the respondent is in doubt, 0 if not. "zRisk1": Risk-question 1 renamed and standardized. Measuring the willingness of risk with money at stake. Higher value indicates more growth mindset. "RiskLife": Risk-question 2. Measuring the willingness of risk when life is at stake. Higher value indicates more growth mindset.

 Figure 7 show the distribution of "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry" measures in education level. Participants with lower education have answered somewhat the same to all the statements incorporated in the dependent variables, and the results indicate that having completed high school or less yields more of a fixed mindset. This is as we expected. The result for participants having completed a Master's degree or equivalent is also as expected; the results indicate that these individuals hold more of a growth mindset. The difference appears when looking at participants with a Bachelor's degree and a PhD, or equivalent. Holding a Bachelor's degree seem to predict a growth mindset when using "zGrowth" as dependent variable, but a fixed mindset when using "zFixedMindsetFailure" and "zFixedMindsetRetry" as dependent variables. This finding indicates that holding a Bachelor's degree yields more of a growth mindset in regards to the malleability of intelligence and putting in effort to gain ability, while yielding more of a fixed mindset in regards to handling challenges and failure. Holding a PhD gives the reverse results. The differences made us investigate further. The number of observations from "PhD" is a lot lower than from "Bachelor" and "Master", thus it may be that the findings of "PhD" is not valid. To check for significance, we regressed "Bachelor", "Master" and "PhD" on the three dependent variables. Our findings when using "zGrowth" is that "PhD" does not have a significant predictive effect on mindset, but when using "zFixedMindsetFailure" and "zFixedMindsetRetry" it does, indicating that "PhD" may have a significant predictive effect on how well these individuals handle challenges and failure, but no predictive effect on the belief of malleability of intelligence and effort. But, as stated, the number of observations may be too small to conclude. For "Bachelor" the findings are reversed. Even though the findings may not be important, it is interesting and surprising to see, given the theories previously discussed.
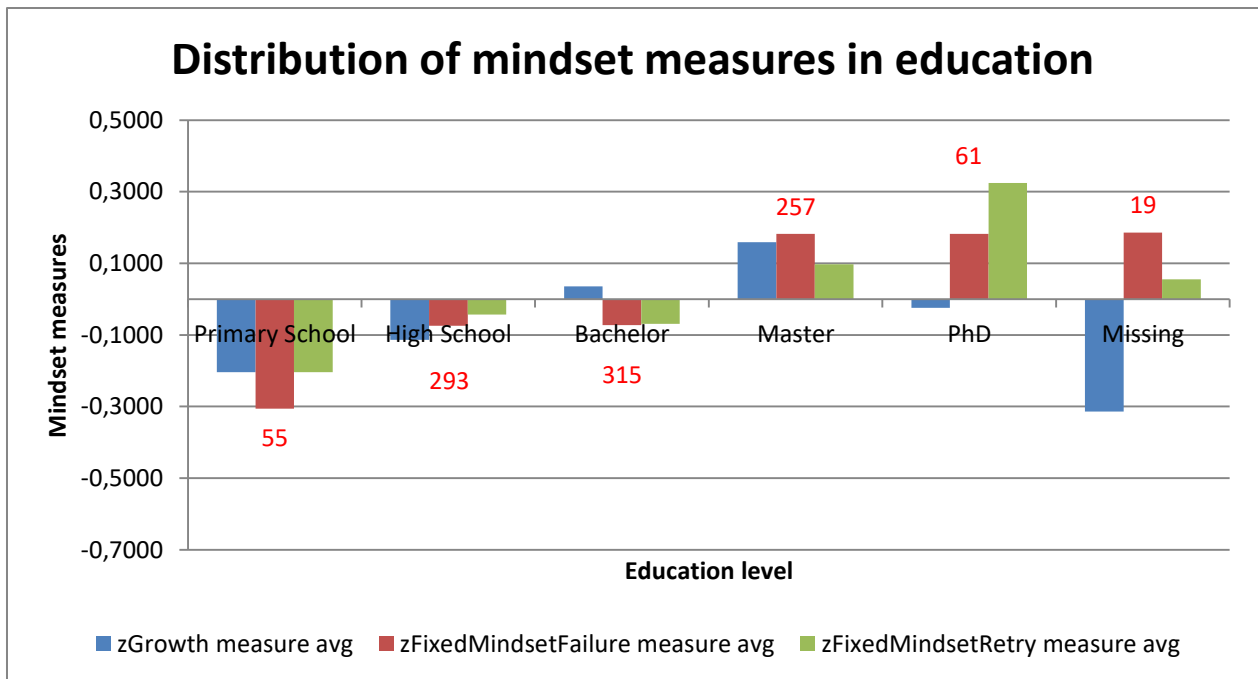
Figure 7, Distribution of "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry" measures in education. Numbers in red represent number of observations in each education level. The figure indicates that having completed only Primary school or High school predicts a fixed mindset for all dependent variables. The findings of having completed higher education are not so clear. Having completed a Master's degree predicts a growth mindset for all dependent variables. Having completed a Bachelor's degree predicts a growth mindset when using "zGrowth" as dependent variable, but predicts a fixed mindset when using "zFixedMindsetFailure" and "zFixedMindsetRetry" as dependent variables. Having completed a PhD, the results are reversed. The number of observations in "PhD" is a lot lower than in "Bachelor" and "Master", thus it may be that the findings of "PhD" is not valid. We found that "PhD" does not have a significant predictive effect on "zGrowth", but it does have a significant predictive effect on "zFixedMindsetFailure" and "zFixedMindsetRetry", indicating that individuals having completed a PhD, or equivalent, hold more of a growth mindset in regards to handling challenges and failure in a good manner. But, the number of observations in "PhD" may be too small to conclude. For individuals having completed a Bachelor's degree, or equivalent, the findings were reversed; they seem to hold more of a growth mindset towards malleability of intelligence and ability.

