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The secret of fear and greed behind financial decision making

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Master Thesis

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Table of contents

Preface

The master thesis is considered as the concluding piece of our four-year-long education of Commercial Sciences at the University of Ghent. It is with some pride and satisfaction that we, Magalie Breda and Eveline Van Berlamont, present our thesis 'The secret of fear and greed behind financial decision making' as a part of our Master in Finance and Risk Management. This paper is partly based on our bachelor thesis 'Angst, Hebzucht en Financiële Beslissingen'.

The months of preparation, implementation and execution weren't always easy. The paper turned out to be a bulky project. The combination of writing our master thesis and doing our internship at KPMG demanded a considerable degree of discipline and perseverance. The two of us made every effort to comprehend the interesting though very scientific literature covering our subject. Looking back at what we have written, we can conclude that we are satisfied with the outcome of this multidisciplinary and challenging research.

We would like to make use of this opportunity to thank a few people. Firstly, a word of thanks goes to our promoter Garo Garabedian. He assisted us during this process and guided us when we were experiencing some difficulties. Professor Jos Meir and professor Mustafa Disli really helped by letting us implement our experiment during their class. Many thanks to all the people who have completed the survey. Furthermore, we would like to address a word of gratitude to Tom Fiers, who was our contact person at the University Hospital of Ghent, and the four people who were willing to participate with the experiment and to provide us saliva samples. A final word of thanks goes to the people who have read over our work.

Abstract

Investors are prone to make the same mistakes over and over again. Securities are bought high out of greed and sold low out of fear, despite knowing it nullifies their profits (Richards, 2010). The hypothesis of the Homo Economicus, fully rational according to the neoclassical theory, doesn't seem to exist in financial markets. Both behavioral economics and neuroeconomics may provide insights in order to design a more accurate model of the financial decision making process.

The underlying neurological mechanisms of greed find their origin in de projection of dopamine into the ventral striatal nucleus accumbens. Activation of the nucleus accumbens, activation of the ventral striatum and the presence of testosterone make people willing to take risks. On the contrary, risk averse behavior originates in the activation of the amygdala and the anterior insula. In stressful situations, cortisol appears to be the hormone that is released when people are overwhelmed by fear.

The experimental design tries to find an answer to the research question 'What is the impact of fear and greed on financial decisions?' by the means of the statistical tool SPSS. Throughout the experiment some statements were verified or falsified. Concretely, it is found that fearful people, characterized by higher levels of IRI and cortisol, take risk averse decisions while greedy people, characterized by higher levels of SDO and testosterone, take risk seeking decisions. The male part of the participants tends to modify their financial decisions due to exogenous factors and visual stimuli, while the female counterpart demonstrates less variability in their financial decision making. Only in the context of excitement, men take riskier choices than women. The younger the people, the more willing they are towards taking financial risks. Inexperienced participants are not inclined to take financial risks. Once someone has some degree of experience in the financial sector, the risk-taking behavior expands. Some of our findings are in line with prior academic literature, while another part of our results contradicts former writings.

Don't let fear and greed have the upper hand, but be aware of these emotions in order to optimize and rationalize the financial decision making process.

1 Introduction

"Be fearful when others are greedy and greedy when others are fearful."

(Warren Buffett)

Although the theory of the neoclassical economy appears to be the prevailing approach of the decision making process, both behavioral economics and neuroeconomics can provide an important contribution.

Since this thesis is written in the context of the Master Finance and Risk Management, the focus goes to financial decision making. Following the example reported by de Freitas (2013), the paper elaborates a multidisciplinary research. This approach seems to be relevant on both scientific and social level. New research publications in the journal Neuron imply that many of the financial decisions are influenced by biological and neurological impulses. De Martino (in: de Freitas, 2013) states that it is no longer about 'which' decisions are made but 'how' decisions are made. In order to conduct a multidisciplinary research, Benedetto De Martino (a neuroscientist) teamed up with Peter Bossaerts (a finance professor) and Colin Camerer (a behavioral economist). "Collaboration between these academic disciplines was key" (de Freitas, 2013, p. 1). The emerging fields of behavioral finance and neuroeconomics may contribute to the explanation of anomalies in financial markets. Both disciplines can be considered as a valuable supplement to the neoclassical financial theory. The latter one dominates financial analyses. "Behavioral finance takes explicit account of psychological factors that are excluded from the conventional financial analysis" (Fromlet, 2001, p. 63). Moreover, the interplay between behavioral finance and experimental economics has proved its usefulness. The interaction between the two research fields has resulted in a better understanding of the financial markets and recommendations for institutional design (LabSi Conference, 2014). Glimcher (in: Tommasi, Peterson & Nadel, 2009) presumes that the combination of economic and psychological approaches can investigate thoroughly how the brain works. Furthermore, the guiding factors of one's choice behavior are examined. In the social field, neuroscience has several applications. Neuromarketing seems to be the best known. An increasing amount of companies makes use of this discipline (Debruyne, 2013). However, Van Roy and Verstreken (2011) underline the ethical questions that arise when neuroscience is used to control one's brain activity. Anyway, neuroscience should be given a chance to develop, because "to understand the market, we must understand the brain" (de Freitas, 2013, p. 1).

The objective of this master thesis is to provide an insight into the research question: "***What is the impact of fear and greed on financial decisions?***" This theorem will be explored profoundly by putting into question following statements:

- *Fearful people take risk averse decisions while greedy people take risk seeking decisions.*
- *Emotions influence the decision making of women more than men.*
- *Women are more risk averse than men.*
- *Older people tend to take more risk averse decisions than younger people.*
- *The financial decision making of people with financial experience is less risk seeking than people without financial experience*.

Our multidisciplinary research commences with a profound literature review, in which behavioral aspects (personality traits) and neurological aspects (brain areas and hormones) are expounded. The experimental part of the study is operationalized by a survey. A questionnaire tries to bring into the picture the interplay between financial decisions and behavioral characteristics. The statistical part of the research is carried out by the means of SPSS. In addition, some saliva samples are collected in order to measure hormones, which in turn can be linked to the neurological aspect. Throughout the period of preparation and the search of academic literature, little papers were traced that are preoccupied with the three disciplines (finance, behavioral economics and neuroeconomics). Nevertheless, such studies may lead to a better understanding of the human decision making process and scientifically substantiated policy recommendations. It is not our goal to provide advice to improve the policy of institutions. Our objective is to give recommendations, that are useful for investors and the average man, in order to optimize and rationalize their decisions. The paper finishes by presenting an extensive list of references and an overview of figures and tables. Appendices may provide elaborated and additional information.

2 Literature review

2.1 Some schools of economic thought

2.1.1 Neoclassical economics

The theory of neoclassical economics assumes that mankind acts like a Homo Economicus. Autonomous preferences, rational choices and the pursuit of self-interest are the main characteristics of the economic man (De Clercq, 2006). A second assumption of the neoclassical theory is the Efficient Market Hypothesis. This theorem, developed by Eugene Fama, can be summarized by the following sentence: "prices fully reflect all available information" (Lo, 2007, p. 2). The literature concerning neoclassical economics stresses the concept of rationality. In reality, however, there are many cases of irrational behavior. "Critics of the Efficient Markets Hypothesis argue that investors are often—if not always—irrational, exhibiting predictable and financially ruinous biases such as overconfidence (Barber & Odean, 2001; Gervais & Odean, 2001; Fischoff & Slovic, 1980), overreaction (DeBond & Thaler, 1986), loss aversion (Odean, 1998; Shefrin & Statman, 1985; Kahneman & Tversky, 1979), herding (Huberman & Regev, 2001), psychological accounting (Tversky & Kahneman, 1981), miscalibration of probabilities (Lichtenstein, Fischoff & Phillips, 1982) and regret (Clarke, Krase, & Statman, 1994; Bell, 1982). The sources of these irrationalities are often attributed to psychological factors—fear, greed, and other emotional responses to price fluctuations and dramatic changes in an investor's wealth" (Lo & Repin, 2002, p. 323).

The previous paragraph briefly highlights the limitations of the neoclassical theory. Other disciplines, such as neuroscience and behavioral economics, try to complete the statements related to human behavior. Lo, Repin and Steenbarger (2005) point out that the notions of rationality in decision making and emotions are complementary.

2.1.2 Behavioral economics

"Standard economics assumes that we are rational… But we are all far less rational in our decision making than standard economic theory assumes. Our irrational behaviors are neither random nor senseless—they are systematic and predictable. We all make the same types of mistakes over and over, because of the basic wiring of our brains."

(Ariely, 2008, p. 239)

In the working paper of Mullainathan and Thaler (2000) a definition of behavioral economics is given, namely "Behavioral Economics is the combination of psychology and economics that investigates what happens in markets in which some of the agents

display human limitations and complications" (p. 2). The goal of behavioral economics is not to reject the neoclassical theory, but to complement it. Proponents of behavioral economics believe that the improvement of the psychological underpinnings of economic analysis will be beneficial for economics. This discipline could generate new theoretical insights which, in turn, could lead to better predictions of field phenomena and better policies (Camerer & Loewenstein, 2002). The authors emphasize that the neoclassical approach provides a theoretical framework that is applicable for various forms of behavior. Most of the papers in behavioral economics relax only one or two assumptions, so that psychological realism increases. The modified presumptions are not the central ones of the neoclassical approach. They generally concern the notions of human limits, the ability to make calculations, willpower and self-interest.

Behavioral finance, on which this thesis will focus, is a component of behavioral economics. Shefrin (2002) defines this field of study as "the study of how psychology affects finance" (p. ix). The incorporation of psychology is valuable because it describes the foundation of human desires, motivations and goals. Errors and biases, which affect a variety of investors, traders, strategists, managers and executives, find their explanation in psychology. The first step towards rational choices is to be aware of the impact of psychology on the financial environment and the financial decision making of oneself and others. Although the modern portfolio theory presumes a rational view of investors concerning risk and return, the bulk of them seems to be driven by their (irrational) emotions and motivations (Hart, 2008).

2.1.3 Neuroeconomics

"Neuroeconomics has the potential to fundamentally change the way economics is done." (Park & Zak, 2007, p. 47)

According to Bernheim (2009) neuroeconomics is an emerging discipline with the potential to add new insights to traditional economic questions. However, not all economists are equally convinced of the contribution neuroeconomics is likely to provide. For example, Rubinstein (2008) indicates the mind-body problem and the style and rhetoric of neuroeconomics. The first comment is about the fear that "decision makers will become machines with no soul" (p. 486). The second one handles the issue of the hastily drawn conclusions that are based on limited data. The objective of neuroeconomists is to acquire a better understanding of how decision making is constructed. This could lead to improved predictions of which decisions economic agents make (Bernheim, 2009). "The brain is the ultimate black box" (Abreu, n.d., p. 175). Neuroscience uses various tools and techniques to examine how the brain works. Brain imaging appears to be one of the most popular instruments. It enables scientists to

map the brain activity. Electro-encephalogram (EEG), positron emmision tomography (PET) scanning and functional magnetic resonance imaging (fMRI) are commonly used. The first one "measures the electrical activity in the brain", while the second one "measures the blood flow" (Hart, 2008, p. 9). Nowadays, the fMRI is the most frequently used technique. The tool "records changes in magnetic properties that occur in brain cells due to blood oxygenation." (Hart, 2008, p. 9). By the means of an fMRI scan, researchers can detect areas and patterns of brain activity. On the scan, the part of the active brain is highlighted because brain cells consume oxygen when they are in action (Hart, 2008). It becomes increasingly possible to measure the human thoughts and feelings directly (Abreu, n.d.). Camerer, Loewenstein and Prelec (2005) point out that the direct measurement could result in new theoretical constructs that challenge the current knowledge of the relation between mind and action.

2.2 Main drivers of irrational behavior

"There is an old saying on Wall Street that the market is driven by just two emotions: fear and greed. Although this is an oversimplification, it can often be true. Succumbing to these emotions can have a profound and detrimental effect on investors' portfolios and the stock market." (Investopedia, 2010)

As mentioned before, behavioral finance challenges the Efficient Market Hypothesis. This discipline states that markets are not rational, instead they are driven by fear and greed (Lo A. W., 2004). Emotions occur in two different states, namely hot states such as anxiety, fear and greed, and cold states of rational serenity. Investors and market participants are prone to make mistakes when they are in a hot state. It is presumable that those flaws result in (excessive) losses (Tseng, 2006). The ability to become a successful investor can be undermined by the power of emotions. This leads to actions which are opposite to what market participants should do. It frequently occurs that the emotions of greed and fear result in the irrational actions of buying high and selling low (Thomas, 2010). "Investors who follow this pattern over the long-term cause serious damage, not only to their portfolios, but also to their financial dreams" (Thomas, 2010, p. 45). Lee and Andrade (2011) mention the article 'How Greed and Fear Kill Return' (NYT, March 2010) in which Richards (2010) points out that investors frequently make the same mistake with money. Greed makes them buy stocks at a high price while fear leads to selling at a low price. This irrational behaviour is quite common in the market despite knowing it's a bad idea which results in fading returns.

In order to better understand the financial market dynamics, Westerhoff (2004) created a behavioral stock market model which includes the emotions fear and greed. Research,

based on the deterministic behavioral stock market model, could allow investors to develop better strategies and it could lead to an improved regulation of the market.

2.2.1 A glimpse into the brain

Our experimental design makes use of short movies to stimulate hot states, namely fear and greed. Therefore, this paragraph shortly describes how stimuli are processed in the brain, which part of the brain is responsible for the assimilation of emotions and the difference between controlled and automatic systems in the brain.

2.2.1.1 The processing of stimuli

Stimuli are processed successively on three different levels of the brain. These are the visual, the emotional and the rational brain.

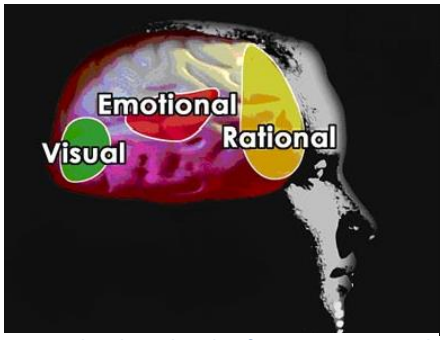


Fig. 1: The three levels of processing stimuli

The first level of the processing takes place in the *visual brain*. This part is responsible for assessing whether the stimulus is getting attention or not. It is connected to both the emotional and rational brain (Van Roy & Verstreken, 2011).

The stimuli that passed the first level are subsequently transmitted to the *emotional brain*. This section links the information of different senses. Next, the information is associated with the appropriate emotions (Van Roy & Verstreken, 2011).

Finally the *rational brain* executes the cognitive functions. Examples are solving problems, thinking abstract, etc. This part is the subject of a number of research techniques (Van Roy & Verstreken, 2011).

Although the unconscious and emotional systems underlie the decision making process, researchers pay more attention to the conscious and cognitive systems. Traditional research methods, such as surveys, examine what happens in the rational brain. Therefore it is recommended to include psychophysiological research methods, such as eye tracking, facial coding, etc. which investigates what occurs in the emotional brain and the subconsciousness (Van Roy & Verstreken, 2011). Lo and Repin (2002) devote their paper to the role of emotions on the decision making process of professional securities traders. Their findings rely on the measurement of physiological characteristics (e.g. skin conductance, respiration rate, body temperature, etc.).

This thesis focusses on the unconscious and emotional systems. Due to budgetary constraints we were not able to implement brain scans nor a sufficient amount of saliva

samples. Future research should examine this more profoundly in order to acquire a better understanding of the subconsciousness.

2.2.1.2 The anatomy of the brain

The neural processes are carried out in three different regions of the brain. These are the midbrain, the limbic system and the cortex.

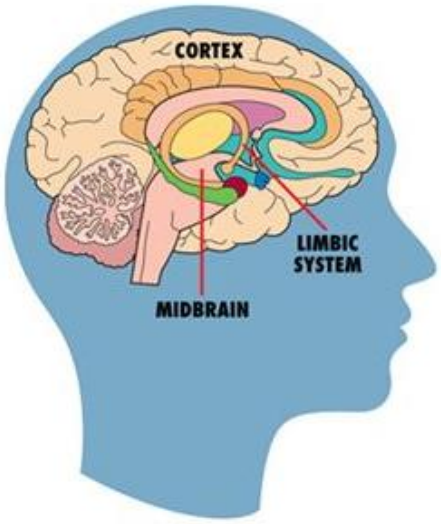


Fig. 2: Anatomy of the brain

The purpose of the *midbrain* is to regulate the vital functions, like breathing and body temperature (Hart, 2008).

The *limbic system* is known as the emotional center of the brain. This section of the brain provides the unconscious motivations of humans. The processing of information happens immediately, which leads to quick reactions and judgments. For example: in a temporary market downturn, an incitement of the limbic system causes a panic reaction amongst investors. Their reactions are based on instincts and intuitions (Hart, 2008).

Analytical thinking, calculating, planning and learning belong to the functions of the *cortex*. Investors ignore their intuition. They tend to ponder all alternatives, however, this is no guarantee to success (Hart, 2008).

Behavior finds its origin in the interplay between cognition (cortex) and emotion (limbic system). Rapid and automatic responses, like rules of thumb and heuristics, originate from emotions (Kuhnen C. M., 2009). The combination of the limbic system (quick instincts and emotions) and the cortex (analytical thinking) is the key to successful investments (Hart, 2008).

2.2.1.3 Automatic versus controlled systems

Within the brain there is a distinction between controlled and automatic processes. The controlled processes allow investors to make deliberate choices. The use of this system is quite effortful, while automatic processes come about rather effortless and are responsible for instantaneous reflexive responses (Camerer, Loewenstein & Prelec, 2005). Disli (2013) describes them in his course 'Behavioral Economics' as system 1 and system 2 decisions. The automatic processes are alligned with system 1, which is characterized by fast, unconscious and impulsive decisions. The controlled processes, on

the other hand, can be interpreted as system 2 way of thinking. The second system incorporates structured and conscious strategies. To recapulate: strong emotions, like desire, fear and panic, trigger system 1. The first system activates quick responses while well-thought planning seems to be the outcome of system 2. Sanfey, Loewenstein, McClure and Cohen (2006) acknowledge the preceding statement, but the authors emphasize that the distinction between the two processes appears to be a continuum rather than a strict dichotomy. Both systems co-operate in the majority of the cases. Problems arise when there is no collaboration between them. Investors tend to overreact positively as well as negatively (Hart, 2008).

2.2.2 Greed

"Greed may (and will) tempt you to take more risk than you are normally comfortable with in your portfolio." (Little, n.d)

2.2.2.1 The presence of greed in the market

The giddy excitement that goes together with triumph is the feeling that every investor wishes to pursue. As a consequence, investors enjoy the feeling of risk. In a positive aroused state they are prone to succumb to foolish risk (Cowen, 2006). Investors become greedy when they see others making money. They want to exploit the rising market before the opportunities fade away. When greed is the main emotion in the stock market, stock prices begin to rise. Upgoing prices are triggered by the massive buying, which is encouraged by greed (Lo C.-S., 2013). Li and Wang (2013) denote the ascending trend in the market as bullish. Determining factors for greed are, inter alia, overoptimism, overconfidence which finds its roots in the underestimation of risks and outrageous levels of desires. The definitional features of greed appear to be having a profound longing for wealth and using aggressive actions to satisfy that desire. Moreover, greed turns out to be one of the factors that causes a financial crisis (Jin & Zhou (2011) in: Li & Wang, 2013). Results of the experiment of Lo C.-S. (2013) show that greed is positively correlated with trading activities. More precisely: optimistic investors are inclined to expand their purchasing. This, in turn, leads to prices that go up and trading activities that enlarge.

2.2.2.2 Behavioral view

The market and the society as a whole are characterized by a general level of either optimism or pessimism. This has an impact on the emotions of financial decision makers. In fact, the senses of the economic participants are correlated among each other (Nofsinger, 2005). Social mood can be described as "investor sentiment that influences

stock market prices" (DeLong et al. (1990) in: Nofsinger, 2005). In short, the shared emotions, opinions and beliefs determine individual decision making. The aggregation of all those individual decisions leads to social trends (Nofsinger, 2005).

Fig. 3: The emotional curve: Greed

Positive feelings like optimism, happiness and hope are often associated with a rising social mood. However, when these emotions peak, they shift towards less positive features, e.g. overconfidence and excess (Nofsinger, 2005). Greed can be defined as "an excessive desire to get more… a primarily materialistic type of desire" (Balot (2001) p. 1 in: Wang, Malhotra & Murnighan, 2011, p. 643). "Greed is the emotion that makes us do things we would not normally do. The right amount of greed is necessary because it gives us the motivation to work at something, but when we are too greedy we will start doing things even when we know that we should not." (Milton, n.d.). Excessive greed, overconfidence and imprudent risk-taking can have disastrous consequences, e.g. bankruptcy of well-established financial institutions (Barton, 2013).

In addition, the level of social mood outlines one's perception of businesspeople and business in general. In case of high social mood, we look up at CEOs and consider bussiness as an important aspect in society. When, on the contrary, social mood is low, we see an executive as a greedy person and believe that there is a need for government intervention in business (Nofsinger, 2005).

The research in this thesis operationalizes greed by measuring the level of SDO. Pratto, Sidanius, Stallworth and Malle (1994) define Social Dominance Orientation as "one's degree of preference for inequality among social groups". The original SDO-scale contains sixteen items, which are measured using a seven-point Likert scale (Pratto, Sidanius, Stallworth & Malle, 1994). "Recent work has linked social dominance orientation (SDO) to ruthless, uncaring individuals who see the world as a competitive jungle" (Cozzolino & Snyder, 2008, p. 1420). When people with high SDO-levels are in a position in which their opportunities are threatened, the necessity to exert power is activated. The expressed SDO-levels are a reflection of someone's personality. Cozzolino and Snyder (2008) found a positive relationship between SDO and greed. This means that high SDO scores indicate a high level of greed. A negative correlation between SDO

and empathy can be found (Pratto, Sidanius, Stallworth & Malle, 1994). Therefore it is convenient to use an index of empathy to define the opposite emotion, namely fear. As a remark, it must be said that “men are more social dominance-oriented than women” (Pratto, Sidanius, Stallworth & Malle, 1994, p. 741).

2.2.2.3 Neurological view

Using brain scans, neuroscience tries to explore the functioning of the brain (Camerer, Loewenstein & Prelec, 2005). As discussed in paragraph 2.2.1.2, the limbic system allows people to make quick and automatic responses to what happens in their environment. The nucleus accumbens and the anterior insula are the main components involved in the decision making under risk. The former processes the information about gains or rewards, while the latter copes with the processing of the information about losses or punishments (Kuhnen & Knutson, 2008). When opening the black box and taking a closer look at what is happening in the brain using fMRI-scans and other techniques, researchers found a link between the activation of the nucleus accumbens, the activation of the ventral striatum and greed (i.a. Lamme, 2011, and Baddeley, 2011).

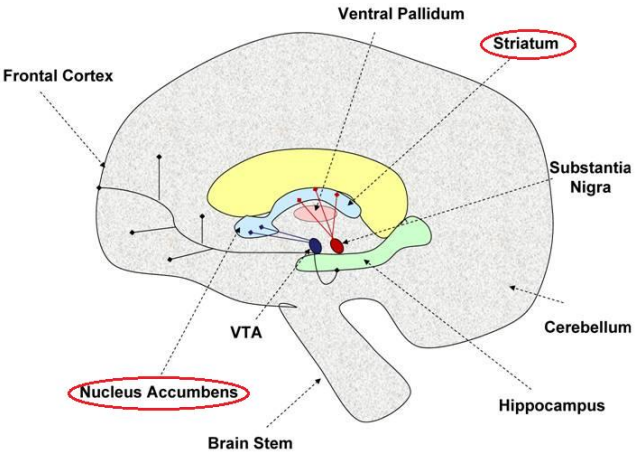


Fig. 4: Nuclues Accumbens and Striatum

Both the nucleus accumbens and the ventral striatum are located in the limbic system. Moreover, “the ventral striatum mostly consists of the nucleus accumbens, which is an important target of dopaminergic projections” (Swenson, 2006, p. 1). Research of Kuhnen (2009) shows that “dopamine is the key neurotransmitter in the limbic system for reward processing”. This hormone leads to types of behavior in which people are willing to undertake actions. When people anticipate reward, such as a monetary gain, a mechanism in the brain is set in motion. The hormone dopamine is released in the ventral striatal nucleus accumbens (Knutson, Adams, Fong & Hommer, 2001). The exudation of dopamine leads to an increased BOLD (Blood Oxygen Level Dependent) signal in the nucleus accumbens (Knutson & Gibbs, 2007). FMRI studies show that enlarged levels of BOLD appear when people anticipate monetary gains (Knutson et al., 2001). Furthermore, the anticipation of gain can be associated with positive aroused feelings, like excitement, which in turn seem to promote risk taking. (Knutson, Taylor, Matthew, Peterson & Glover, 2005). Also, Knutson, Wimmer, Kuhnen and Winkielman

(2008) give evidence that the “anticipation of both financial and nonmonetary rewards increases NAcc activation”. As a consequence, the “activation of the NAcc can be seen as a neural marker of positive arousal (p. 3)”. Hence, “NAcc activation preceded both risky choices and risk-seeking mistakes. These findings are consistent with the hypothesis that NAcc represents gain prediction (Knutson et al., 2001)” (Kuhnen & Knutson, 2005, p. 766). The riskiness of the chosen investment and the activation of the brain areas in question show a causal relationship. More precisely: a positive affect, activated by an ‘exciting’ visual stimulus, stimulates the nucleus accumbens before the financial decision takes place. Due to this stimulation, subjects tend to make riskier investments (Knutson et al. (2008) in: Kuhnen & Knutson, 2008). Thus, the activation of the ventral striatum predicts the tendency to purchase financial assets and to invest in risky ones (i.e. choosing stocks over bonds) (Knutson & Bossaerts, 2007). According to Khoshnevisan, Nahavandi, Bhatacharya and Bakhtiary (2008), the anticipatory neural mechanisms may attribute to the prediciton of economic decision making. In other words, emotion has a strong impact on decision making under risk. When investors experience positive emotions, they are inclined to be more risk seeking and more confident in their conviction. Their goal is to maintain a positive affect and avoid a negative one (Kuhnen & Knutson, 2008). In achieving this, investors simply ignore new information that contradicts their actions (Shefrin, 2002, and Kuhnen & Knutson, 2008). Einhorn and Hogarth (1978) define the search for confirming evidence and the ignoring of disconfirming evidence as the illusion of validity (in: Shefrin, 2002, p. 64). All this leads to irrational investments and deficient learning (Kuhnen & Knutson, 2008).

The findings regarding the neurological explanation of decision making under risk appears to be a meaningful contribution to other literature which focuses on “the link between mood and stock returns (Saunders, 1993, Hirshleifer and Shumway, 2003), between overconfidence and trading (Barber & Odean, 2000; Gervais & Odean 2001; Grinblatt & Keloharju, 2006) and between overconfidence and managerial decisions (Heaton, 2002; Malmendier & Tate, 2005; Gervais et al., 2005; Ben-David et al., 2007)” (Kuhnen & Knutson, 2008, p. 4). Especially the fact that emotions lie at the origin of many financial choices is of great importance.

Are there any measurable hormones that predict the level of risk-taking?

Using saliva samples, scientists can measure both the level of cortisol and testosterone. When someone experiences stress, cortisol is released into the brain. This hormone makes him more alert. Both risk and uncertainty, which are measurements of market volatility, show a connection with the level of cortisol. Testosterone, on the other hand, increases someone’s fearlessness and willingness to take risk (Medeiros, 2013). In other

words, “testosterone is the molecule of irrational exuberance and cortisol the molecule of irrational pessimism” (John Coates in: Medeiros, 2013). However, it must be kept in mind that hormones are not only the output of brain processes, but they are also an input for some brain mechanisms. Thus they affect human behavior (Bruce McEwen in: (Medeiros, 2013). Sensation-seeking can be defined as “persuing and taking risks in order to experience a variety of new sensations” (Zuckerman, 1979; McCourt, Gurrera & Cutter, 1993 in: Rosenblitt, Soler, Johnson & Quadagno, 2001; p. 396). Based on this definition, the link between sensation-seeking and risk-taking arises. Many studies have examined the biological origin of those types of behavior. Scientists found a link between the level of sensation-seeking and men’s testosterone levels (e.g. Daitzman, Zuckerman, Sammelwitz & Ganjam, 1978; Daitzman & Zuckerman, 1980; Bogaert & Fisher, 1995; Gerra, Avanzini, Zaimovic, Sartori, Bocchi, Timpano, Zambelli, Delsignore, Gardini, Talarica & Brambilla, 1999 in: Rosenblitt et al., 2001, p. 396) and cortisol levels (Netter, Henning & Roed, 1996; Wang et al., 1997 in: Rosenblitt et al., 2001, p. 396). Christion Cook (in: Medeiros, 2013) underlines the connection between testosterone and the perception of winning, and not the winning itself. Apicella, Dreber, Campbell, Gray, Hoffman and Little (2008) found a positive correlation between testosterone and risk-taking. Men with high testosterone levels tend to be more risk-taking.

2.2.3 Fear

“Fear is the emotion that stops us from doing things that might be too risky. In the right quantity, fear is obviously an emotion that we need, but when fear becomes too great we can be prevented from doing things that might be necessary.” (Milton, n.d.)

2.2.3.1 The presence of fear in the market

Fear can be described as an “uncertain feeling towards situational control” (Lerner & Keltner (2000, 2001) in: Li & Wang (2013), p. 48). Future events are evaluated pessimistically when people experience fear (Li & Wang, 2013). This emotion triggers the automatic ‘fight or flight’ response, which constitutes a basic reaction of all mammals (Lo A. W., 2011). Lee and Andrade (2011) point out that fearful investors tend to sell their stocks earlier. So, fear can be seen as a bearish behavior to which investors act. This results in decreasing stock prices, called a bear market (Li & Wang, 2013). People become anxious when they think about costs. As a consequence, they seek salvation in safe investment options (Cowen, 2006). Moreover, it is proven that fear is negatively associated with trading activities. Research shows that investors are inclined to diminish their purchasing volume and market liquidity (Lo C.-S., 2013). The author best summarizes the features of investors experiencing this emotion. The investors are

fearful of uncertainty and prove to be risk averse. They settle for low-risk, low-return securities. In quest of the less risky assets, investors sell their current portfolio to avoid further losses.

2.2.3.2 Behavioral view

As described in paragraph 2.2.2.2, social mood has an impact both in positive and negative way.

A fearful investor assumes that his individual feelings are common with those of other investors (Lee & Andrade, 2011). This can result in an overall feeling of pessimism that dominates the market (Nofsinger, 2005). Furthermore, investors are prone to incorporate their emotions in decision making. The bulk of them will be inclined to sell their stocks when the overall mood reaches its lowest point and is marked by fear (Lee & Andrade, 2011 and Nofsinger, 2005). The collective selling behavior will end in a drop in the value of the stock (Lee & Andrade, 2011).

Fig. 5: The emotional curve: Fear

In the experimental part of this thesis, the IRI is used to quantify fear. The abbreviation IRI stands for “Interpersonal Reactivity Index” (Davis, 1980). The index traces the four aspects of empathy, namely Perspective Taking, Fantasy, Empathic Concern and Personal Distress. The original IRI consists of twenty-eight statements answered on a five-point Likert scale (Davis, 1983). Davis’ research shows that the scale concerning personal distress can be linked to the tendency to experience particular types of emotions, more precisely fearfulness, uncertainty and vulnerability. The author points out that the different scales are intercorrelated with each other. What is more, variables such as gender and age have an impact on the scales.

2.2.3.3 Neurological view

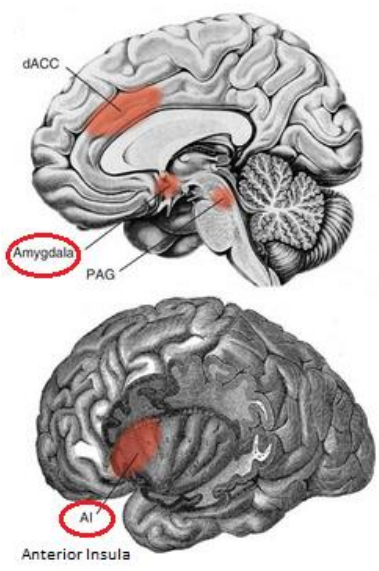


Fig. 6: Amygdala and Anterior Insula

Negative emotions such as anxiety, fear and pessimism inhibit people from taking risks. Serotonin is one of the neurotransmitters that causes people to resort to an avoidance-type behavior (Kuhnen C. M., 2009). This type of behavior finds its origin in the anterior insula. This part of the brain deals with the avoidance of aversive stimuli and the processing of information concerning losses and punishments. (Kuhnen & Knutson, 2008). The limbic system comprises several brain regions, including the amygdala (Rajmohan & Mohandas, 2007) and the insula (McGill, n.d.). According to Denny et al. (2013), both the amygdala and insula work together on the affective appraisal of aversive stimuli. In addition, the connection between the two brain areas becomes stronger when participants are exposed to negative images, which evoke anxiety. The insula has frequently been associated with basic emotions (e.g. fear) and pain processes. It receives stimuli and sends output to, inter alia, the amygdala (McGill, n.d. and Flynn, Benson & Ardila, 1999). There exists a connection between the neurotransmitter serotonin and extended fear and anxiety behavior. In other words, fearful stimuli trigger serotonin, which in turn encourages the activation of the amygdala (Hariri, et al., 2002).

Research shows that the anterior insula gets activated when people anticipate (non)monetary losses and pain (Kuhnen C. M., 2009). There seems to be a correlation between negative aroused feelings, like anxiety, and the anticipation of loss. This mechanism incites people to take risk averse decisions (Knutson et al., 2005; Paulus et al., 2003 in: Kuhnen C. M., 2009). FMRI-studies indicate that prior to riskless choices and risk-averse mistakes, the anterior insula is stimulated (Kuhnen & Knutson, 2005). This is consistent with the findings of Paulus et al. (2003), in which they state that the anterior insula represents loss prediction (Kuhnen & Knutson, 2005). Moreover, people tend to prefer selling instead of buying financial assets. If investors do purchase assets, they invest in safe ones (i.e. choosing bonds over stocks) (Knutson & Bossaerts, 2007).

Stressful circumstances stimulate the relaese of cortisol (Lighthall, Mather & Gorlick, 2009). Cortisol activates two other hormones, namely epinephrine (adrenaline) and norepinephrine (noradrenaline). When people experience fearful and anxious events, the two hormones are excessively stimulated and are to a large extent present in the body (DeMarco, 2009). Excessive levels of cortisol have an important impact on the

brain. It “dramatically changes our brain and subsequently our behavior; you become risk-averse and despondent” (Medeiros, 2013, p. 2) . According to Mazur (1995), risk-taking behavior and cortisol show an inverse relation. People with high cortisol levels are more stressful than others and less inclined to seek sensation. Many other studies support this point of view, but it must be kept in mind that researchers only examined the influence of cortisol on men and not on women (Rosenblitt et al., 2001). The reason why so little studies include women is the fact that the menstrual cycle and the use of birth control pills can have an impact on the composition of the female saliva due to an increased level of progesterone (Elverne, 2012). In general, hormone levels fluctuate during the day and during someone’s life. They are dependent of chronobiological processes, such as the sleep/awake cycles and women’s montly cycle (Clinical & Research Laboratory, 2012).

To sum up, “high levels of testosterone have been associated with dominant aggressive behavior in both men (Dabbs et al., 1995 and Dabbs & Morris, 1990) and women (Dabbs & Hargrove, 1997 and Dabss et al., 1998)” (Terburg, Morgan & van Honk, 2009, p. 216). That type of behavior is also correlated with low levels of cortisol (McBurnett et al., 1991, Vanyukov et al., 1993 and Virkkunen, 1985). High levels of cortisol, on the other hand, show a relationship with low-spirited mood (Van Honk et al., 2003 in: Terburg et al., 2009) and anxiety and obedient behavior (Brown et al., 1996 and Sapolsky, 1990 in: Terburg et al., 2009). When people are in stressful situations, their brain activates the nervous system so that the fight-or-flight mechanism takes effect. Two types of behavior can occur. The approaching behavior is the one in which people are willing to take actions. So they are rather risk-seeking. This is called the fight response where testosterone has the upper hand. The avoidant behavior by contrast, makes people risk-averse. This can be adressed to the flight response in which cortisol dominates (Terburg, Morgan & van Honk, 2009).

2.2.4 Financial bubbles and crises

“Historical accounts of financial crises suggest that fear and greed are the common denominators of these disruptive events: periods of unchecked greed eventually lead to excessive leverage and unsustainable asset-price levels, and the inevitable collapse results in unbridled fear, which must subside before recovery is possible. The cognitive neurosciences may provide some new insights into this boom/bust pattern through understanding of the dynamics of emotion and human behavior.” (Lo A. W., 2011)

2.2.4.1 What lies behind financial bubbles and crises

Basically crises are the consequence of fear, while bubbles indicate greedy attitudes.