Figure 8 show the distribution of "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry" measures in age. For all age groups except the thirties, the findings when using "zFixedMindsetFailure" and "zFixedMindsetRetry" as dependent variables are the opposite of the finding when using "zGrowth" as dependent variable. The figure indicates that when individuals are in their twenties or younger they hold more of a growth mindset towards malleability of intelligence and putting in effort to gain ability then individuals 30 years of age or older. When it comes to believing in abilities to handle challenges and failure in a good manner, it seems that individuals 40 years of age or older hold more of a growth mindset than individuals that are younger than 40. The case of individuals in their thirties stands out; it seems that these individuals have a fixed mindset in all respects. There may be a case for

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excluding the under 20's and the 50's, due to the small number of observations that might make these measures insignificant.
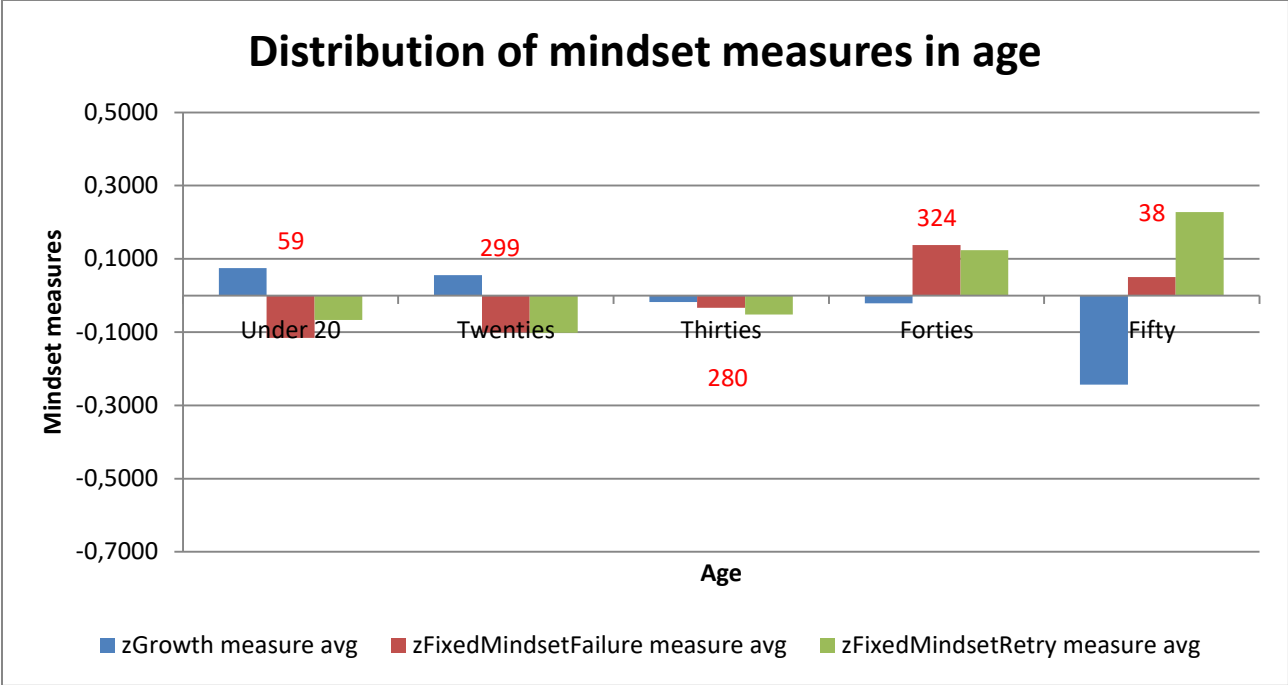

Distribution of mindset measures in age

Figure 8, Distribution of "zGrowth", "zFixedMindsetFailure" and "zFixedMindsetRetry" measures in age. Numbers in red represent number of observations in each age group. The figure shows that when in the 30's, individuals seem to hold a fixed mindset in regards to all the mindset measures. The mindset score is small though. When in the twenties or younger it seems that individuals have a growth mindset towards malleability of intelligence and putting in effort to gain ability and a fixed mindset towards believing in their abilities to handle challenges and failure in a good manner. For individuals in their 40's or older, the finding is reversed.