Many investments are made on irrational basis. Greed makes investors willing to buy stocks at whatever price, so this results in overpriced assets. When the market hits a high, investors greedily buy assets. They want to purchase a large quantity of stocks too rapidly. The core of a bubble is the willingness of investors to buy assets because they believe that those assets can be sold at a higher price (Wharton University, 2009). Fear, on the other hand, may lead to a panic mechanism in which investors want to get rid of their assets and sell them at low prices. When the market hits a low, investors become fearful and start to panic. They want to sell their risky assets as fast as possible. This pattern indicates a bubble followed by a crash (Richards, 2010).

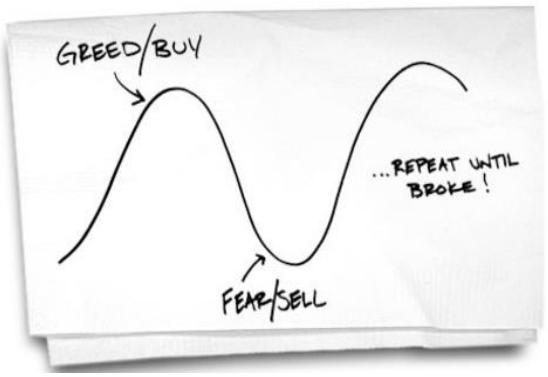


Fig. 7: Financial bubbles and crises

"Positive returns in financial markets may induce a positive affective state and make investors more willing to invest in stocks, and more confident that they have chosen the right portfolio, which will lead to increased buying pressure and future positive returns" (Kuhnen & Knutson, 2008, p. 15). When investors anticipate rewards, they feel excited which activates the nucleus accumbens. As a consequence, they are prone to risk-seeking behavior. On top of that, asset pricing bubbles are more likely to occur when naïve investors use past data as an indicator for future price developments. So they tend to buy assets that have been recently rising because they anticipate a further rise. This creates some sort of vicious circle: investors purchase assets because prices go up and the prices increase because investors are purchasing (Andrade, Odean & Lin, 2013). The prevailing optimism in the market induces investors to behave overconfident (Nofsinger, 2005). They are guided by their greed which results in ever rising prices. In the jargon, this mechanism is called a bullish market. Testosterone incites especially young male traders to take too much risk. Consequently, a bull market may be turned into a bubble and even a financial crisis (John Coates in: Solon, 2012). Increasing testosterone levels seem to be the biological reason for behavioral irrationality such as overconfidence and one's appetite for risk (Solon, 2012). In addition, when experiencing a bubble in the market, testosterone levels tend to increase even more. Investors are prone to take more financial risk, which amplifies the market's upward movement (Medeiros, 2013)

and is known as a boom (Coates J., 2012). Coates (2012) stresses that a bull market is not created by testosterone. However, the hormone inflates the bubble.

“After losses in the financial markets, investors may experience a state of negative affect which will reduce their willingness to take on more risk, and their confidence in their ability to choose stocks” (Kuhnen & Knutson, 2008, p. 15). Fear and anxiety cause investors to take risk-averse decisions (Andrade, Odean & Lin, 2013). If the market shows a downward trend, then pessimism seems to be the dominant emotion in the market (Nofsinger, 2005). The investor is guided by his fear and behaves risk-averse. He wants to get rid of his risky assets and resorts to safe investments. The terminology designates this procedure as a ‘bearish market’. The body releases cortisol when it experiences stress. Small doses of this hormone have a positive impact on one’s action. However, when there is an excess of this hormone, investors show signs of anxiety and problems in uncertain markets get magnified (Solon, 2012). Additionaly, the level of cortisol is presumed to rise in a market crash. The hormone makes investors risk averse. All this magnifies the market’s downward movement (Medeiros, 2013) and eventually results in a bust (Coates J., 2012).

As a conclusion, it can be said that “testosterone shifts traders’ risk profiles to become overly aggressive, causing bubbles. In bear markets, stress hormones cause people to be too risk averse. Risk preferences are radically unstable in the financial world” (John Coates in: Solon, 2012, p. 1).

2.2.5 Fear and Greed index

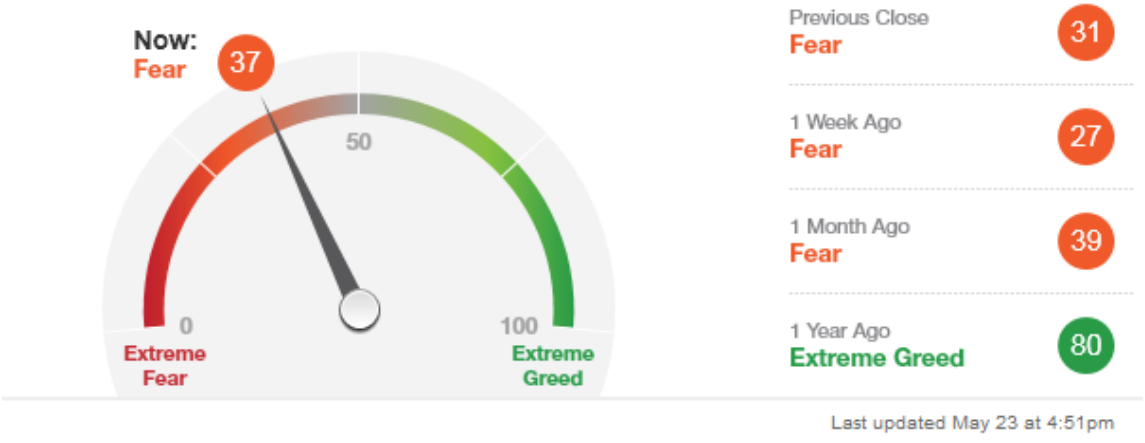


Fig. 8: Fear and Greed Index

The fear and greed index gives an answer to the question: “What emotion is driving the market?” (CNN Money, 2014). The index indicates the main emotion that influences the financial decisions of investors. The ratio uses a scale ranging from 0 to 100. Values close to 0 designate fear while values close to 100 report greed. Rates below 25 or above 75

are considered to be extreme values. Those, in turn, are interpreted as trading signals towards investors. Low values incite people to buy stocks and bonds, while high values encourage them to sell their financial securities (Göpfert, 2014). When there is too much fear in the market, stock prices plummet. When greed has the upperhand, investors bid up the stock prices to an excessive level. Seven indicators determine the ratio (CNN Money, 2014):

		Nowadays
1.	Stock Price Momentum A comparison between the S&P 500 and its 125-day moving average is made. How much does the exchange rate deviates from the average? How is the discrepancy proportionated against the normal deviation?	greed
2.	Stock Price Strength How many stocks were traded during highs and lows on the NYSE?	fear
3.	Stock Price Breadth What is the ratio between traded stocks on the rise versus those that are declining?	extreme fear
4.	Put and Call Options The put/call ratio compares the trading volume of call options (bullish) relative to the trading volume of put options (bearish).	extreme fear
5.	Junk Bond Demand What is the expected risk premium requested by people when investing in junk bonds?	neutral
6.	Market Volatility How volatile is the market? VIX measures the volatility.	neutral
7.	Safe Haven Demand Does the investor choose risky stocks or safe bonds? What are the requested returns?	neutral

Table 1: The seven indicators of the Fear and Greed Index and the perception nowadays

At the moment, the market seems to be overshadowed by fear. The index displays a value of 37, which is in great contrast with the value of 80 one year ago. This gives an indication that the sentiment fluctuates over time, which can be confirmed by figure 9.

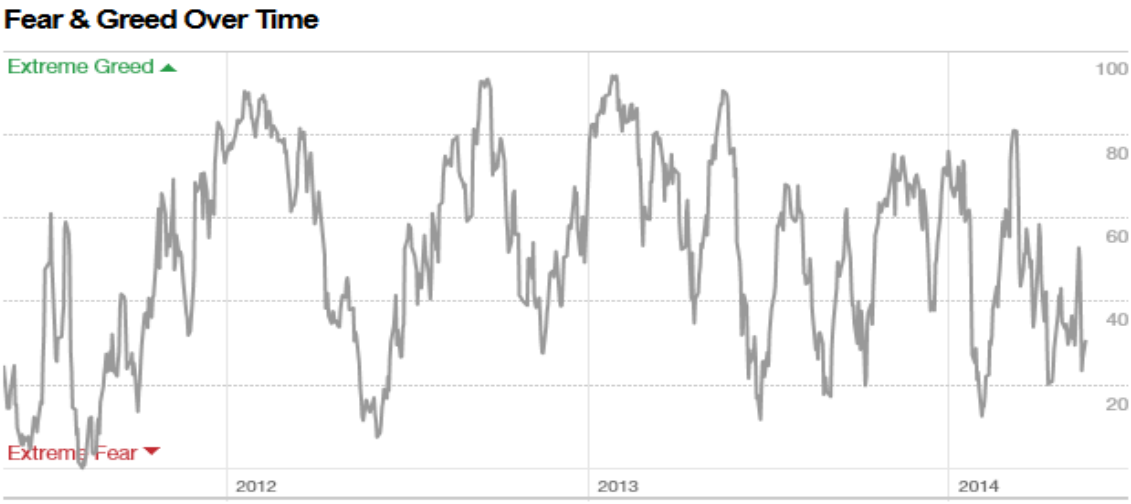
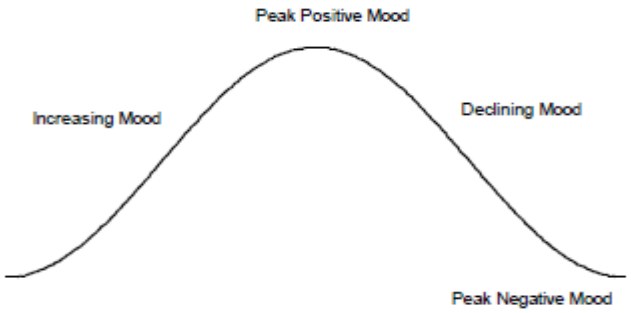


Fig. 9: Fear and Greed over time

Nofsinger (2003) states that "the general level of optimism/pessimism in society affects the emotions of most financial decision makers at the same time. This creates biased financial decisions that are correlated across society" (p. 2). This hypothesis results in three statements. Firstly, high social mood leads to the presence of optimism, which triggers a boom in investments and business activity. Low social mood, on the other hand, is correlated with pessimism and will decline the amount of investments and business activity. Secondly, decisions concerning buying or selling stocks and bonds are made rather quickly. Therefore the stock market can be seen as a measure of social mood. Thirdly, since the stock market is an indicator of the social mood, the changes in the market forecast financial and economic activity in the future.



Emotional Characteristics at Each Phase of the Social Mood Cycle

Increasing Mood	Peak Positive Mood	Declining Mood	Peak Negative Mood
Optimism	Overconfidence	Pessimism	Fear
Happiness	Euphoria	Sadness	Depression
Generous	Excess	Conservatism	Stinginess
Inclusion	Ambivalence	Exclusion	Segregation
Supportiveness	Graciousness	Defensiveness	Antagonistic
Hope	Trust	Suspicion	Mistrust

Fig. 10: Social Mood Cycle

Figure 10 shows that the social mood highly controls the waves of the financial market. “The stock market is made up of many participants who interact with each other and with society at large. Therefore, the collective level of optimism or pessimism in society is the background mood that impacts investor decisions” (Loewenstein, G., et al, 2001; in: Nofsinger, 2003; p. 13).

3 Experimental design

3.1 From theory to practice

The following section concerns the operationalization of the theory towards the experimental design. Our analysis is based on the hypothetico-deductive method. This research method derives hypotheses from a general theory. Like the deductive reasoning, general assumptions are tested on more specific cases. In those particular situations, the hypotheses are verified or falsified. The decision whether to support or refute statements is based on the results, which are obtained by gathering and analyzing data (Crossman, 2014).

The main research question of this thesis is preoccupied with the theorem: "***What is the impact of fear and greed on financial decisions?***" In order to investigate this principal question, we examine several statements. We consider the following sub questions:

- *Fearful people take risk averse decisions while greedy people take risk seeking decisions*.

Shefrin (2002) states that the financial decision making process is dependent on the prevailing dominant emotion. When fear has the upperhand, people are inclined to choose for security. When hope or greed is prevalent, profit potential gets more attention so that risk-taking behavior arises. According to Kuhnen and Knutson (2008), emotions have indeed a strong influence on one's risk-taking behavior. "Events associated with positive and arousing emotions such as excitement lead to riskier choices, while those associated with negative and arousing emotions such as anxiety lead to more risk averse choices" (p. 16).

- *Emotions influence the decision making of women more than men.*

"Women have been found to be more susceptible than men to emotional contagion in certain contexts" (Magen & Konasewich, 2011, p. 611). Our experiment wants to investigate whether exogenous factors and visual stimuli affect financial decision making. Consequently, we expect women to experience a greater impact of the displayed film fragment on their decision making than men do.

- *Women are more risk averse than men*.

Many researchers have already considered the subject of women being more risk averse than men (Park & Zak, 2007; Sapienza, Zingales, & Maestripieri, 2008; Schubert, Brown, Gysler, & Brachinger, 1999). According to Eckel and Grossman (1998), men act more out

of self-interest than women do. It can be stated that men are inclined to behave more greedy and their moral feelings are less negative than women's (Wang, Malhotra & Murnighan, 2011). A close correlation between greed, overconfidence and risk taking has already been pointed out (Barton, 2013).

- *Older people tend to take more risk averse decisions than younger people*.

"A PaineWebber study found that younger investors were more optimistic than older investors were" (Shefrin, 2002, p. 134). Optimism may be a stepping stone towards overconfidence, which in turn may lead to riskier choices. "Most financial planners advise their clients to shift their investments away from stocks and toward bonds as they age" (Jagannathan & Kocherlakota, 1996, p. 11). The advisors' point of view is that stocks outperform bonds in the long term. Older people don't have as many years ahead of them, like young people do. So it is better to invest in a safer option such as bonds. According to MacCrimmon and Wehrung (1990) risk aversion increases with the age "because older people have less time to recover from a large financial loss" (p. 422).

- *The financial decision making of people with financial experience is less risk seeking than people without financial experience*.

Investors with little experience have more confidence in the belief that they can beat the market (Shefrin, 2002). However, overconfidence can easily proceed to greed, which in turn may lead to more risk-taking behavior. As experience expands, the level of overconfidence diminishes. This explains why young inexperienced investors, who tend to be more overconfident, administer riskier portfolios. The findings of previous studies concerning the relationship between risk-taking and experience are rather contradictory (Brozynski, Menkhoff, & Schmidt, 2004). Some researchers notice a negative relation between the two (i.a. Grahan, 1999; Li, 2002 and Boyson, 2003), while others find a positive connection (i.a. Chevalier and Ellison, 1999b; Hong et al., 2000 and Lamont, 2002).

3.2 Design and methodology

3.2.1 Population, sample and sampling framework

People who have to deal with financial choices and take financial decisions at some point of their life represent the population. The aim of this thesis is to investigate their behavior and, ultimately, make recommendations to rationalize their way of acting in order to optimize their decision making.

Our sample consists of Flemish people between 18 and 70 years old. In our opinion, on average, people start to build up their financial wealth at the age of 18. They are officially considered to be an adult when reaching the age of 18 and start to manage their own affairs. By the age of 70 the capacity of managing their financial portfolio decreases. However, this is an estimation. The ability to organize one's finances varies from person to person. Students represent the main part of our sample because they are easy to reach. Furthermore students are popular in research, for the simple reason they're cheap or even free in some cases (Brookshire, 2013). In order to end up with representative results, we have tried to include people of different ages.

The problem of the WEIRD population is something we must be aware of. WEIRD is the abbreviation of Western, Educated, Industrialized, Rich, and Democratic. A number of academic papers uses samples which are entirely drawn from WEIRD societies. Results turn out to be unrepresentative so that generalization is not possible (Henrich, Heine & Norenzayan, 2010). The authors point out that "96% of psychological samples come from countries with only 12% of the world's population" (p. 63). A second issue is that adolescents and students have another point of view regarding risk evaluation than adults. However, studies that involve WEIRD people do have value and can be generalized to the rest of the WEIRD population (Brookshire, 2013). The key rule is that both researchers and readers must be aware of the applied sample, which consists of WEIRD people. A recommendation for future research emphasizes the need for cross-cultural studies (Gibbons & Poelker, 2013).

This thesis makes use of the opportunity sampling technique and the voluntary sampling technique. The first one is quick and easy to establish, but the results appear to be biased. Generalization can only be made to that specific group of people (PsychTeacher, Population Sampling, n.d.). The participants of the second one have chosen to contribute, so they will accurately and carefully answer the questions.

Some statistical concepts need to be taken into consideration. Validity relates to the requirement of accuracy, namely 'Can we derive meaningful decisions from the obtained

answers and information regarding our examination?' Internal validity concerns the ability to give an answer to the research question with the use of the chosen research tool. Generalizability, which is known as external validity, checks if the obtained results from the sample can be generalized to the whole population. Reliability of the results, also called robustness of the outcomes, verifies if the measurement doesn't include random errors. More precisely, the results need to be tested in order to check whether the measurement leads to consistent outcomes. (Verhofstadt, 2013). The latter, namely the robustness, will be tested by carrying out different though similar SPSS tests on the results.

3.2.2 Collection of data

In order to collect our data, participants were recruited through various platforms. Students from the University of Ghent represent the bulk of them. We approached two professors and requested them to run the survey during their lecture. This provided us responses of 150 students who follow a linking program and 66 students of the third bachelor. Those 216 students are enrolled in the study field of Commercial Sciences. The other 100 participants voluntarily joined in via self-selection on the internet. Hoping for a higher response rate, an incentive was given. Participation gave them the possibility to win a cinema ticket. Unfortunately the dropout rate amounts to 49%. This high level can partly be attributed to the issues that have been occurred regarding the playing of the movies.

Irrespective of the platform, the implemented procedure was based on the same principle. The participants were randomly assigned to watch a particular movie fragment. Three clips were used to create different conditions, namely fear/anxiety (using the trailer of 'The Conjuring'), greed/excitement (using the trailer of 'The Wolf of Wall Street') and a neutral condition (using an advertisement of a Bosch water kettle). Our framework is an extension to the one applied by Kuhnen and Knutson (2008), making use of pictures to arouse emotions, and is in line with the one adopted by Andrade, Odean and Lin (2013), evoking feelings by letting participants watch a video clip. After attentively viewing one of the three movie fragments, our participants were requested to fill out a survey. This questionnaire consists of three parts. The first section records the general background (gender, age and experience). The second one gauges the financial decision making. The final part examines the personality traits, by the means of SDO-scales (Pratto et al., 1994) and IRI-scales (Davis, 1980). The original questionnaires measuring SDO and IRI comprise respectively fourteen (Pratto et al., 1994) and twenty-eight (Davis, 1980) different statements. Our survey has made a selection of ten statements per personality trait quoted on a five-point Likert scale. The

questionnaire only includes those that have a connection with the concept of greed and fear. See appendices 8.1 and 8.2 to see an extract of the survey. Both the original version, drawn up in Dutch, and the translated version, written in English, are included.

3.3 Analysis of data

3.3.1 Statistical approach

The obtained data will be analyzed using the statistical tool SPSS. Different statistical tests will verify whether the research questions can be confirmed or not. The section covering the statistical processing of the information makes use of the funnel approach. The method starts off with broad and general tests. Then it passes to the actual tests and finishes with some specific ones that investigate some findings more in detail. More precisely, the subsequent procedure will be followed. Firstly, some general characteristics of the sample are given. Frequencies and descriptives give a general insight into the results. Secondly, it is investigated whether our framework makes sense, i.e. using film fragments to evoke emotions. Then, the results of the survey are examined profoundly using ANOVA, contrasts, ANCOVA, multiple linear regression, etc. Finally, some detail tests are carried out in order to refine the outcomes. Field (2011) and Laerd (2013) provide theoretical and practical guidance. An overview of the entire SPSS output can be found in appendix 8.4.

3.3.2 Description of the sample

The analysis of the data was set in motion after the closing of the survey. The sample provided us the answers of 316 respondents. In terms of distribution based on gender, there is a slight statistical predominance of women (55,4%) compared to men (44,6%). The age of the participants extends from eighteen to seventy year, with a mean age of twenty-three (standard deviation of 6,84981). When comparing the level of experience, an unequal partition is noticeable. Approximately 22% of the respondents have no financial experience at all, while more than 70% of the participants follow financial courses during his or her study. Only 4% of the people who have been surveyed invests actively on the stock market and less than 3% of the interviewees have a job in the financial sector. An explanation for this distribution lies in the chosen method by which our data was collected. Students, who are enrolled in economic classes, represent the bulk of the respondents. The different film fragments are quite randomly distributed. Each trailer has been viewed by approximately one third of the participants. More precisely, 36,1% of them has viewed ‘The Wolf of Wall Street’, 32,6% has seen ‘The Conjuring’ and 31,3% was subjected to the trailer of ‘Bosch’. The frequencies and descriptives are presented in the tables and graph below.

	Frequency	Percent (%)
Gender		
man	141	44,6
woman	175	55,4
total	316	100
Experience		
yes, in my spare time I invest actively in the stock market	14	4,4
yes, my job is situated in the financial world	9	2,8
yes, in my studies I have financial courses	222	70,3
no, I don't have experience in the financial market	71	22,5
total	316	100
Film fragment		
The Wolf of Wall Street	114	36,1
The Conjuring	103	32,6
Bosch	99	31,3
total	316	100

Table 2: Frequencies of the sample

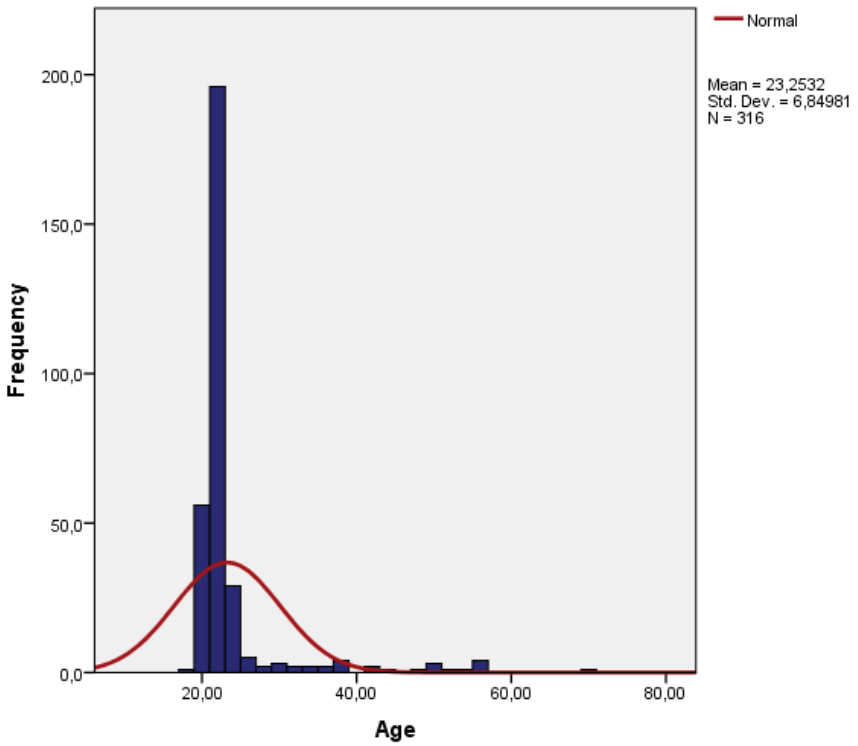


Fig. 11: Distribution of age

	Min	Max
Age	18	70

Table 3: Descriptive statistics regarding age

3.3.3 Results

3.3.3.1 General features of the sample

Some of the variables are formed by transforming the data of the survey. Appendix 8.3 gives a succinct, though clear, insight in the transformation. Before proceeding to the statistical analysis and processing of the data, it is imperative to affirm some assumptions. The presumptions concerning the sample that need to be verified are those of normality, homogeneity and the absence of outliers.

In order to check whether the sample is normally distributed, the Kolmogorov-Smirnov test is used. The dependent variable 'RiskTaking', D(315) = 0,181; p = 0,000, is significantly non-normal distributed. This can be attributed to the artificial composition of the variable (see appendix 8.3). The central theorem hypothesis, however, tells us that "as samples get large (usually defined greater than 30), the sampling distribution has a normal distribution with a mean equal to the population mean and a standard deviation of $\sigma_x = \frac{s}{\sqrt{N}}$" (Field, 2011, p. 42). Moreover, the ANOVA test (which will be used in paragraph 3.3.3.3) seems to be robust to a distribution that violates the assumption of normality (Laerd, 2013). The homogeneity of the sample will be checked by conducting Levene's test, using 'RiskTaking' as the dependent variable and the different film fragments as the factors. The Test of Homogeneity of Variance shows four different results. With a value of F(2,312) = 4,677; p = 0,010 [based on mean] and F(2,312) = 4,764; p = 0,009 [based on trimmed mean], the variances are considered to be significantly different. However, the variances are assumed to be equal when the values based on median and median with adjusted degrees of freedom are taken into account. In both cases, there is an outcome of F(2,312) = 2,786; p = 0,063, which is an indication of homogeneity. The final assumption is the one that considers the absence of outliers. Extreme values can be detected by investigating a boxplot. Values are spotted above the top 25%, which indicates outliers. Those extreme values can also be explained by the way the dependent variable has been composed. As a matter of fact, those values are situated in the interval of the variable 'RiskTaking', extending from a minimum of zero to a maximum of six. So they can be considered as normal values.

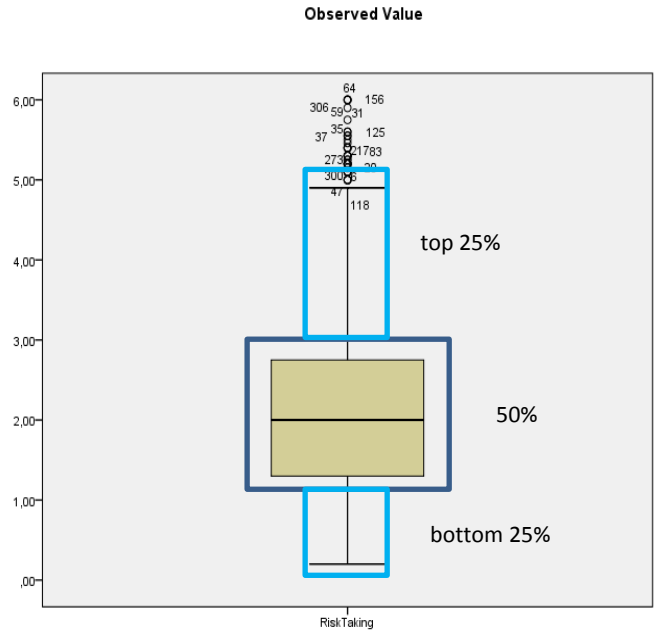


Fig. 12: Boxplot

3.3.3.2 Does the framework make sense?

This section checks whether the framework that has been created really makes sense. This will be done by questioning the design. Online lectures of Field (n.d.) gave practical guidance. See appendix 8.4 (8.4.3) for more details.

I. Do the film fragments have an influence on the sentiment?

Following the example of Andrade, Odean and Lin (2013), the survey endeavoured to manipulate/evoke certain types of feelings. A one-way ANOVA is used in combination with contrasts (Field, 2012). This time the dependent variable is the level of sentiment that someone experiences, namely the degree of excitement or fear. The scale of those variables extends from zero to four. The one-way ANOVA uses the variable 'filmfragment', which reflects the three different movies ('The Wolf of Wall Street', 'The Conjuring' and 'Bosch'), as the factor. The table below shows the mean level of sentiment after watching a specific film fragment.

	Excitement			Fear		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
The Wolf of Wall Street	114	1,91	1,085	114	0,47	0,743
The Conjuring	103	1,26	0,928	103	1,53	1,187
Bosch	99	0,70	0,974	99	0,20	0,534

Table 4: Degree of sentiment after watching a specific film fragment

Figure 13 and 14 are graphical representations of the results.

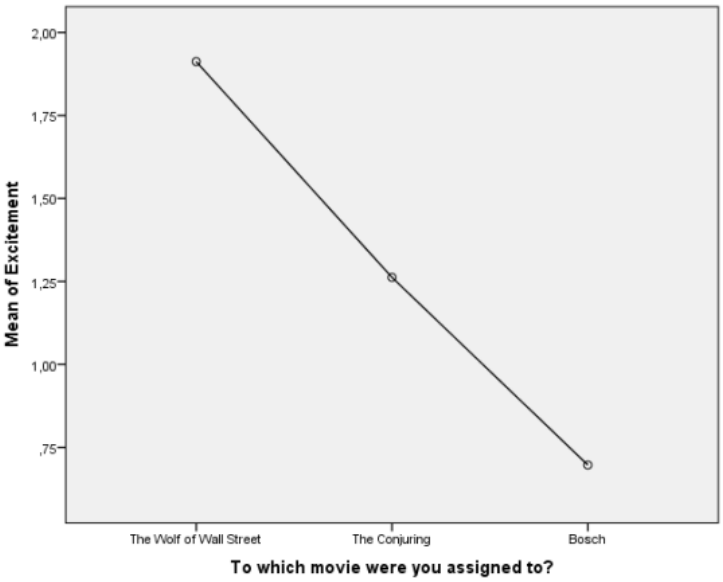


Fig. 13: Mean level of excitement after watching a specific film fragment

In terms of excitement, people who are subjected to the 'Wolf of Wall Street' indicate a mean level of 1,91 (std.dev. of 1,085), while people who have seen the 'The Conjuring' scale their mean level at 1,26 (std.dev. of 0,928). The benchmark, subjects that have viewed the trailer of 'Bosch', has a mean level of 0,70 (std.dev of 0,974).

Now, the question is: "Do these means significantly differ from each other?"

Levene's test shows a value of F(2,313) = 1,67; p = 0,190 (> 0,05), which is an indication to assume equal variances. The contrasts compare the mean level of excitement between the experimental groups ('The Wolf of Wall Street' and 'The Conjuring') and the benchmark ('Bosch'). With a p-value of 0,000 (< 0,05), it can be said that the mean level of excitement significantly differs between the two groups. The second contrast compares the two experimental groups mutually. Again the p-value is 0,000 (< 0,05), so there's a significant difference in mean level of excitement. In our framework, the trailer of 'The Wolf of Wall Street' significantly (5% level) triggers a higher level of excitement.

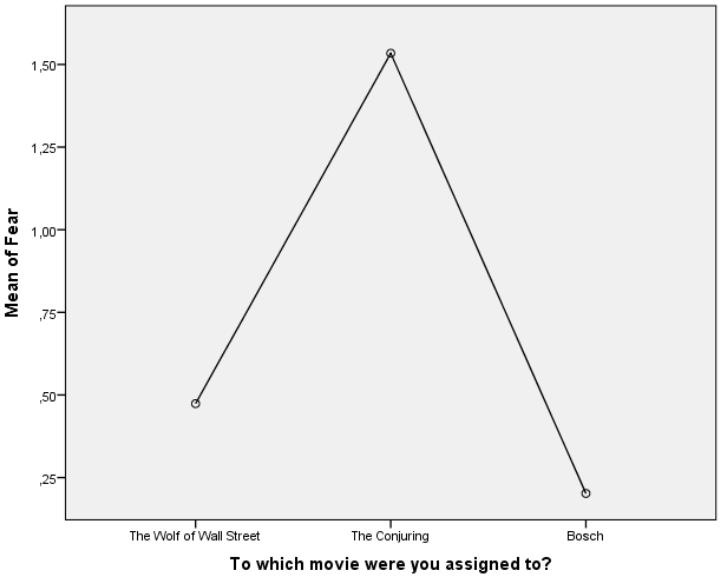


Fig. 14: Mean level of fear after watching a specific film fragment

The mean level of fear is the highest after watching 'The Conjuring', namely 1,53 (std.dev. of 1,187). After viewing 'The Wolf of Wall Street' people indicate a mean level of 0,47 (std.dev. of 0,743). Subjects who belong to the benchmark and have seen 'Bosch' show a mean level of fear of 0,20 (std.dev. of 0,534).

Again, it needs to be considered whether these results significantly differ from each other.

The Test of Homogeneity of Variance, i.e. Levene's test, assumes unequal variances with F(2,313) = 58,443; p = 0,000 (< 0,05). Both the first contrast, comparing the experimental groups against the benchmark, and the second contrast, comparing the results of the two experimental groups mutually, have a p-value of 0,000 (< 0,05). This indicates a significant difference in mean levels of fear. In our framework, the trailer of 'The Conjuring' significantly (5% level) triggers a higher level of fear.

II. Is there a connection between sentiment and personality traits?

Since the Kolmogorov-Smirnov test indicated a non-normal distribution of the sample, the Spearman's correlation is preferred to Pearson's correlation. Moreover the Spearman's rank order correlation is less sensitive for detected outliers (Chok, 2010). "Spearman's correlation coefficient varies from -1 to +1 and the absolute value describes the strength of the monotonic relationship" (Chok, 2010, p. 5).

		Overall SDO	Overall IRI
Excitement	Correlation Coefficient	0,040	-0,084
	p-value	0,480	0,138
	N	316	316
Fear	Correlation Coefficient	-,126*	0,204**
	p-value	0,025	0,000
	N	316	316

** Correlation is significant at the 0,01 level
* Correlation is significant at the 0,05 level

Table 5: Spearman's correlation

The table above exhibits a significant negative correlation [-0,126; p = 0,025 (< 0,05)] and a significant positive correlation [0,204; p = 0,000 (< 0,05 and < 0,01)] between respectively fear – Overall SDO and fear – Overall IRI. Excitement is positively correlated with Overall SDO [0,040; p = 0,480 (> 0,05)] and negatively correlated with Overall IRI [-0,084; p = 0,138 (> 0,05)]. Both of these coefficients are not significant. However the results are in line with our expectations.

III. Is there a relationship between the film fragments and the personality traits?

Conform the first paragraph (I.), the connection is verified by using a one-way ANOVA and contrasts.

	SDO			IRI		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
The Wolf of Wall Street	114	19,8158	6,71620	114	19,9123	6,30432
The Conjuring	103	18,4563	5,82216	103	21,5728	5,21612
Bosch	99	18,7980	6,03219	99	20,9192	5,87398

Table 6: Degree of personality trait after watching a specific film fragment

Table 6 displays the mean level of Overall SDO, which is the highest (19,8158; std.dev. of 6,71620) among people who have been subjected to 'The Wolf of Wall Street' and the lowest (18,4563; std.dev. of 5,82216) among people who have seen 'The Conjuring'. Subjects who belong to the benchmark indicate a mean level of Overall SDO of 18,7980 (std.dev. of 6,03219). Figures 15 and 16 show the results graphically.

Do these means significantly differ from each other?

Levene's test assumes equal variances [F(2,313) = 1,418; p = 0,244 (> 0,05)]. The mean level of Overall SDO does not significantly differ between the experimental groups and the benchmark [contrast 1; p = 0,655 (> 0,05)]. The difference in mean level between the two experimental groups mutually [contrast 2] is not significant at the 5% nor the 10% level. However, the p-value is close to the 10% level, namely p = 0,109. It cannot be concluded that the trailer of 'The Wolf of Wall Street' significantly triggers a higher SDO. When taking the 90% confidence interval into consideration, the difference between the mean level of Overall SDO after watching 'The Wolf of Wall Street' and 'The Conjuring' is fairly significant.

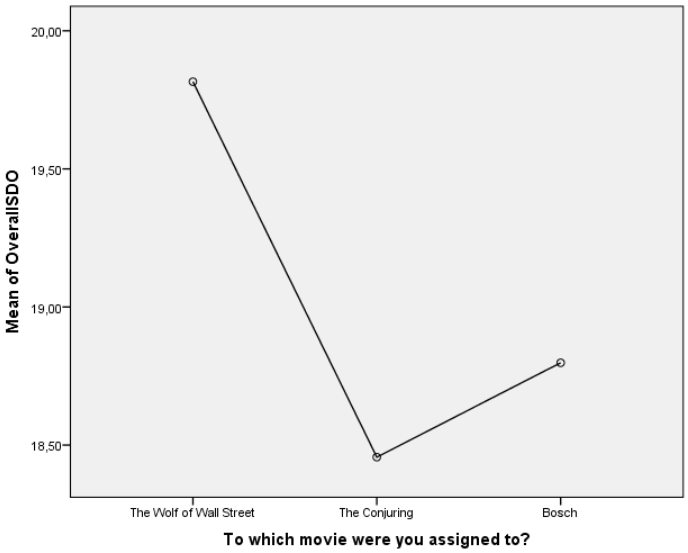


Fig. 15: Mean level of Overall SDO after watching a specific film fragment

People who have seen 'The Conjuring' indicate the highest mean level of Overall IRI, namely 21,5728 (std.dev. of 5,21612), while the mean level of people who were subjected to 'The Wolf of Wall Street' lies at 19,9123 (std.dev. of 6,30432). The benchmark, viewing the trailer of 'Bosch', shows a mean level in between the two (20,9192; std. dev. of 5,87398).