In our preferred regression, education level and age was the strongest predictors of a growth mindset. But when looking at how individuals handle challenges and failure, it seems that these predictors are weaker, contrary to what we expected. Thus we need to question the findings of former research on mindset and how individuals handle challenges and failure. This is especially current in the case of age, where we find that young age predicts more of a growth mindset in regards to malleability of intelligence and gaining more ability through effort, while it predicts more of a fixed mindset in regards to how these younger individuals handle challenges and failure. But, our sample is from Norway, and former researches findings are from other countries. Thus the findings of former research may be valid in the countries they were performed, but not in Norway, and the differences we find here may be a product of differences between countries. Because of the lower correlation, the two last

statements not building on internationally validated mindset measures, and the uncertainty of the relationship between mindset and how individuals handle challenges and failure, we claim that the growth mindset variable "zGrowth" is the best measure for a growth mindset, and thus we do not change this.

The map on the front side presents geographical differences in Norwegian counties visualized. In Table 6 we present the basis for the color coding of the Norwegian map. Column "County" presents the names of the 19 Norwegian counties. Column "Deviation from Mean zGrowth" presents the average deviation from mean of the standardized growth mindset measure in Norway, in the respective county. The number of observations, standard errors and confidence interval per county are presented in columns three, four and five. The last two columns present the 95 percent confidence interval, lower and upper value, for each county. The basis for the color coding is "Deviation from Mean zGrowth". All counties with a deviation of 0.1 or higher are defined as growth mindset (yellow). Deviation between -0.1 and 0.1 are defined as neutral mindset (green), and a deviation of -0.1 or lower are defined as fixed mindset (blue). The map on the front page of this thesis shows a difference in mindset between the Norwegian counties. It is interesting to see how mindset is partitioned in Norway, and after identifying predictors of a growth mindset, we wanted to find if these can explain the differences. It was important for us to do this check, to identify if there may be other predictors of a growth mindset not investigated in this thesis.

County	Deviation from Mean zGrowth	Number of observations	Standard Error	95% Confidence interval	
				Lower value	Upper value
NordTrondelag	0,224	19	0,28	-0,325	0,773
Hedmark	0,159	40	0,17	-0,174	0,492
MoreogRomsdal	0,159	31	0,14	-0,115	0,433
Akershus	0,129	107	0,10	-0,067	0,325
VestAgder	0,089	38	0,16	-0,225	0,403
Rogaland	0,088	74	0,12	-0,147	0,323
Oslo	0,081	150	0,07	-0,056	0,218
Finnmark	0,071	9	0,39	-0,693	0,835
Oppland	0,064	46	0,15	-0,230	0,358
Vestfold	0,043	43	0,13	-0,212	0,298
Telemark	0,030	29	0,20	-0,362	0,422
Ostfold	-0,021	50	0,12	-0,256	0,214
Troms	-0,093	31	0,18	-0,446	0,260
Buskerud	-0,102	45	0,15	-0,396	0,192
SorTrondelag	-0,109	83	0,10	-0,305	0,087
Hordaland	-0,117	128	0,09	-0,293	0,059
SognogFjordane	-0,179	17	0,26	-0,689	0,331
Nordland	-0,301	49	0,17	-0,634	0,032
AustAgder	-0,673	11	0,27	-1,202	-0,144
		1000			

Table 6: mean growth per county
Notes: basis for the color coding of the Norwegian map. "County" presents the names of the 19 Norwegian counties. "Deviation from Mean zGrowth": average deviation from mean of the standardized growth mindset measure in Norway, in the respective county. "Number of observations": number of respondents of the respective county. "Standard error": standard error of the value of the county. "95% Confidence Interval": display lower and upper value of the 95% confidence interval of the respective county.
Yellow color represents a growth mindset, given by a deviation of 0.1 or higher from the mean. Green color represents a neutral mindset, given by a deviation of -0.1 and 0.1 from the mean. Blue color represents a fixed mindset, with a deviation of -0.1 or lower from the mean.

By comparing our estimated coefficients to statistics offered by Statistics Norway (SSB) we hoped to find possible explanations for these differences. Unfortunately, the numbers given from SSB on the education level of residents 16 years of age or older (Statistics Norway, 2015) did not reveal any explanation as to why the population of some counties seem to hold more of a growth mindset than other counties population, neither did the statistics on disposable income per resident (Statistics Norway, 2014a). Some of the largest colleges and universities in Norway are located in Oslo, Bergen, Trondheim and Tromsø, providing some of the largest student environments in Norway. Because several studies have found a positive correlation between mindset and education (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012), we expected that this may lead us to find an answer for the differences between counties. Oslo and Tromsø (Troms) has a mean mindset score in the middle range, green, Bergen (Hordaland) and Trondheim (Sør-Trøndelag) have a mean mindset score in the lower range, blue, pointing more towards fixed mindset than growth.