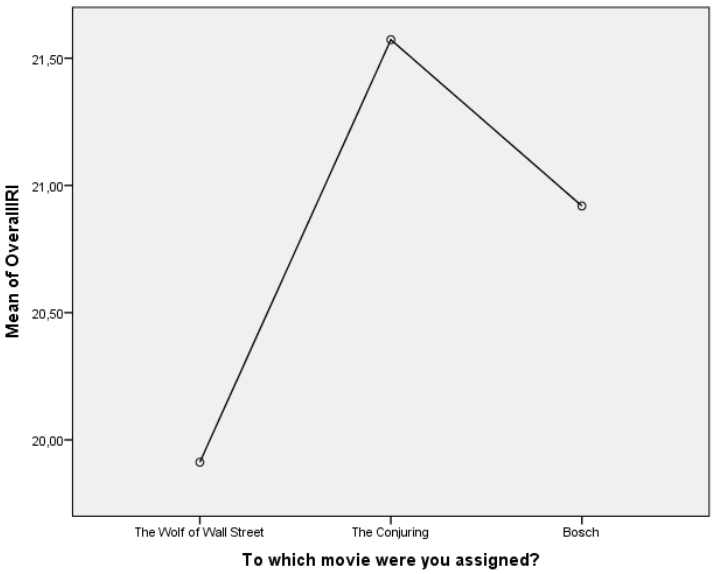


Fig. 16: Mean level of Overall IRI after watching a specific film fragment

With a value of F(2,313) = 2,527; p = 0,081 (> 0,05), equal variances are assumed. Contrast 1, comparing 'The Wolf of Wall Street' and 'The Conjuring' against 'Bosch', shows no significant difference in mean level of Overall IRI (p = 0,803). Contrast 2, however, indicates a significant difference in mean level of Overall IRI between the two experimental groups mutually (p = 0,037). It can be concluded that 'The Conjuring' significantly triggers a higher mean level of Overall IRI with a 95% confidence interval.

IV. Conclusion

To recapitulate, 'The Wolf of Wall Street' significantly evokes excitement (95% confidence) and fairly substantially triggers a higher level of Overall SDO (90% confidence). Moreover, excitement and Overall SDO are positively correlated while excitement and Overall IRI have a negative relationship, although both not substantially. On a 95% confidence interval, 'The Conjuring' significantly evokes fear and a higher level Overall IRI. Furthermore, the correlation between fear and Overall SDO is significantly negative (95% confidence) and the relationship between fear and Overall IRI is significantly positive (99% confidence).

All in all, the envisioned framework makes sense.

3.3.3.3 Specific tests

After the verification of our framework, we can shift towards the actual tests. Some of them are very similar to others. This is done in order to guarantee robust results. If various test show similar results, then we can conclude that the outcomes are consistent and reliable (Verhofstadt, 2013).

I. One-way ANOVA

The one-way ANOVA, also called the analysis of variance, "analyses situations in which we want to compare more than two conditions" (Field, 2011, p. 348). The objective is to compare the difference in mean level of 'RiskTaking' between groups of personality traits. The variables 'GroupSDO' and 'GroupIRI' are created. Appendix 8.3 shows how the variables are formed. Briefly mentioned: the interval [0 – 40] of SDO and IRI is cut in half. People with an SDO or IRI level below 20 belong to the 'Low' group, while subjects with an SDO or IRI level above 20 are grouped together in the 'High' group. The one-way ANOVA checks whether the difference in mean level of 'RiskTaking' is significant between people experiencing a high or a low level of, on the one hand, SDO and, on the other hand, IRI. In fact, an independent samples t-test could be used. The t-test compares two means. The reason why we prefer to perform an ANOVA is the fact that it is possible to conduct extensions, like carrying out a two-way ANOVA, an ANCOVA, etc.

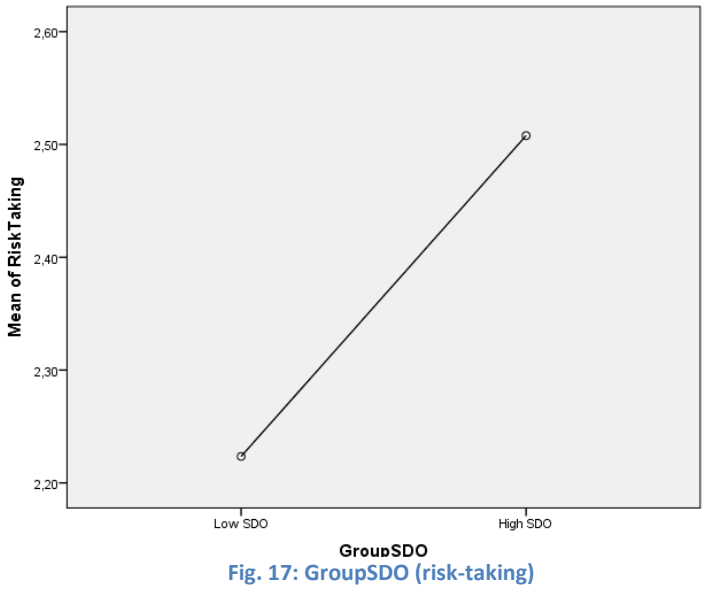


Fig. 17: GroupSDO (risk-taking)

When observing the graphs, an indication is already given. Figure 17 indicates that people who belong to the group with a high level of SDO are more willing to take risks. The one-way ANOVA, however, refines the intuition. The output shows an F-statistic of F(1,314) = 2,990 and a p-value of 0,085. On a 5%-significance level, there is no significant difference in mean level of risk-taking between people with a high and people with a low SDO. On a 10%-significance level, however, there is a significant difference in the level of risk-taking between the two groups. With 90% confidence, it can be stated that participants belonging to the high SDO group (M = 2,5078; SD = 1,50648) are considerably more willing to take financial risks than participants belonging in the low SDO group (M = 2,2235; SD = 1,40936).

On figure 18, an inverse relation between GroupIRI and the mean level of risk-taking is noticeable. This means that subjects belonging to the group with a low level of IRI designate a high mean level of risk-taking, while subjects belonging to the group with a high level of IRI demonstrate a low mean level of risk-taking. The one-way ANOVA confirms that there is a significant difference in the mean level of risk-taking between people with a high and people with a low IRI (F(1,314) = 18,087; p = 0,000). With 95% confidence, results show that people pertaining to the low IRI group (M = 2,7817; SD = 1,53281) are considerably more inclined to take financial risks than people pertaining to the high IRI group (M = 2,0831; SD = 1,34673).

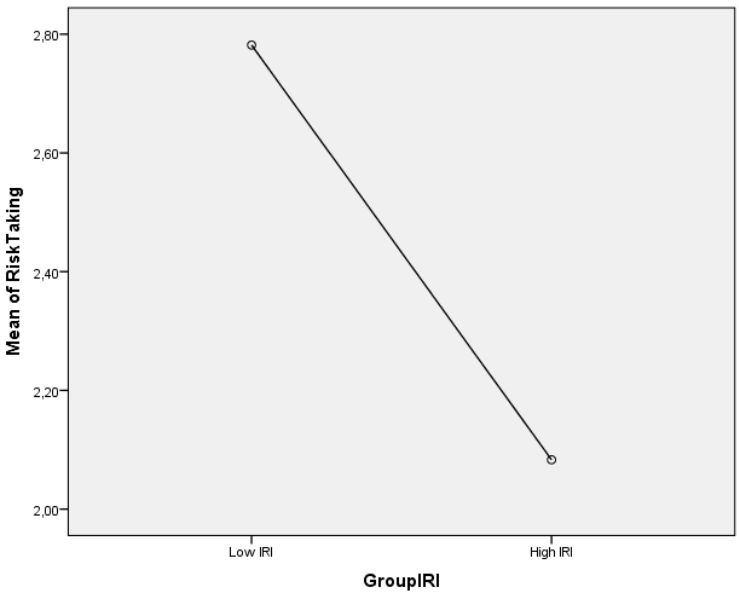


Fig. 18: GroupIRI (risk-taking)

II. Two-way ANOVA

The two-way ANOVA includes both 'GroupSDO' (people belonging either to the high or low level of SDO) and 'GroupIRI' (people belonging either to the high or low level of IRI), as the factors of the test. The SPSS-output shows whether the chosen independent variables differ in mean level of 'RiskTaking' and includes the interaction term of the two independent variables. "The interaction term in a two-way ANOVA informs you whether the effect of one of your independent variables on the dependent variable is the same for all values of your other independent variable (and vice versa)" (Laerd, 2013, p. 1). When executing the test, it is found that both 'GroupSDO' (F(1,314) = 1,592; p = 0,208) and the interaction term, 'GroupSDO*GroupIRI', (F(1,314) = 0,439; p = 0,508) are not significant on either the 5% level nor the 10% level. On a 95% confidence interval, it can be said that 'GroupIRI' (F(1,314) = 16,010; p = 0,000) is a significant variable.

In order to check the robustness, a second two-way ANOVA is carried out using 'OverallSDO' (measuring the absolute level of SDO) and 'OverallIRI' (measuring the absolute level of IRI) as the factors. The SPSS-output seems similar to the first one. Again both 'OverallSDO' (F(34,281) = 1,238; p = 0,214) and the interaction term, 'OverallSDO*OverallIRI', (F(165,150) = 0,963; p = 0,588) are not significant. This time the p-value of 'OverallIRI' is slightly higher (F(29,286) = 2,047; p =0,006), but still significant on the 5%-level.

Both tests, the two-way ANOVA using the personality traits as a group (high versus low) and the two-way ANOVA including the total level of the personality traits, indicate that SDO is a non-significant variable and IRI is a significant variable.

III. ANCOVA

The ANCOVA is another extension to the ANOVA. The dependent variable stays the same, namely 'RiskTaking' and the fixed factors remain the personality traits, using 'OverallSDO' and 'OverallIRI'. In addition, the ANCOVA includes covariates, which are variables that "are not part of the main experimental manipulation but have an influence on the dependent variable" (Field, 2011, p. 396). The including variables are the following: Gender (dummy), Age (scale), Experience (three dummies: Stock market, Job and Studies) and Sentiment (two dummies: Excitement and Fear). The table below succinctly displays the findings of the SPSS-output when carrying out the ANCOVA.

Dependent variable: Risk Taking	F-statistic	p-value	Significant on 10% level	Significant on 5% level
Fixed factors				
Overall SDO	F(34,281) = 1,305	p = 0,166	×	×
Overall IRI	F(29,286) = 1,637	p = 0,045	✓	✓
Interaction term				
Overall SDO * Overall IRI	F(165,150) = 0,942	p = 0,629	×	×
Covariates				
Gender	F(1,314) = 2,277	p = 0,135	×	×
Age	F(1,314) = 0,453	p = 0,503	×	×
Experience				
- Stock Market	F(1,314) = 0,016	p = 0,900	×	×
- Job	F(1,314) = 4,994	p = 0,028	✓	✓
- Studies	F(1,314) = 0,836	p = 0,363	×	×
Sentiment				
- Excitement	F(1,314) = 3,596	p = 0,062	✓	×
- Fear	F(1,314) = 0,948	p = 0,333	×	×

Table 7: Output of ANCOVA

The ANCOVA has an explanatory power of 17,6% (R^2 = 0,176). As table 7 shows, there are only two variables that are significant on the 5%-level, namely having a job in the financial sector (experience) and the level of IRI that someone has (Overall IRI). Being in an exciting mood (sentiment) is a significant variable on a 90% confidence interval. All other variables seem individually non-significant.

IV. Multiple Linear Regression

The objective of a regression analysis is to "fit a model to our data and use it to predict values of the dependent variable from one or more independent variables" (Field, 2011, p. 198). Multiple linear regression allows us to make a prediction about the outcome

variable from a set of predictor variables. The method of least squares generates a 'line of best fit'. This means that the differences[1] between the predicted values and the observed data are reduced to a minimum (Field, 2011).

Verhofstadt (2013) describes the consecutive steps to follow when running and interpreting a multiple regression.

i. Determination of the deterministic model: Which independent variables are included in the model?

The model comprises the same independent variables as the ANCOVA, which are gender, age, experience (three dummies: actively investing in the stock market, having a job in the financial sector and following financial courses during one's studies), sentiment (two dummies: being in an exciting mood and being in a fearful mood) and the personality traits (Overall SDO and Overall IRI).
The deterministic model can be written as:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9$$

With β_0 as the intercept and β_i as the contribution of the explanatory variable x_i.

x_1 = gender	x_4 = job	x_7 = fear
x_2 = age	x_5 = studies	x_8 = Overall SDO
x_3 = stock market	x_6 = excitement	x_9 = Overall IRI

ii. Estimation of the parameters: What are the values of the β_i's?

After running the multiple linear regression, the SPSS-output displays two regression lines, namely one with unstandardized and one with standardized coefficients. The latter shows the β_i's that "take into account the differences in units of the independent variables" (Verhofstadt, 2013, p. 5) and are calculated by using the formula 'standardized β_i = unstandardized β_i * (standard deviation of x_i / standard deviation of y)'. It can be said that the standardized β_i's show the real contribution of the independent variable x_i to the explanation of de dependent variable y.
The model can be written as:

$$y = -0{,}039x_1 - 0{,}109x_2 + 0{,}142x_3 + 0{,}094x_4 + 0{,}134x_5 + 0{,}196x_6 + 0{,}002x_7 + 0{,}459x_8 - 0{,}183x_9 + \varepsilon$$

[1] From here on, the differences between the predicted values and the observed data are called 'residuals'.

iii. Specification and verification of the assumptions concerning the error term: What does the analysis of the residuals tell us?

Some assumptions are made concerning the probability distribution of the residuals (ε):

- The mean value of ε is equal to zero: $E(\varepsilon) = 0$
- The variance of ε is equal to σ^2: $Var(\varepsilon) = \sigma^2$
- ε is normally distributed
- Different random errors are independent from each other: $Cov(e_i, e_{i-1}) = 0$

The first two presumptions can be verified by observing the scatterplot.

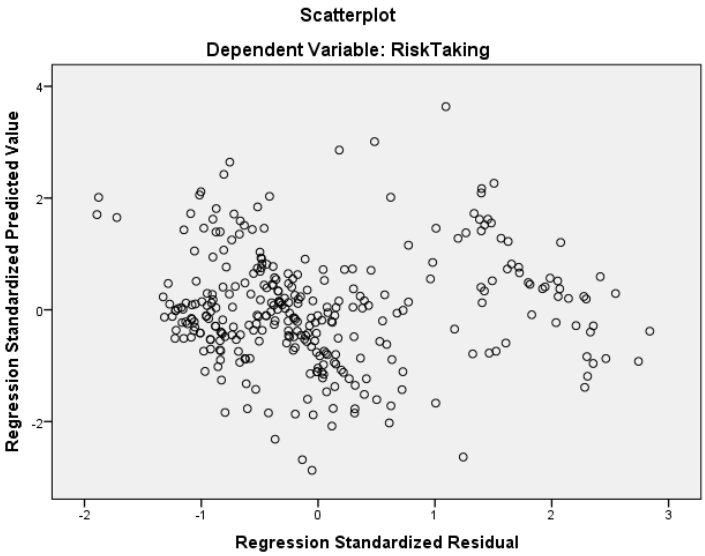


Fig. 19: Scatterplot of the residuals

The errors are not fully randomly dispersed. This is due to the artificial definition of the dependent variable. Another consequence of this manipulated formula is the presence of "extreme" values. However, they cannot be interpreted as outliers because they are situated within the interval of the dependent variable. The Kolmogorov-Smirnov test confirms that the residuals are significantly non-normally distributed. D(315) = 0,133; p = 0,000 (< 0,05) gives an indication for the rejection of the null hypothesis. White's test examines whether the residuals are independent from the explanatory variables. In other words, the test checks the presence of homoscedasticity, i.e. $Var(e_t) = \sigma^2$. For this test Gretl is used and appendix 8.4 (8.4.4.4) gives the entire output. $TR^2 = 30{,}860422$; p = 0,897742 (> 0,05) rejects heteroskedasticity and therefore assumes homoscedasticity.

In order to check the independence of residuals, the Durbin-Watson test is carried out. The SPSS output displays a Durbin-Watson value of d = 1,742. The figure below shows the different thresholds and the situations in which the null hypothesis of independence needs to be rejected. Appendix 8.4 (8.4.4.4) gives some more information concerning the calculation of the thresholds.

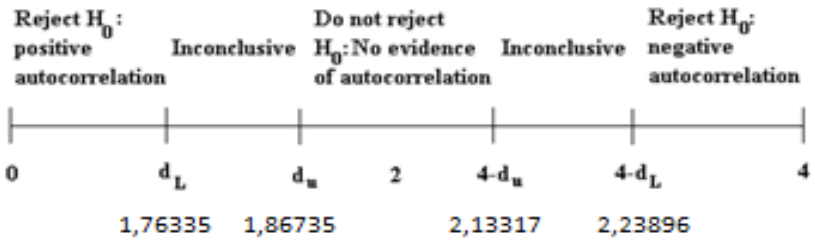


Fig. 20: Thresholds of the Durbin-Watson test

Since d = 1,742 < d_L = 1,76335, the null hypothesis must be rejected. The experimental setting gives an indication of a slightly positive correlation. The model still has some predictive power, but the usability is somehow dwindled. "The estimated regression parameters remain unbiased. Hence, point estimates can be made and the model can be used for predicting values of Y for any given set of X values. However, the standard errors of the estimates of the regression parameters are significantly underestimated. This may lead to erroneously inflated t-values" (Wake Forest University, n.d.). The causes may be: "omitted variables, ignoring nonlinearities, measurement errors, misspecification of the functional form and systematic errors in measurement" (Gau, 2002).

iv. Assessment of the usability of the model: Is the estimated model useful to make predictions?

13,8% of the variance in the dependent variable 'RiskTaking' can be explained by the model, i.e. the chosen independent variables (adjusted R^2 = 0,138). The ANOVA verifies the statistical significance of the model. With F(9,305) = 6,576; p = 0,000 (< 0,05), the null hypothesis (all β_i's are equal to zero) is rejected. With 95% confidence, it can be said that the regression model is a good fit of the data. The model can be used. The estimated model uses the standardized coefficients. The table below observes the regression line and tells something more about the statistical significance of the individual β_i's.

$$y = -0{,}039x_1 - 0{,}109x_2 + 0{,}142x_3 + 0{,}094x_4 + 0{,}134x_5 + 0{,}196x_6 + 0{,}002x_7 + 0{,}459x_8 - 0{,}183x_9 + \varepsilon$$

Dependent variable: Risk Taking	t-statistic	p-value	Significant on 10% level	Significant on 5% level	Tol	VIF
Explanatory variables						
X_1 = Gender	t(305) = -0,652	p = 0,515	×	×	0,766	1,306
X_2 = Age	t(305) = -1,759	p = 0,080	✓	×	0,717	1,395
Experience						
- X_3 = Stock Market	t(305) = 2,356	p = 0,019	✓	✓	0,758	1,319
- X_4 = Job	t(305) = 1,679	p = 0,094	✓	×	0,871	1,148

– X_5 = Studies	t(305) = 1,997	p = 0,047	✓	✓	0,610	1,639
Sentiment						
– X_6 = Excitement	t(305) = 3,621	p = 0,000	✓	✓	0,936	1,068
– X_7 = Fear	t(305) = 0,034	p = 0,973	×	×	0,929	1,076
X_8 = Overall SDO	t(305) = 0,459	p = 0,646	×	×	0,844	1,184
X_9 = Overall IRI	t(305) = -2,994	p = 0,003	✓	✓	0,737	1,358

Table 8: Statistical significance of the individual β's

Since Tol > 0,1 and VIF < 10, there doesn't seem to be a problem of multicollinearity. In other words, the independent variables are not mutually correlated.