Thus, large student environments cannot explain the geographical differences in Norway. Looking at the location of Norway's 5 largest cities Oslo, Bergen, Trondheim, Stavanger and Kristiansand, we see that they are all located in counties with a mean mindset score in the middle or in the lower range. This is consistent with our estimated coefficient in Table 2, implying that living in urban areas decreases the mindset measure score by 19.4 percent of a standard deviation. Because "City with 50.000 citizens or more" turned out to indicate a fixed mindset in Figure 5, this explanation is somewhat questionable. Trying to find other possible explanations for the differences in mindset, we looked up statistics on religious affiliation (Statistics Norway, 2014b) and businesses in the different counties (numbers employed in public administration, financial business and non-financial businesses in each county) (Statistics Norway, 2016b). Our main regression implies that having a religious affiliation tend to fix individual's mindset, decreasing the mindset measure by 15.6 percent of a standard deviation. However, the statistics were not able to confirm the estimated coefficient of this variable, neither sign nor size. The statistics offered on businesses showed no clear pattern that could explain the differences between counties either.

Thus we have to conclude that we have found no good explanation to the variations in different Norwegian counties. As mentioned, city size may explain some of the difference, but not all.

Our tests for heteroskedasticity and multicollinearity did not reveal any strong evidence that these phenomenon are present. As for normality the test indicated not a perfectly normal distribution, but closes enough to assume normality. Also, we could not find any indication of model misspecification. Further, the tests for heteroskedasticity are very sensitive to assumptions such as normality, and thus it may be that when the regressions do not inhibit perfect normality, this may influence the tests for heteroskedasticity. Since we do not find any strong evidence of heteroskedasticity and we have a fairly large sample, we conclude that we do not need to correct for heteroskedasticity.

6. IMPORTANCE OF FINDINGS

We have identified several significant predictors of a growth mindset; education, age, city size, religion and risk regarding life, but we claim that the finding of education is the most important finding for society and businesses. There seems to be more growth mindset individuals holding a high education, than a low education. Education being an important subject for society as a whole, our finding is important for developing legislations for the school system, and also how to go about teaching children. As several studies have shown, holding a growth mindset seem to increase the likelihood of doing well in school (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012), which confirms our findings that individuals with higher education seem to have more of a growth mindset.

Education is also shown to be correlated with crime and health, and have intergenerational effect, which again is important for the economic outcomes of the society. Both family income (Ben-Halima et al., 2014), investment in the human capital of one's children (Borjas, 2013), and parents' education level (Chesters, 2010; de Walque, 2009; Pfeffer, 2008) seems to have a positive impact on children's education, which we have found to have a predictive effect on the individuals' mindset. The higher the income and education level of the parents, the higher education the children are shown to complete. Further, higher education has proved to increase the wages of the employees (Barrow & Rouse, 2005, 2006; Borjas, 2013), which increases the opportunity cost of performing crime and may be a contributing factor to why studies have found a negative correlation between education and crime.

Our study indicate that the level of education predicts the individual's mindset, leading us to assume that education provides knowledge enabling the individual to digest the society's interplay differently than individuals with lower education, and thus more easily find legal ways of solving the challenges they are faced with. Glaeser et al.'s (1996) findings indicate that criminals interact with each other, at least for some types of criminal activities. Together with the finding that many inmates have completed only high school (Harlow, 2003; Statistics Norway, 2004), lower educated individuals may be exposed to crime more frequently than individuals with higher education and may be tempted to perform criminal activities more frequent.

A study performed in 2014 show that the majority of inmates in Norway have finished no more than junior high school (Revold, 2015), and the dropout rate from Norwegian High Schools are quite high, 30 percent (Chaudhary, 2011). This point to the importance of finding ways to equip students with tools to stay in school and not give up. Without a good education, the adolescents will probably look forward to a future with low wages, which is associated with higher probability for engaging in criminal activities (Machin & Meghir, 2004) and worse health (Lochner, 2011). Both crime and bad health are costly for society (Kriminalomsorgen, 2016; Røsjø, 2014), and it is therefore important from an economic standpoint, as well as from a welfare standpoint, to teach our children a mindset that gives them the absolute best conditions to manage well in life. Norway's correctional facilities costs the Norwegian state 4 billion kroners a year (Statistics Norway, 2013), in addition to damages for the society from criminal activity. It is a substantial amount of money that may be reduced by acknowledging the importance of mindset.

Health is, as mentioned, also a costly implication, in particular mental health. Røsjø (2014) claims anxiety and depression costs the Norwegian society 60 to 70 billion NOK a year. Severe depression is a large reason for disabilities. On The Global Burden of Disease Study's, it ranks as number four, and estimations indicates that it will be number two by 2020 (Murray & Lopez, 1997a; Murray & Lopez, 1997b). The health factor is also a major concern in prisons (Statistics Norway, 2004). Lochner (2011) finds that education may improve health through higher wages. This may not be as true for countries like Norway, which has socialistic healthcare, as it is for countries as the U.S. But Lochner (2011) also suggest that education may reduce the risk people take with their health. Norway pays out about 437 billion NOK in social benefits a year. This number includes pensions and the total welfare system (Statistics Norway, 2017c), but it is easy to get a picture of how large the expenses for disabilities and unemployment are.

The modern society has a rapid changing technology, putting pressure at countries to keep up with the changes to experience economic growth. The schools play a crucial part in building the knowledge platform on which further expertise can be built, educating individuals to be skilled and productive workers, and thus ensuring future prosperity by spurring innovation and technological progress (Hanushek & Woessmann, 2015).

Higher education is also shown to increase productivity (Hægeland & Klette, 1997) yielding better economical outcomes for firms. Education increases the individual's human capital,

which is very important for a nation's economic development. The long-run differences in economic growth around the world the last half century can largely be explained by the knowledge capital of the nation (Hanushek & Woessmann, 2015). Dweck and colleagues have found that schooling outcome is affected by the students' mindset, and that holding a growth mindset increases the outcome of schooling (Blackwell et al., 2007; Haimovitz et al., 2011; Yeager & Dweck, 2012). Hence a country would benefit from its citizens holding a growth mindset.

Hægeland and Klette (1997) conclude that higher wages reflect higher productivity. If wages drop, frustration increases and motivation decreases. The employee's work morale is offended, resulting in declining work effort and productivity which in the end yield a decrease in profits for the firm. Following this reasoning, a motivated employee would invest their own human capital into the firm and thus increase the profits. A firm should never take for granted the employees willingness to invest their own human capital into the firm (Rouse, 2010). Along with the findings that mindset affects management and consumer behavior, this goes to show that acknowledging the importance of mindset is not only important for social economics, but also for the economics of businesses.

Our finding of risk regarding life being a significant predictor of a growth mindset is important for prevention of accidents and disabilities. Accidents and disabilities are costly for society; thus mindset is an important issue to investigate in regards to risk to help prevent future happenings.

We claim that our findings of age, city size and religion do not have particularly important implications for society, but may be important for the location of businesses and identifying what type of consumers the business wants to target. It is interesting though to see the differences, and may be applicable for further research.

7. CONCLUSION

Our most important findings are that being young and holding a high education seems to be highly significant predictors of a growth mindset, while income seems to have no predictive effect on the mindset. Other predictors where also found, and some of our expectations were met, but some variables yielded surprising results by not being significant predictors. We could not reject Hypotheses 1 and 4, and thus conclude that education and risk regarding life

are significant predictors of a growth mindset; when education and willingness of risk regarding life increases, mindset measure increases and indicates more of a growth mindset. We do reject Hypotheses 2 and 3, and thus conclude that we found no predictive effect on mindset from income and risk regarding money.

As mentioned, having completed 3 years of college or university education predicts more of a growth mindset. This estimated coefficient is highly significant. Surprisingly, income does not seem to predict an individual's mindset. However, age is highly significant and negative, indicating that aging fixes the individual's mindset. So does living in urban areas and being religious. The two risk variables differed both concerning the sign and the significance level. Risk regarding money does not seem to predict an individual's mindset, but risk regarding life predicts a growth mindset. Taken together, our findings indicate that individuals with a high education, young, not religious, living in non-urban areas, and embracing risk regarding life hold more of a growth mindset than individuals with a low education, older, risk-averse towards risk regarding life, religious and living in urban areas. An important implication of our findings is that mindset may be more important for social, as well as business economics than earlier acknowledged, and that we may have to look to the education system to better the outcome for the society. Our findings do not point to a causal relationship, but they indicate that there is a relationship. Whether the predictors we found are the cause of a growth mindset, or a growth mindset is the reason why these individuals hold these qualities, is a question for further research. Other topics for further research are investigating whether there are differences between Norwegian data and results from other countries. If so, maybe mindset is related to culture. It would also be interesting to investigate why income is not significant. What other factors may be impacting income, eliminating the predicting effect of income on mindset. Why does not income predict mindset like education does, when education and income are found to be positively correlated?

Finally, an investigation into why we find differences between the Norwegian counties would also be interesting. There may be differences in how many is employed in different sectors, and which sectors is overrepresented in the different counties that can explain the county differences, or maybe number of immigrants make up a significant predictive effect.

REFERENCES

Baddeley, M. (2013). *Behavioural economics and finance*. London: Routledge.