V. Conclusion

Some assumptions were violated, but not in a way that it harms the model. Although some individual β_i's are statistical not significant, the envisioned model seems to be usable and has a decent level of explanatory capacity. Other statistical problems are out of the question.

3.3.3.4 Detail tests

The final section of the experimental design examines a few extra tests. More precisely, it is investigated whether gender, age and experience affect the willingness to take financial risks.

I. Gender

In order to research the influence of gender on the level of risk taking, the independent t-test is utilized. The t-test "is used in situations in which there are two experimental conditions and different participants have been used in each condition" (Field, 2011, p. 334). In particular, it is tested whether the mean level in 'RiskTaking' significantly differs between men and women.

i. General independent t-test

Firstly, the t-test is carried out on the entire sample. Levene's test for equality of variances assumes equal variances (F(2,313) = 0,753; p = 0,386 > 0,05). The independent samples t-test rejects the null hypothesis of equal means (t(313) = 3,412; p = 0,001 < 0,05). Based on the latter test, it can be deduced that the mean level of risk-taking significantly differs between men and women.

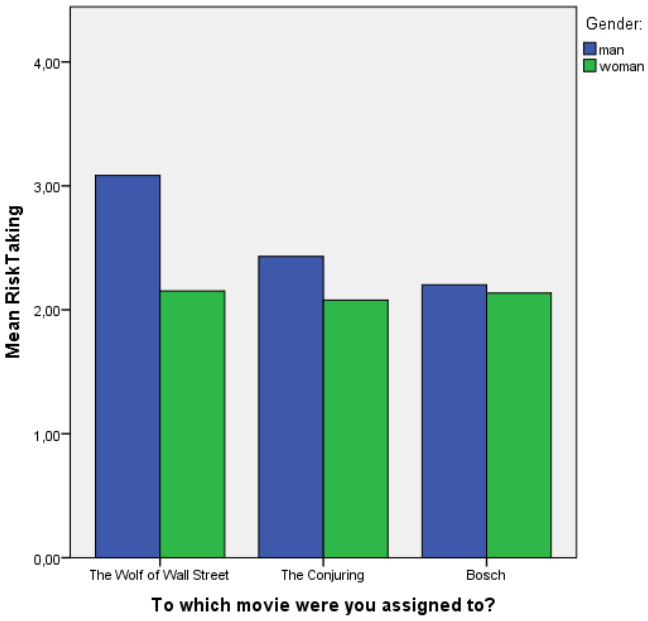


Fig. 21: Men versus women (risk taking)

The setting of our framework divides the sample into three groups according to the type of movie the participants have been subjected to. Figure 21 shows for every film fragment the mean level of risk-taking between men and women.

It is appropriate to question the origin of the difference in average level between the two groups. Is there a real difference in the mean level of risk-taking between men and women or is the deviation due to the influence of the film fragments? In other words: 'Does gender affect the willingness to take financial risks or do the film fragments provoke a different behavior in terms of taking risk?'

ii. Independent t-test per film fragment

The Wolf of Wall Street

With an F-statistic of F(2,111) = 1,649 and a p-value of 0,202 (> 0,05), Levene's test assumes equal variances. The independent samples t-test rejects the null hypothesis (t(111) = 3,196; p = 0,002 < 0,05) and designates a significant difference in mean level. In the context of 'The Wolf of Wall Street', men (M = 3,0833; SD = 1,56710) are significantly more risk-taking than women (M = 2,1513; SD = 1,47146).

The Conjuring

Levene's test presumes equal variances (F(2,101) = 0,103; p = 0,749 > 0,05) and the independent samples t-test accepts the null hypothesis (t(111) = 1,299; p = 0,197 > 0,05). When people have seen 'The Conjuring', men (M = 2,4303; SD = 1,2641) are not significantly more risk-taking than women (M = 2,0780; SD = 1,35067).

Bosch

Again equal variances are presumed (F(2,97) = 1,698; p = 0,196 > 0,05). With a t-statistic of 0,229 and a p-value of 0,819 (> 0,05), the null hypothesis is accepted. In the control group, in which the participants have watched the trailer of 'Bosch',

men (M = 2,2018; SD = 1,26961) are not significantly more risk-taking than women (M = 2,1352; SD = 1,48218).

II. Age

The impact of age on the willingness to take financial risks is rather difficult to observe because the amount of observations is highly concentrated in the low age category. This is due to the fact that the survey is mainly accomplished by students. With the goal to properly investigate the influence of age on risk-taking, the observations are divided into several classes. People with the age of 18 till 30, 31 till 50 and 51 till 70 are grouped together.

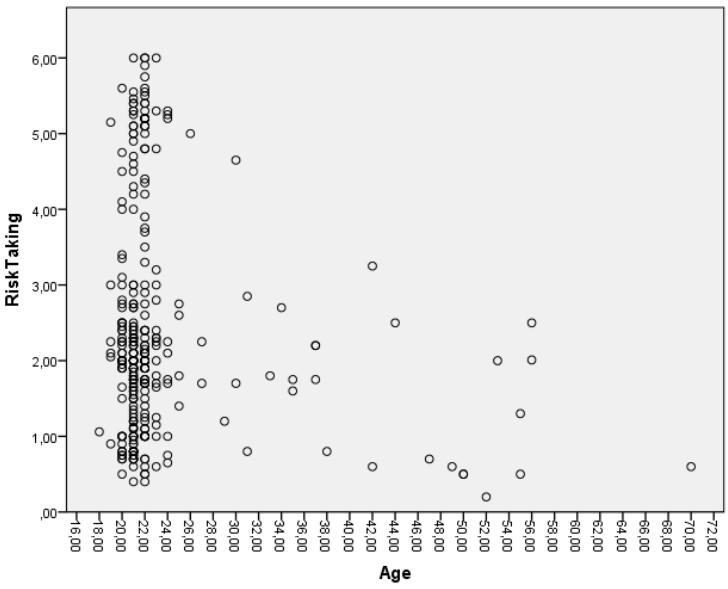


Fig. 22: Age (risk-taking)

All groups cover approximately the same interval of age. The first class has a smaller interval because the subjects of the first category are highly represented in the sample.

	N	Mean	Std. dev.
18-30	291	2,4378	1,47959
31-50	17	1,5941	0,92261
51-70	7	1,3014	0,89201

Table 9: Age (distribution and risk-taking)

Table 9 shows the distribution as well as the corresponding mean level of risk-taking and the standard deviation.

At first sight, it seems that the willingness to take financial risks decreases as age increases. However, some statistical tests need to give a decisive answer. The one-way ANOVA with contrasts is used. The test of homogeneity of variances, Levene's test, assumes equal variances (F(2,312) = 2,044); p = 0,131 > 0,05). Table 10 displays the outcome of the contrast tests.

Contrast	t-statistic	p-value
18-30 vs. 31-70	t(312) = 2,948	p = 0,003
18-30 vs. 51-70	t(312) = 2,053	p = 0,041
18-30 vs. 31-50	t(312) = 2,337	p = 0,020

Table 10: Contrasts ('young' versus 'old')

The three contrasts display a p-value that is below 0,05. It can be concluded that the mean level of risk-taking significantly differs between the two groups.

The age category of 18-30 (M = 2,4378; SD = 1,47959) is significantly more risk-taking than the age category of 31-50 (M = 1,5941; SD = 0,92261) and the age category of 51-70 (M = 1,3014; SD = 0,89201).

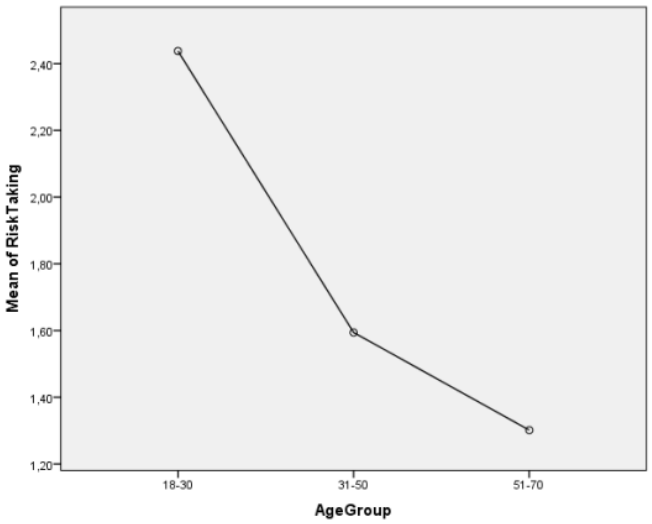


Fig. 23: Age categories (risk-taking)

III. Experience

Since the variable 'Experience' may adopt four types of answers, namely investing actively on the stock market, having a job in the financial sector, having financial courses during studies and not having any financial experience, the one-way ANOVA with contrasts is used. With F(3,311) = 4,320 and p = 0,005 (< 0,05), Levene's test does not assume equal variances. Table 11 demonstrates the outcome of the contrast tests and appendix 8.4 (8.4.5) gives a more enhanced overview of the test.

Contrast	t-statistic	p-value
Experience (stock market, job and studies) *versus* no experience	3,644	0,001
Stock market and job *versus* studies	1,311	0,208
Stock market *versus* job	1,383	0,188

Table 11: Contrast ('experience' versus 'no experience')

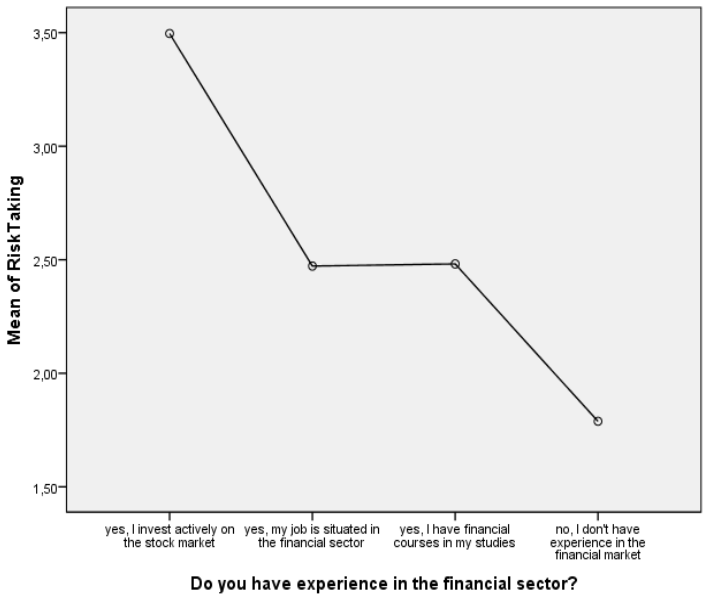


Fig. 24: Experience (risk-taking)

Only the first contrast seems to be significant. So, the mean level of risk-taking significantly differs between experienced people and inexperienced people. When comparing the type of experience mutually, the deviation in mean level is not statistically significant.

Having some financial experience [investing actively on the stock market (M = 3,4962; SD = 1,45566), having a job in the financial sector (M = 2,4722; SD = 1,86181) and having financial courses during the studies

(M = 2,4816; SD = 1,48716)] leads to a significantly higher level of willingness to take financial risks in comparison to people who have no financial experience at all (M = 1,7885; SD = 1,11823).

IV. Conclusion

In terms of gender, figure 21 already gives an indication that men are more risk-taking than women. The t-test that has been carried out on the entire sample confirms that men are significantly more willing to take financial risks than women. However, the t-test per film fragment only confirms a significant difference in mean level of risk-taking between men and women in the setting of 'Wolf of Wall Street'. When participants were subjected to either 'The Conjuring' or 'Bosch', gender has no significant impact on the willingness to take financial risks. When exploring the influence of age more profoundly, the findings confirm that the mean level of risk-taking decreases as age increases. It can be stated that younger people are more willing to take financial risks than older ones. In our experiment, the results show that experienced people are inclined to take more financial risks than inexperienced people. However, the type of experience does not seem to have a significant impact.

3.3.4 A biological digression

Current literature doesn't pay enough attention to research on the effect of hormones on financial decision making and risk-taking. Broadly speaking, a large gap concerning this topic arises. Several academic papers recognize this hiatus. "Currently, little is known about the relationship between testosterone and risk preferences" (Apicella, Dreber, Campbell, Gray, Hoffman & Little, 2008, p. 385), "Little is known about the role of the endocrine system in financial risk taking" (Coates & Herbert, 2008, p. 6167) and "Little is known about the role of the endocrine system in financial decision making" (Coates, Gurnell & Sarnyai, 2010, p. 331) are just some examples. Sapienza, Zingales and Maestripieri (2008) suggest future studies with regard to "the possibility that there may be biological differences in the molecular mechanisms through which testosterone affects brain and behavior in men and women" and "the interplay of biological and sociocultural factors in the emergence and maintenance of between- and within- gender differences in financial decision making and other types of risk behavior" (p. 15271). Carr and Steele (2010) indicate that decision making is a product of several elements, which are the cognitive processes, internalized factors (such as biology and socialization), situation-sensitive factors (i.e. emotions) and stereotypes.

Our thesis acknowledges this gap in the literature, but budgetary constraints hinder us to thorougly examine this topic. However, a small amount of saliva samples were carried

out. We knew in advance that a collection of four saliva samples wouldn't lead to significant results but our goal is to encourage further research on this hiatus. The University Hospital of Ghent provided us the necessary information, the tools and the analysis.

Saliva samples are a convenient method to obtain accurate results. It can easily be done at home and, on the condition of a proper storage, the saliva can be kept for some period of time (Hormone Saliva Test, 2014). Testosterone and cortisol, which are the two hormones that were verified, vary in the course of the day. The highest level of testosterone is measured between 7 a.m. and 11 a.m. (S H HO Urology and Laparoscopy Centre, 2008) while cortisol shows a peak in the moning, at 8 a.m., and the evening, between 8 p.m. and 12 p.m. (Hatfield, Herbert, van Someren, Hodges & Hastings, 2004). All this information was confirmed by our contact person in the University Hospital of Ghent. In order to acquire comparable hormone levels, the samples were executed on the same day at the same time, namely March 29 2014 at 8 a.m. Our experimental sounding only comprises men. Some extra guidelines needed to be taken into consideration when including women, like considering the moment of their menstrual cycle, the use of contraceptives,… (Labrix Clinical Services, n.d.). On top of that, women produce on average only ten percent of the amount of testosterone produced by men (Medeiros, 2013). Therefore women are believed to be less prone to excessive risk-taking behavior (Coates in: Medeiros, 2013). "When it comes to financial markets, Coates says, men are more hormonal than women" (Medeiros, 2013, p. 2). However, the level of testosterone declines when men are aging (Sternbach, 1998). When analyzing the figures, this must be taken into consideration. Some general directives needed to be taken into account when collecting the saliva (Labrix Clinical Services, n.d. and see appendix 8.5). The results can be read in the table below and a more extended file can be found in appendix 8.6.

Experimental subject	Age	Testosterone	SDO	Cortisol	IRI	Risk-taking
LVDB23	23	6,790 ng/dl	26	0,198 µg/dl	11	5.40
JC24	24	6,419 ng/dl	18	0,617 µg/dl	13	5.30
LVDB63	63	4,762 ng/dl	12	0,180 µg/dl	10	2.30
WH59	59	5,303 ng/dl	21	0,233 µg/dl	20	2.00

Table 12: Hormone levels of the experimental sounding

Initially the four participants were supposed to be subjected to one of the film fragments. Two of them would have a look at 'The Wolf of Wall Street' and the other two would see 'The Conjuring'. In order to examine the influence of the fragment on the hormone levels, it is necessary to measure the hormones prior to and after the short

movie. As stated before, we don't have the budgetary means to collect multiple saliva samples. On top of that, it is possible that someone has a natural low level of a hormone. For example: someone with a natural low level of testosterone could remain having a lower level of testosterone after watching 'The Wolf of Wall Street' in comparison with someone with a natural high level of testosterone who has watched 'The Conjuring'. Therefore our investigation focuses on the relationship between the level of the measured hormones, namely testosterone and cortisol, and the level of risk-taking behavior. The levels of SDO, IRI and risk-taking were measured using the same survey like the regular participants (those who have watched a short movie and filled out the questionnaire).

As mentioned before, our four saliva samples do not provide significant results. It is not possible to conclude whether subjet JC24 is an outlier or not. In order to draw scientific conclusions, research on large scale seems to be appropriate. Our main objective of this small-scale study was to broach the topic and convince more affluent researchers to examine this hiatus more thoroughly. However, the findings will be assessed against the preliminary academic statements. Table 12 confirms the negative relation between the level of testosterone and the age of the person. Higher levels of testosterone/cortisol should show higher levels of SDO/IRI, but this cannot be fully affirmed by the results in table 12. The level of risk-taking is quite in accordance with the level of hormones, however the second experimental subject shows a level of cortisol which is not in line with the expectations.

3.4 Conclusion

In order to give an answer to the main research question "***What is the impact of fear and greed on financial decisions?***", various sub questions will be discussed individually. First of all, it is necessary to verify whether the envisioned framework makes sense.

Academic literature evinces the connection between certain types of personality traits. According to Cozzolino and Snyder (2008), greed can be linked to SDO while Davis (1983) gives evidence of the linkage between fear and IRI, especially the statements concerning personal distress. The framework of our experiment was set up based on those relationships. Statistical tests have confirmed that our framework is usable. By analogy with Andrade, Odean and Lin (2013) and Kuhnen and Knutson (2008), various film fragments evoke different types of sentiment and different levels of personality traits. Sentiment and the personality traits are correlated mutually as well. Paragraph 3.3.3.2 and appendix 8.4 can be consulted for a more thorough explanation.

- *Fearful people take risk averse decisions while greedy people take risk seeking decisions.*

Participants with a high SDO (more greedy) show a higher level of risk-taking than participants with a low SDO (less greedy) [M = 2,5078 (high SDO) versus M = 2,2235 (low SDO)]. Those results are statistically significant on a 10%-level [p = 0,085]. With 95% confidence [p = 0,000], it can be stated that people with a high IRI (more fearful) are less willing to take financial risks than people with a low IRI (less fearful) [M = 2,0831 (low IRI) versus M = 2,7817 (high IRI)]. Those findings seem to be in line with the literature of Shefrin (2002) and Kuhnen & Knutson (2008).