Barrow, L., & Rouse, C. E. (2005). Do Returns to Schooling Differ by Race and Ethnicity? *American Economic Review, 95*(2), 83-87. doi:http://dx.doi.org/10.1257/000282805774670130

Barrow, L., & Rouse, C. E. (2006). The economic value of education by race and ethnicity. *Economic Perspectives.* Retrieved from http://web.a.ebscohost.com/ehost/detail/detail?sid=1c6c08af-85c8-4007-a391-d1d8329a1604%40sessionmgr4010&vid=0&hid=4206&bdata=JnNjb3BlPXNpdGU%3d#AN=0862946&db=eoh

Bassi, L., Harrison, P., Ludwig, J., & McMurrer, D. (2004). The Impact of U.S. Firm's Investments in Human Capital on Stock Prices. Retrieved from http://www.mtdiabloastd.org/Resources/Documents/Meetings/2010-07%20Gina%20Jesse%20Impact%20on%20Stock%202004%20research-Bassi.pdf

Ben-Halima, B., Chusseau, N., & Hellier, J. (2014). Skill premia and intergenerational education mobility: The French case. *Economics of Education Review, 39*, 50-64. doi:http://dx.doi.org/10.1016/j.econedurev.2013.12.004

Bénabou, R., & Tirole, J. (2016). Mindful Economics: The Production, Consumption, and Value of Beliefs †. *Journal of Economic Perspectives, 30*(3), 141-164. doi:http://dx.doi.org/10.1257/jep.30.3.141

Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit Theories of Intelligence Predict Achievement Across an Adolescent Transition: A Longitudinal Study and an Intervention. *Child Development, 78*(1), 246-263. doi:http://dx.doi.org/10.1111/j.1467-8624.2007.00995.x

Borjas, G. J. (2013). *Labor economics* (6th ed. ed.). New York: McGraw-Hill.

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-Sets Matter: A Meta-Analytic Review of Implicit Theories and Self-Regulation. *Psychological Bulletin, 139*(3), 655-701. doi:http://dx.doi.org/10.1037/a0029531

Card, D., & Krueger, A. B. (1992). Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States. *Journal of Political Economy, 100*(1), 1-40. doi:http://dx.doi.org/10.1086/261805

Chaudhary, M. (2011, 5. December 2011). Sju av ti fullfører videregående opplæring. Retrieved from https://www.ssb.no/utdanning/artikler-og-publikasjoner/sju-av-ti-fullforer-videregaaende-opplaering

Chesters, J. (2010). Has the effect of parents' education on child's education changed over time? Retrieved from https://www.cbe.anu.edu.au/researchpapers/cepr/DP637.pdf

de Walque, D. (2009). Parental Education and Children's Schooling Outcomes: Evidence from Recomposed Families in Rwanda. *Economic Development and Cultural Change, 57*(4), 723-746. doi:http://dx.doi.org/10.1086/598764

Dweck, C. S. (1999). *Self-theories : their role in motivation, personality, and development*. New York: Psychology Press.

Dweck, C. S. (2006). *Mindset the new psychology of success*. New York: Random House Inc.

Erdley, C. A., & Dweck, C. S. (1993). Children's Implicit Personality Theories as Predictors of Their Social Judgments. *Child Development, 64*(3), 863-878. doi:http://dx.doi.org/10.1111/j.1467-8624.1993.tb02948.x

Feldman, S. S., & Elliott, G. R. (1990). *At the threshold : the developing adolescent*. Cambridge, Mass: Harvard University Press.

Glaeser, E. L., Sacerdote, B., & Scheinkman, J. A. (1996). Crime and Social Interactions. *The Quarterly Journal of Economics, 111*(2), 507-548. doi:http://dx.doi.org/10.2307/2946686

Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology, 24*(6), 645-662. doi:http://dx.doi.org/10.1016/j.appdev.2003.09.002

Haimovitz, K., Wormington, S. V., & Corpus, J. H. (2011). Dangerous mindsets: How beliefs about intelligence predict motivational change. *Learning and Individual Differences, 21*(6), 747-752. doi:http://dx.doi.org/10.1016/j.lindif.2011.09.002

Hansson, B., Johanson, U., & Leitner, K.-H. (2004, 2004). The impact of human capital and human capital investments on company performance. Evidence from literature and European survey results Retrieved from http://www.cedefop.europa.eu/files/BgR3_Hansson.pdf

Hanushek, E. A., & Woessmann, L. (2015). *The knowledge capital of nations : education and the economics of growth* CESifo book series The knowledge capital of nations, *CESifo Book Ser*

Harlow, C. W. (2003, January 2003). Education and Correctional Populations Retrieved from https://www.bjs.gov/content/pub/pdf/ecp.pdf

Heslin, P. A., Latham, G. P., Don Vandewalle, G. P., & Zedeck, S. (2005). The Effect of Implicit Person Theory on Performance Appraisals. *Journal of Applied Psychology, 90*(5), 842-856. doi:http://dx.doi.org/10.1037/0021-9010.90.5.842

Heslin, P. A., Vandewalle, D., & Latham, G. P. (2006). KEEN TO HELP? MANAGERS' IMPLICIT PERSON THEORIES AND THEIR SUBSEQUENT EMPLOYEE COACHING. *Personnel Psychology, 59*(4), 871-902. doi:http://dx.doi.org/10.1111/j.1744-6570.2006.00057.x

Hægeland, T., & Klette, T. J. (1997). *Do higher wages reflect higher productivity? : education, gender and experience premiums in a matched plant-worker data set* Discussion papers (Statistisk sentralbyrå. Forskningsavdelingen : online), Vol. no. 208. Retrieved from http://www.ssb.no/a/publikasjoner/pdf/DP/dp_208.pdf

King, R. B. (2012). How you think about your intelligence influences how adjusted you are: Implicit theories and adjustment outcomes. *Personality and Individual Differences, 53*(5), 705-709. doi:http://dx.doi.org/10.1016/j.paid.2012.05.031

Kriminalomsorgen. (2016). *Årsrapport 2015*. Retrieved from www.kriminalomsorgen.no: http://www.kriminalomsorgen.no/getfile.php/3520937.823.ffutrawfqr/%C3%85rsrapport+2015+for+kriminalomsorgen.pdf

Kriminalomsorgen. (2017, 11. May 2017). Utdanning og opplæring. Retrieved from http://www.kriminalomsorgen.no/utdanning-og-opplaering.237883.no.html

Lazear, E. P., & Gibbs, M. (2014). *Personnel economics in practice* (3rd ed. ed.).

Lewis, M., Alessandri, S. M., & Sullivan, M. W. (1992). Differences in Shame and Pride as a Function of Children's Gender and Task Difficulty. *Child Development, 63*(3), 630-638. doi:http://dx.doi.org/10.1111/j.1467-8624.1992.tb01651.x

Li, H., Liu, P. W., & Zhang, J. (2012). Estimating returns to education using twins in urban China. *Journal of Development Economics, 97*(2), 494-504. doi:http://dx.doi.org/10.1016/j.jdeveco.2011.05.009

Lochner, L. (2011). Non-Production Benefits of Education: Crime, Health, and Good Citizenship. Retrieved from http://www.nber.org/papers/w16722.pdf

Machin, S., & Meghir, C. (2004). Crime and Economic Incentives. *Journal of Human Resources.* Retrieved from http://web.a.ebscohost.com/ehost/detail/detail?sid=47ff21e3-b698-4ca6-ba5d-9f07ea602645%40sessionmgr4008&vid=0&hid=4206&bdata=JnNjb3BlPXNpdGU%3d#db=bth&AN=15213902

Mathur, P., Chun, H. H., & Maheswaran, D. (2016). Consumer mindsets and self-enhancement: Signaling versus learning. *Journal of Consumer Psychology, 26*(1), 142-152. doi:http://dx.doi.org/10.1016/j.jcps.2015.06.007

Mueller, C. M., Dweck, C. S., & Kruglanski, A. W. (1998). Praise for Intelligence Can Undermine Children's Motivation and Performance. *Journal of Personality and Social Psychology, 75*(1), 33-52. doi:http://dx.doi.org/10.1037/0022-3514.75.1.33

Murphy, M. C., & Dweck, C. S. (2016). Mindsets shape consumer behavior. *Journal of Consumer Psychology, 26*(1), 127-136. doi:http://dx.doi.org/10.1016/j.jcps.2015.06.005

Murray, C., & Lopez, A. (1997a). Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *The Lancet, 349*(9063), 1436-1442. doi:http://dx.doi.org/10.1016/S0140-6736(96)07495-8

Murray, C. J. L., & Lopez, A. D. (1997b). Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *The Lancet, 349*(9064), 1498-1504. doi:http://dx.doi.org/10.1016/S0140-6736(96)07492-2

Norstat. (2016). Panel Book.   Retrieved from http://www.norstat.no/methods/online-datainnsamling/

Pfeffer, F. T. (2008). Persistent Inequality in Educational Attainment and its Institutional Context. *European Sociological Review, 24*(5), 543-565. doi:http://dx.doi.org/10.1093/esr/jcn026

Revold, M. K. (2015). *Innsattes levekår 2014*. Retrieved from ww.ssb.no: https://www.ssb.no/sosiale-forhold-og-kriminalitet/artikler-og-publikasjoner/_attachment/244272?_ts=150b8c1bce0

Rhodewalt, F. (1994). Conceptions of Ability, Achievement Goals, and Individual Differences in Self-Handicapping Behavior: On the Application of Implicit Theories. *Journal of Personality, 62*(1), 67-85. doi:http://dx.doi.org/10.1111/j.1467-6494.1994.tb00795.x

Ross, D. (1997, Dec 9 2014). Game Theory.   Retrieved from https://plato.stanford.edu/entries/game-theory/

Rouse, W. B. (2010). *The Economics of Human Systems Integration : Valuation of Investments in Peoples Training and Education, Safety and Health, and Work Productivity* (Vol. v.72). Hoboken: Wiley.