The findings of our small-scale collection of saliva samples confirm the statement of Apicella, et al. (2008). Men with higher levels of testosterone are inclined to take more financial risks. Our results cannot verify nor falsify the inverse relation between risk-taking behaviors and the presence of cortisol (Mazur, 1995). However, the outcome gives an indication of the negative relationship but the extreme value of one experimental subject must be kept in mind.

- *Emotions influence the decision making of women more than men.*

In contrast with what was stated, women do not experience a greater impact of the displayed film fragment on their decision making. In our framework, men demonstrate more variability in their financial decision making. The male part of the participants seems to be more prone to modify their financial decisions due to exogenous factors and visual stimuli than their female counterpart. Our findings don't affirm the statement

of Magen and Konasewich (2011), in which they state that women are more susceptible to emotion-inducing stimuli than men.

- *Women are more risk averse than men.*

What has been stated by many authors, i.a. Park and Zak (2007); Sapienza, Zingales and Maestripieri, 2008; Schubert, Brown, Gysler and Brachinger, 1999, is partly corroborated by our experiment. Only in one case[2], men significantly exhibit a higher mean level of risk-taking than women ['The Wolf of Wall Street': M = 3,0833 (men) versus M = 2,1513 (women)]. In the other two cases, a difference between men and women is noticable ['The Conjuring': M = 2,4303 (men) versus M = 2,0780 (women) and 'Bosch': M = 2,2018 (men) versus M = 2,1352 (women)]. However, the deviation between the two sexes doesn't turn out to be statistically significant.

- *Older people tend to take more risk averse decisions than younger people.*

Since students (mean age of 23) represent the bulk of our participants, we are not able to draw general conclusions. MacCrimmon and Wehrung (1990) state that risk aversion increases with the age. Our statistical tests affirm this and show a discrepancy in risk-taking between people belonging to a different age group. The mean level of risk-taking decreases as age increases.

- *The financial decision making of people with financial experience is less risk seeking than people without financial experience.*

Because students are the main part of the subjects, there is an unequal partition between the groups of people having a different level of financial experience. There seems to be a significant difference in the mean level of risk-taking between people who have some financial experience and people who don't have any experience in the financial sector. However, our results contradict the statement. People who don't have any financial experience seem to be more risk averse than experienced people. In line with Chevalier and Ellison, (1999b), Hong, et al., (2000) and Lamont (2002) in: Brozynski, Menkhoff and Schmidt (2004), a positive relation between experience and risk-taking is found. In our findings, the type of experience doesn't influence the willingness to take financial risks.

[2] The cases are defined by the type of film fragment which the participants were subjected to ('The Wolf of Wall Street', 'The Conjuring' or 'Bosch').

4 Epilogue

“I will tell you the secret to getting rich on Wall Street. You try to be greedy when others are fearful. And you try to be fearful when others are greedy.” (Warren Buffett)

Both the introduction and the conclusion include a quote of Warren Buffet. The citations contain a wisdom and can be scientifically substantiated.

When investors are guided by fear, they will be inclined to act risk averse and want to withdraw from the financial market. The price of securities will drop due to the increased supply. If an individual investor makes financial decisions contrary to the crowd, then he or she can buy securities at a favourable price. When greed prevails the financial market, many investors will be encouraged to take financial risks. The augmented demand for securities pushes up the price. If an individual investor responds to this situation and sells securities, then he or she can cash high profits.

The lesson, which is included in the quote, can be recapitulated by the words of Richards (2010): “It makes far more sense to ignore what the crowd is doing and base your investment decisions on what you need to reach your goals, then stick with the plan despite the fear or greed you may feel. To do otherwise would be following a pattern that has proven to be extraordinarily painful” (p. 1).

4.1 Conclusion

Throughout the master thesis, the underlying mechanisms of fear and greed are examined and elaborated on both behavioral and neurological level.

The presence of greed in financial markets can be recognized by features such as increased asset purchases, resulting in rising prices, and expanding trading activities (Lo C.-S., 2013). On a behavioral point of view, greed can be linked to overoptimism and overconfidence (Li & Wang, 2013, and Nofsinger, 2005), imprudent risk-taking (Barton, 2013) and Social Dominance Orientation (Cozzolino & Snyder, 2008). Neuroscience incorporates brain areas and hormones in order to support the explanation. The brain parts that are responsible for succumbing to greed are located in the limbic system. Particularly the ventral striatum, which mostly consists of the nucleus accumbens, seems to be the key actor (Swenson, 2006). Dopamine is released in the ventral striatal nucleus accumbens (Knutson, Adams, Fong & Hommer, 2001). This, in turn, promotes risk-taking behavior (Knutson, Taylor, Matthew, Peterson & Glover, 2005). People whose nucleus accumbens is stimulated are prone to make riskier investments (Kuhnen & Knutson,

2008). The hormone testosterone triggers irrational extravagance (Coates in: Medeiros, 2013) and is positively correlated with risk-taking behavior (Apicella, et al., 2008).

Properties that are noticable when fear has the upper hand in financial markets are: the offload of securities (Lee & Andrade, 2011) leading to decreasing prices, the predilection for safe investments (Cowen, 2006) and diminishing trading activities (Lo C.-S. , 2013). In this situation, the overall feeling of pessimism dominates the market (Nofsinger, 2005). The behavioral part of our experiment uses the Interpersonal Reactivity Index. Especially the statements related to personal distress can be linked to fearfulness, uncertainty and vulnerability (Davis, 1983). Anxiety, fear and pessimism prevent people from taking risks (Kuhnen C. M., 2009). Risk-averse behavior can neurologically be explained by the anterior insula (Kuhnen & Knutson, 2008) and the amygdala (Rajmohan & Mohandas, 2007). Negative visual stimuli, evoking feelings of fear and anxiety, trigger serotonin. This hormone activates the amygdala (Hariri, et al., 2002). In stressful circumstances, the hormone cortisol is released (Lighthall, Mather & Gorlick, 2009). Risk-taking behavior and cortisol are inversely correlated (Mazur, 1995).

Whether the fight or the flight response occurs, depends on the prevailing hormone. Testosterone encourages the approaching behavior, while cortisol incites the avoidance behavior.

As the final piece, an intuitive though scientifically informative sketch of Peterson (2006) is portrayed.

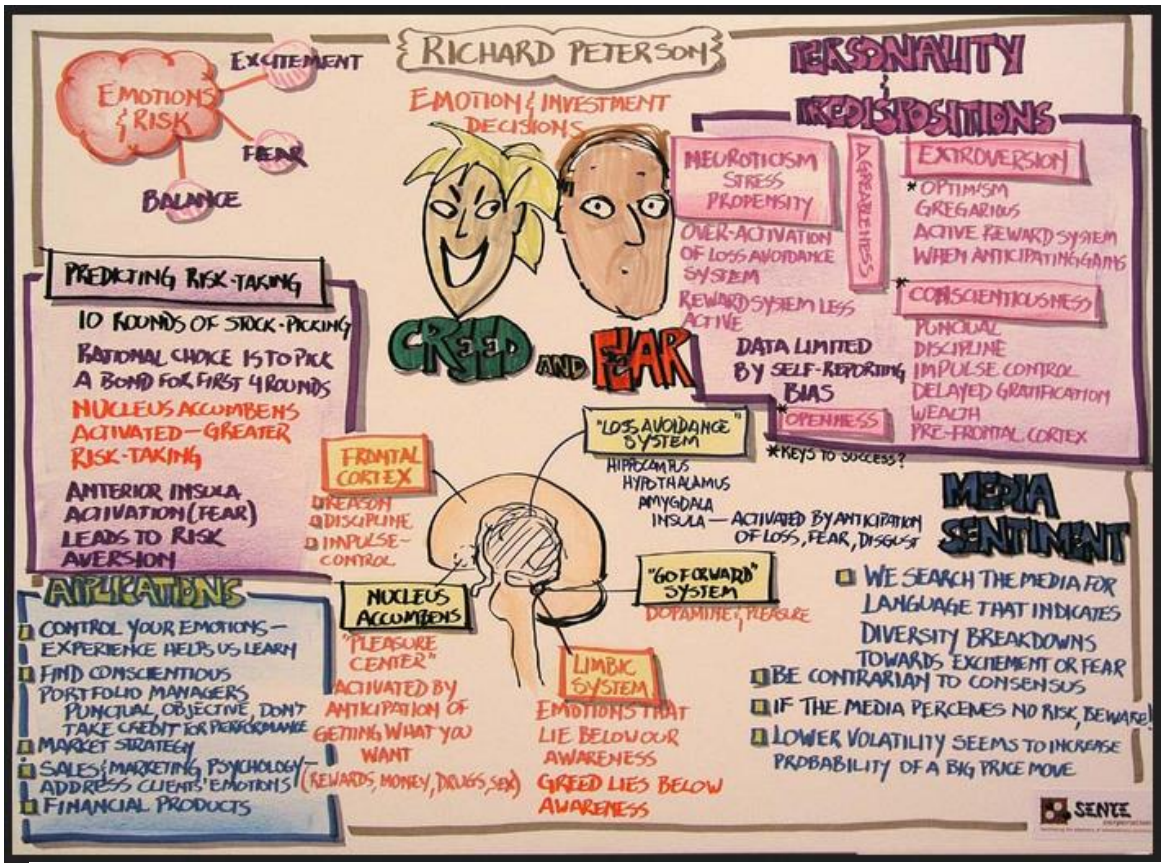


Fig. 25: Summary by Richard Peterson

4.2 Recommendations

In terms of future research, we recommend scientists to develop more multidisciplinary research. Insights from various study fields, such as finance, behavioral economics and neuroeconomics, lead to a better understanding of how financial decisions are made and how the decision making process can be improved. When the neoclassical model of rational decision making is complemented with insights of behavioral economics and neuroeconomics, the model becomes more veracious and accurate. This, in turn, seems to be relevant for economic policy and institutional design (Khoshnevisan, et al., 2008). Since little is known about the hormonal aspects of decision making (Apicella, et al., 2008; Coates & Herbert, 2008; Coates, Gurnell & Sarnyai, 2010; etc.), a collection and examination of saliva samples on a large scale seems to be relevant. Basically, "in order to understand our own behavior we have to understand our own biology" (Medeiros, 2013, p. 1). Moreover, brain scans can certainly add value to the study. Our advice can be underpinned by the fact that visual stimuli, which can be found everywhere (in the streets, in shops and casinos, etc.), have a major impact on both hormones and brain areas. Pictures and movies that arouse excitement neurologically trigger greed and risk-seeking behavior while pictures and movies that provoke fear urge risk-averse behavior. In order to handle the issue of the WEIRD population, cross-cultural research is desired (Gibbons & Poelker, 2013).

For people who want to optimize and rationalize their financial decision making, the following tips and tricks may seem convenient:

People must be aware of the impact of hormones on their financial decision making. John Coates (in: Solon, 2012) has theorized that "if bubbles are caused by a testosterone loop in young men, you could stabilize the financial markets by having more women and older men working in high-frequency trading positions, since they have a 'very different biology with less testosterone', which could make them less prone to the winner effect" (p. 1). John Coates (in: Medeiros, 2013) believes that "a deeper understanding of our physiology should inform not just how we manage our trading floors, but also how we design all workplaces" (p. 3). There is a need for biological diversity, a need for both young and old, male and female traders/employees.

People can overcome fear and greed by learning how these emotions work. Based on Goodman (2013), three specific guidelines can be given. Firstly, when taking risks, a combination between research and gut feeling is the key. Decisions based on only weighing the pros and cons or only gut reactions are doomed to fail. Secondly, people must set manageable goals. When the goals are set too high, people experience fear because they guess they won't be able to achieve them. When the goals are set too low,

people become overconfident, which may result in greed. Thirdly, it is better to be surrounded by people who act in an opposite way. Fearful people should surround themselfves with risk-takers, while greedy ones should be surrounded by risk-averters.

“There’s nothing wrong with making mistakes. The problem is making the same ones over and over” (Hart, 2008, p. 18). The author’s action plan contains three steps as well. First, “Define a personal risk policy” and decide how much risk you are willing to take. Second, “Develop an effective investment strategy” and compose a portfolio consistent with your risk profile and make sure it is diversified enough. Third, “Maintain a long-term perspective” and “put the expectations in perspective” because short-term changes of the market deviate from the long-term market trend.

All in all: “To reach goals, be more logical and take a scientific view of your emotions” (Chen, 2014, p. 1).

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6 List of figures and tables

7 Glossary

S&P	Standard and Poor's Rating agency	Standard and Poor's. (2014). Standard & Poor's Rating Services. Retrieved from satardandpoors.com: http://www.standardandpoors.com/en_US/web/guest/home
NYSE	New York Stock Exchange	New York Stock Exchange. (2014). NYSE Euronext. Retrieved from nyse.nyx.com: https://nyse.nyx.com/
VIX	Volatility Index	Bloomberg. (2014). Chicago Board Options Exchange SPX Volatility Index. Retrieved from bloomberg.com: http://www.bloomberg.com/quote/VIX:IND
SPSS	Statistical Package For Social Sciences	**"SPSS."** *Abbreviations.com.* STANDS4 LLC, 2014. Web. 13 Apr. 2014. <http://www.abbreviations.com/SPSS>.
ANOVA	Analysis Of Variance	**"ANOVA."** *Abbreviations.com.* STANDS4 LLC, 2014. Web. 13 Apr. 2014. <http://www.abbreviations.com/ANOVA>.
ANCOVA	Analysis OF Covariance	"**ANCOVA.**" Abbreviations.com. STANDS4 LLC, 2014. Web. 14 Apr. 2014. <http://www.abbreviations.com/ANCOVA>.
Tol VIF	Tolerance ($1 - R^{*2}_i$) Variance Inflation Factor ($1/Tol_i$)	$Tol_i < 0{,}1$: problem VIF > 10: problem Verhofstadt, E. (2013). Werkcollege Kwantitatieve Methoden. Hogeschool Gent.
TR^2	"TR^2 is a test statistic, where T is the number of observations in the auxiliary regression"	LearnEconometrics. (n.d.). *Time-Varying Volatility and ARCH Models.* Retrieved from learneconometrics.com: http://www.learneconometrics.com/class/5263/notes/arca.pdf
M	Mean	
SD	Standard Deviation	

8 Appendices

8.1 Survey (Dutch version)

UNIVERSITEIT GENT

Beste,

U zal zodra deelnemen aan een enquête gecombineerd met een financieel experiment,
dit in het kader van onze masterproef.
Het is van belang om deze vragenlijst eerlijk in te vullen; er bestaat namelijk geen fout antwoord.
Wij doen onderzoek naar financiële beslissingen en met de resultaten willen we nagaan hoe we financiële keuzes kunnen optimaliseren.

Deze enquête zal slechts enkele minuten in beslag nemen, maar u bewijst ons hiermee een grote dienst.
Deze enquête is anoniem en de gegevens worden vertrouwelijk verwerkt.

Magalie Breda & Eveline Van Berlamont

Master Finance & Risk Management
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WIN!. Indien u kans wil maken op een cinematicket, gelieve uw e-mailadres te noteren.

1. Geslacht:

- ○ man
- ○ vrouw

2. Leeftijd: _____ jaar

3. Heeft u ervaring in de financiële sector?

- ○ ja, in mijn vrije tijd beleg ik actief op de beurs
- ○ ja, mijn beroep is gesitueerd in de financiële wereld
- ○ ja, in mijn studies volg ik financiële vakken
- ○ neen, ik heb geen ervaring in de financiële sector

4. Voordat u van start ging met deze enquête, heeft u een filmpje bekeken.
Welk filmpje werd u toegewezen?

The Wolf of Wall Street	The Conjuring	Bosch
○	○	○

5. Duid aan hoe u zich momenteel voelt:

angstig	neutraal	opgewonden / uitgelaten
○	○	○

6. Duid aan in welke mate de volgende gevoelens op dit moment bij u van toepassing zijn:

	ik ervaar deze emotie helemaal niet	ik ervaar deze emotie in beperkte mate	neutraal	ik ervaar deze emotie eerder sterk	ik ervaar deze emotie heel sterk
opgewonden / uitgelaten	○	○	○	○	○
angstig	○	○	○	○	○

7. Nu vragen we u een financiële keuze te maken.

Welk financieel product kiest u?

Hier vindt u de kenmerken van de financiële producten:

Aandeel X	Aandeel Y
50% kans op + €10	25% kans op + €28
25% kans op - €10	50% kans op - €12
25% kans op €0	25% kans op €0

- ○ Aandeel X
- ○ Aandeel Y

8. Welk financieel product kiest u?

Hier vindt u de kenmerken van de financiële producten:

Aandeel X	Aandeel Y	Obligatie
50% kans op + €10	25% kans op + €28	100% kans op €2
25% kans op - €10	50% kans op - €12	
25% kans op €0	25% kans op €0	

- ○ Aandeel X
- ○ Aandeel Y
- ○ Obligatie

9. In de volgende situatie krijgt u (hypothetisch) €100 en dient u deze te verdelen over verschillende financiële activa.

Hoe verdeelt u uw geld?

* risico is afhankelijk van de rating van de onderneming
→ hoe hoger de rating,
hoe beter de kredietwaardigheid, hoe lager het risico

♦ liquiditeit = de mate waarin u uw financiële bezittingen kunt omzetten in contant geld

<u>cash</u> → laag risico (*) → geen opbrengst → volledig liquide (♦)	
<u>obligaties</u> → laag risico (*) → laag verwacht rendement maar vast → liquiditeit is afhankelijk van de beurs (♦) (gewaarborgde coupon, gewaarborgd kapitaal)	
<u>aandelen</u> → hoog risico (*) → hoog verwacht rendement maar variabel (opbrengst is afhankelijk van de rendabiliteit van de onderneming) → liquiditeit is afhankelijk van de beurs (♦) (niet gewaarborgd dividend)	
Totaal	

Nu volgt de laatste sectie van de enquête. Via deze vragen willen we iets meer te weten komen over uw persoonlijkheid. Het is dan ook van belang om deze eerlijk in te vullen en deze niet te overdenken (volg uw buikgevoel).