Røsjø, B. (2014, 23. May 2017). Angst og depresjon koster mest.   Retrieved from http://forskning.no/psykiske-lidelser-eu-okonomi/2014/04/angst-og-depresjon-koster-mest

Spaeter, S. (2016). DO SELF-THEORIES ON INTELLIGENCE EXPLAIN OVERCONFIDENCE AND RISK TAKING? A Field Experiment.   Retrieved from http://www.beta-umr7522.fr/productions/publications/2016/2016-11.pdf

Statistics Norway. (2004, 18. February 2004). Levekårsproblemer blant innsatte i norske fengsler. Retrieved from http://www.ssb.no/sosiale-forhold-og-kriminalitet/artikler-og-publikasjoner/levekaarsproblemer-blant-innsatte-i-norske-fengsler

Statistics Norway. (2013, 3. December 2013). Kriminalomsorgen - StatRes (opphørt), 2012. Retrieved from https://ssb.no/sosiale-forhold-og-kriminalitet/statistikker/kriminal_statres/aar

Statistics Norway. (2014a, 30.October 2016). Fylkesfordelt nasjonalregnskap, Tabell: 09797: Inntekter i husholdningene (F).   Retrieved from https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=FNRhusholdn&KortNavnWeb=fnr&PLanguage=0&checked=true

Statistics Norway. (2014b, 4.December 2014). Organisasjonsaktivitet, politisk deltakelse og sosialt nettverk, levekårsundersøkelsen, Tabell: 09145: Religiøs tilhørighet og deltakelse for personer 16 år og over, etter landsdel.   Retrieved from https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=ReligTilhLands&KortNavnWeb=orgakt&PLanguage=0&checked=true

Statistics Norway. (2015, 20. June 2016). Befolkningens utdanningsnivå, Tabell: 09429: Personer 16 år og over, etter kjønn og utdanningsnivå. Absolutte tall og prosent (K) Retrieved from https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=UtNiv03&KortNavnWeb=utniv&PLanguage=0&checked=true

Statistics Norway. (2016a, 7. March 2016). Kjønnslikestilling i utdanning og arbeidsmarked. Kjønnsdelt arbeidsmarked tross kvinnenes utdanningsforsprang.   Retrieved from http://www.ssb.no/befolkning/artikler-og-publikasjoner/kjonnsdelt-arbeidsmarked-tross-kvinnenes-utdanningsforsprang

Statistics Norway. (2016b, 21. January 2017). Virksomheter, Tabell: 10308: Virksomheter, etter foretakenes sektor og antall ansatte (K).   Retrieved from

https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=BedrSekt&KortNa
vnWeb=bedrifter&PLanguage=0&checked=true

Statistics Norway. (2017a, 22. April 2017). Befolkningens utdanningsnivå, Tabell: 06983: Personer 16
år og over, etter kjønn og utdanningsnivå (ny nivåinndeling) (K) (avslutta serie).   Retrieved
from
https://www.ssb.no/statistikkbanken/SelectVarVal/define.asp?SubjectCode=al&ProductId=al
&MainTable=UtNiv02Off&contents=&PLanguage=0&Qid=0&nvl=True&mt=1&pm=&SessID=1
3521180&FokusertBoks=1&gruppe1=Hele&gruppe2=Hele&gruppe3=Hele&gruppe4=Hele&V
S1=Landet&VS2=Nivaa03&VS3=Kjonn3&VS4=&CMSSubjectArea=&KortNavnWeb=utniv&Stat
Variant=&Tabstrip=SELECT&aggresetnr=1&checked=true

Statistics Norway. (2017b, 22. April 2017). Befolkningens utdanningsnivå, Tabell: 11293: Personer 16
år og over, etter utdanningsnivå og kjønn Retrieved from
https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=UtNiv09&KortNa
vnWeb=utniv&PLanguage=0&checked=true

Statistics Norway. (2017c, 3. April 2017). Statsregnskapets inntekter og utgifter.   Retrieved from
https://ssb.no/offentlig-sektor/statistikker/statsregn/kvartal

Walker, I., & Zhu, Y. (2011). Differences by degree: Evidence of the net financial rates of return to
undergraduate study for England and Wales. *Economics of Education Review, 30*(6), 1177-
1186. doi:http://dx.doi.org/10.1016/j.econedurev.2011.01.002

Wheeler, S. C., & Omair, A. (2016). Potential growth areas for implicit theories research. *Journal of
Consumer Psychology, 26*(1), 137-141. doi:https://doi.org/10.1016/j.jcps.2015.06.008

Yeager, D. S., & Dweck, C. S. (2012). Mindsets That Promote Resilience: When Students Believe that
Personal Characteristics Can Be Developed. *Educational Psychologist, 47*(4), 302-314.
doi:http://dx.doi.org/10.1080/00461520.2012.722805

Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., . . . Dweck, C. S.
(2016). Using Design Thinking to Improve Psychological Interventions: The Case of the
Growth Mindset during the Transition to High School. *Journal of Educational Psychology,
108*(3), 374-391. doi:http://psycnet.apa.org/doi/10.1037/edu0000098

Yeager, D. S., & Walton, G. M. (2011). Social-Psychological Interventions in Education: They're Not
Magic. *Review of Educational Research, 81*(2), 267-301.
doi:http://dx.doi.org/10.3102/0034654311405999