10. Duid aan wat het beste bij u past:

	niet akkoord	eerder niet akkoord	neutraal	eerder akkoord	akkoord
Sommige groepen van mensen zijn inferieur aan andere groepen.	○	○	○	○	○
In het verkrijgen van wat je wilt, is het soms nodig om macht tegen andere groepen te gebruiken.	○	○	○	○	○
Het is OK als sommige groepen meer kansen hebben in het leven dan anderen.	○	○	○	○	○
Het is waarschijnlijk een goede zaak dat bepaalde groepen aan de top en anderen onderaan de ladder staan.	○	○	○	○	○
Soms moeten mensen/groepen op hun plaats gehouden worden.	○	○	○	○	○
	niet akkoord	eerder niet akkoord	neutraal	eerder akkoord	akkoord
Groepsgelijkheid zou ons ideaal moeten zijn.	○	○	○	○	○
Alle groepen moeten een gelijke kans krijgen.	○	○	○	○	○
Verhogen van de sociale gelijkheid is noodzakelijk.	○	○	○	○	○
We moeten ernaar streven de inkomens zo gelijk mogelijk te maken.	○	○	○	○	○
Geen groep zou mogen domineren in de maatschappij.	○	○	○	○	○

11. Duid aan wat het beste bij u past:

	niet akkoord	eerder niet akkoord	neutraal	eerder akkoord	akkoord
Soms zit ik niet erg in met andere mensen wanneer ze problemen hebben.	○	○	○	○	○
In noodsituaties voel ik me angstig/bezorgd /ongerust en ongemakkelijk.	○	○	○	○	○
Ik voel me soms hulpeloos als ik mij in het midden van een zeer emotionele situatie bevind.	○	○	○	○	○
Wanneer ik zie dat iemand gewond raakt, heb ik de neiging kalm te blijven.	○	○	○	○	○
Ellende van andere mensen raakt me meestal niet.	○	○	○	○	○
	niet akkoord	eerder niet akkoord	neutraal	eerder akkoord	akkoord
Ik vind het beangstigend om me in een gespannen/stressvolle emotionele situatie te bevinden.	○	○	○	○	○
Als ik zie dat iemand ongelijk behandeld wordt, heb ik soms weinig medelijden met hem.	○	○	○	○	○
Ik ben meestal vrij effectief in het omgaan met noodsituaties.	○	○	○	○	○
Ik heb de neiging om de controle te verliezen in noodsituaties.	○	○	○	○	○
Als ik iemand zie die hulp nodig heeft in een noodsituatie, begin ik te flippen.	○	○	○	○	○

8.2 Survey (English version)

Dear participant,

You're about to participate a survey combined with a financial experiment,
this occurs in the framework of our master thesis.
It is important to honestly fill out the questionnaire and remember that there are no wrong answers.
We are doing research on financial decisions and with the results we want to investigate how to optimize financial choices.

This survey will only take a few minutes, but you prove us a great favour.
This survey is anonymous and the data will be treated confidentially.

Magalie Breda & Eveline Van Berlamont

Master Finance & Risk Management
Handelswetenschappen
UGent

1. Gender:

- ○ man
- ○ woman

2. Age: _____ years old

3. Do you have experience in the financial sector?

- ○ yes, in my spare time I invest actively in the stock market
- ○ yes, my job is situated in the financial world
- ○ yes, in my studies I have financial courses
- ○ no, I don't have experience in the financial sector

4. Prior to this survey, you have watched a short movie.
Which movie were you assigned to?

The Wolf of Wall Street	The Conjuring	Bosch
○	○	○

5. Indicate the mood you are experiencing right now:

anxious	neutral	excited
○	○	○

6. Indicate the extent to which these feelings are applicable to you at this moment:

	I don't experience this emotion at all	I experience this emotion to a limited degree	neutral	I experience this emotion rather strong	I experience this emotion very strongly
excited	○	○	○	○	○
anxious	○	○	○	○	○

7. Now we ask you to make a financial choice.

Which financial product do you choose?

Below you find the characteristics of the financial products:

Stock X	Stock Y
50% probability of + €10	25% probability of + €28
25% probability of - €10	50% probability of - €12
25% probability of €0	25% probability of €0

○ Stock X

○ Stock Y

8. Which financial product do you choose?

Below you find the characteristics of the financial products:

Stock X	Stock Y	Bond
50% probability of + €10	25% probability of + €28	100% probability of €2
25% probability of - €10	50% probability of - €12	
25% probability of €0	25% probability of €0	

○ Stock X

○ Stock Y

○ Bond

9. In the following situation you get (hypothetically) €100 which you should divide among various financial assets.

How do you do you divide your money?

* Risk is dependent on the rating of the company
→ the higher the rating,
the better the creditworthiness and the lower the risk

♦ Liquidity = the degree to which you can convert your financial assets into cash

<u>cash</u> → low risk (*) → no return → completely liquid (♦)	
<u>bonds</u> → low risk (*) → low expected return but fixed → liquidity is dependent on the stock market (♦) (guaranteed coupon, guaranteed capital)	
<u>stocks</u> → high risk (*) → high expected return but variable (the yield depends on the profitability of the company) → liquidity is dependent on the stock market (♦) (dividend is not guaranteed)	
Totaal	

The following part is the last section of the survey. Through these questions, we want to learn something more about your personality. It is important to fill out the questionnaire honestly (follow your gut feeling).

10. Indicate what suits you best:

	disagree	rather disagree	neutral	rather agree	agree
Some groups of people are simply inferior to other groups.	○	○	○	○	○
In getting what you want, it is sometimes necessary to use force against other groups	○	○	○	○	○
It's OK if some groups have more of a chance in life than others	○	○	○	○	○
It's probably a good thing that certain groups are at the top and other groups are at the bottom.	○	○	○	○	○
Sometimes other groups must be kept in their place.	○	○	○	○	○
	disagree	rather disagree	neutral	rather agree	agree
Group equality should be our ideal.	○	○	○	○	○
All groups should be given an equal chance in life.	○	○	○	○	○
Increased social equality.	○	○	○	○	○
We should strive to make incomes as equal as possible.	○	○	○	○	○
No one group should dominate in society.	○	○	○	○	○

11. Indicate what suits you best:

	disagree	rather disagree	neutral	rather agree	agree
Sometimes I don't feel very sorry for other people when they are having problems.	○	○	○	○	○
In emergency situations, I feel apprehensive and ill-at-ease.	○	○	○	○	○
I sometimes feel helpless when I am in the middle of a very emotional situation.	○	○	○	○	○
When I see someone get hurt, I tend to remain calm.	○	○	○	○	○
Other people's misfortunes do not usually disturb me a great deal.	○	○	○	○	○
	disagree	rather disagree	neutral	rather agree	agree
Being in a tense emotional situation scares me.	○	○	○	○	○
When I see someone being treated unfairly, I sometimes don't feel very much pity for them.	○	○	○	○	○
I am usually pretty effective in dealing with emergencies.	○	○	○	○	○
I tend to lose control during emergencies.	○	○	○	○	○
When I see someone who badly needs help in an emergency, I go to pieces.	○	○	○	○	○

8.3 SPSS: Transformation of the variables

General background			
A1 (geslacht)	Nominaal 1 = man 2 = vrouw	Gender	Dummy 0 = man 1 = woman
A2 (leeftijd)	Schaal	Age	Scale
A3 (ervaring)	Nominaal 1 = beurs 2 = job 3 = studies 4 = geen	Experience	Dummies - StockMarket 1 = stock market 0 = other - Job 1 = job 0 = other - Studies 1 = studies 0 = other
Experiment			
A4 (filmfragment)	Nominaal 1 = The Wolf of Wall Street 2 = The Conjuring 3 = Bosch	Movie	Nominal 1 = The Wolf of Wall Street 2 = The Conjuring 3 = Bosch
A5 (emotie)	Nominaal 1 = angstig 2 = neutraal 3 = opgewonden/uitgelaten	Emotion	Dummies - Dexcitement 1 = excitement 0 = other - Dfear 1 = fear 0 = other
A6_1 (opgewonden / uitgelaten)	Ordinaal 1 = ik ervaar deze emotie helemaal niet 2 = ik ervaar deze emotie in beperkte mate 3 = neutraal 4 = ik ervaar deze emotie eerder sterk 5 = ik ervaar deze emotie heel sterk	Excitement	Scale 0 = I don't experience this emotion at all 1 = neutral 2 = I experience this emotion to a limited degree 3 = I experience this emotion rather strong 4 = I experience this emotion very strongly
A6_2 (angstig)	Ordinaal 1 = ik ervaar deze emotie helemaal niet 2 = ik ervaar deze emotie in beperkte mate 3 = neutraal 4 = ik ervaar deze emotie eerder sterk 5 = ik ervaar deze emotie heel sterk	Fear	Scale 0 = I don't experience this emotion at all 1 = neutral 2 = I experience this emotion to a limited degree 3 = I experience this emotion rather strong 4 = I experience this emotion very strongly
A7 (financiële keuze)	Nominaal 1 = aandeel X	FinProdXY	Scale 0 = stock X

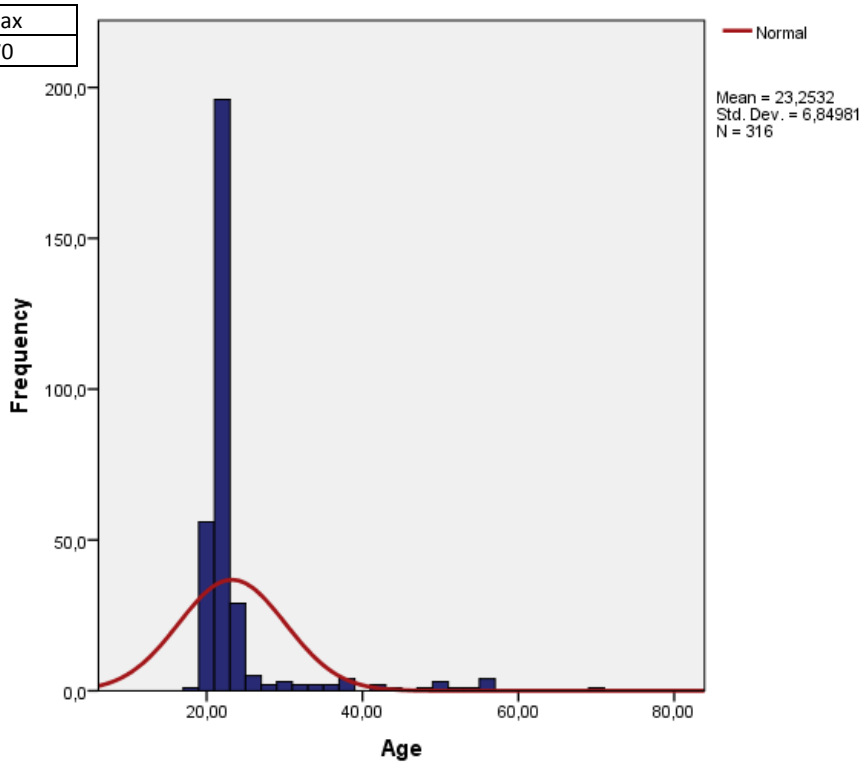
	2 = aandeel Y		2 = stock Y
A8 (financiële keuze)	Nominaal 1 = aandeel X 2 = aandeel Y 3 = obligatie	FinProdXYO	Scale 0 = obligation 1 = stock X 2 = stock Y
A9_1 (cash)		MoneyDivision	Scale [(A9_1*0)+(A9_2*1)+(A9_3*2)]/10 0
A9_2 (obligatie)			
A9_10 (aandeel)			
RiskTaking			Scale FinProdXY + FinProdXYO + MoneyDivision
Personality Traits			
A10_1 t.e.m. A10_10	Ordinaal 1 = niet akkoord 2 = eerder niet akkoord 3 = neutraal 4 = eerder akkoord 5 = akkoord	SDO1 t.e.m. SDO5 SDO6 t.e.m. SDO10	Ordinal 0 = disagree 1 = rather disagree 2 = neutral 3 = rather agree 4 = agree Ordinal 0 = agree 1 = rather agree 2 = neutral 3 = rather disagree 4 = disagree
Overall SDO			Scale Σ SDO$_i$
A11_1 t.e.m. A11_10	Ordinaal 1 = niet akkoord 2 = eerder niet akkoord 3 = neutraal 4 = eerder akkoord 5 = akkoord	IRI 2, 3, 6, 9, 10 IRI 1, 4, 5, 7, 8	Ordinal 0 = disagree 1 = rather disagree 2 = neutral 3 = rather agree 4 = agree Ordinal 0 = agree 1 = rather agree 2 = neutral 3 = rather disagree 4 = disagree
Overall IRI			Scale Σ IRI$_i$
GroupAge	1 = 18 – 30 2 = 31 – 50 3 = 51 – 70		
GroupSDO	1 = Low SDO (0 – 20) 2 = High SDO (21 – 40)		
GroupIRI	1 = Low IRI (0 – 20) 2 = High IRI (21 – 40)		

8.4 SPSS: Statistical output

8.4.1 Descriptive statistics

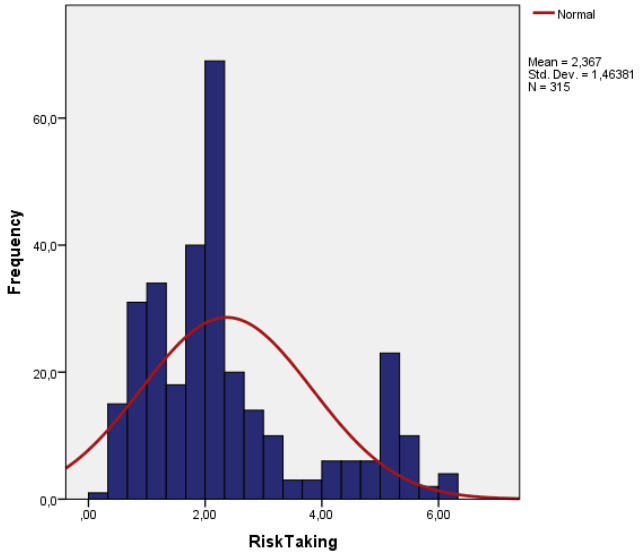
	Frequency	Percent (%)
Gender		
man	141	44,6
woman	175	55,4
total	316	100
Experience		
yes, in my spare time I invest actively in the stock market	14	4,4
yes, my job is situated in the financial world	9	2,8
yes, in my studies I have financial courses	222	70,3
no, I don't have experience in the financial market	71	22,5
total	316	100
Film fragment		
The Wolf of Wall Street	114	36,1
The Conjuring	103	32,6
Bosch	99	31,3
total	316	100

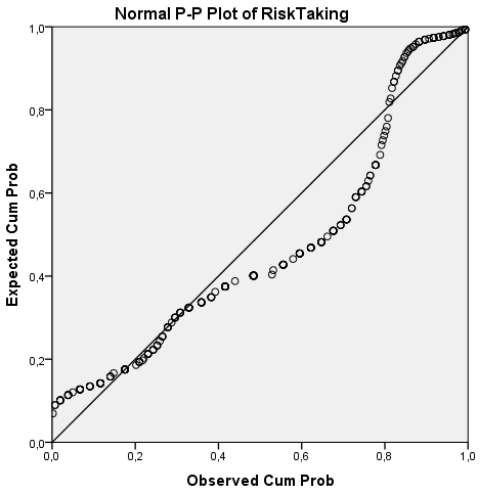
	Min	Max
Age	18	70



8.4.2 Tests on the sample

Assumption	Test	Conclusion	Response
Normally distributed data (Field, Exploring statistics using SPSS, 2009)	Histogram and P-P Plot Kolmogorov-Smirnov test	K-S: **D(315) = 0,181; p = 0,000 (< 0,05)** → significantly non-normal	"The one-way ANOVA is considered a robust test against the normality assumption" (Laerd Statistics, one-way ANOVA, 2013)





Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RiskTaking	,181	315	,000	,878	315	,000

a. Lilliefors Significance Correction

Dependent variable: RiskTaking

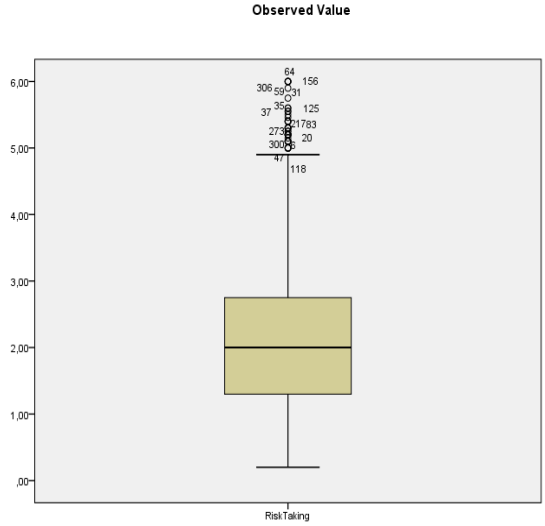
Homogeneity of variance (Field, Exploring statistics using SPSS, 2009)	Levene's test	L: **F(2,312) = 4,677; p = 0,000 (< 0,05)** → variances are significantly different	

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
RiskTaking	Based on Mean	4,677	2	312	,010
	Based on Median	2,786	2	312	,063
	Based on Median and with adjusted df	2,786	2	307,593	,063
	Based on trimmed mean	4,764	2	312	,009

Dependent variable: RiskTaking
Factors: Film fragments

Outliers (Field, Exploring statistics using SPSS, 2009)	Boxplot List with extreme values	There are extreme values.	The presence of extreme values is normal due to the definition (formula) of the dependent variable



Extreme Values

			Case Number	Value
RiskTaking	Highest	1	31	6,00
		2	59	6,00
		3	64	6,00
		4	156	6,00
		5	306	5,90
	Lowest	1	135	,20
		2	303	,40
		3	88	,40
		4	314	,50
		5	294	,50[a]

a. Only a partial list of cases with the value ,50 are shown in the table of lower extremes.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
RiskTaking	315	99,7%	1	0,3%	316	100,0%

Descriptives

			Statistic	Std. Error
RiskTaking	Mean		2,3670	,08248
	95% Confidence Interval for Mean	Lower Bound	2,2047	
		Upper Bound	2,5293	
	5% Trimmed Mean		2,2870	
	Median		2,0000	
	Variance		2,143	
	Std. Deviation		1,46381	
	Minimum		,20	
	Maximum		6,00	
	Range		5,80	
	Interquartile Range		1,45	
	Skewness		,983	,137
	Kurtosis		-,009	,274

8.4.3 Does our framework make sense?

8.4.3.1 The impact of the film fragments on the sentiment

Excitement

ANOVA + contrast (Field, n.d. and Field, 2012)

Descriptives

Excitement

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
The Wolf of Wall Street	114	1,91	1,085	,102	1,71	2,11
The Conjuring	103	1,26	,928	,091	1,08	1,44
Bosch	99	,70	,974	,098	,50	,89
Total	316	1,32	1,117	,063	1,20	1,44

Test of Homogeneity of Variances

Excitement

Levene Statistic	df1	df2	Sig.
1,671	2	313	,190

L: **F(2, 313) = 1,671; p = 0,190 (> 0,05)**
→ equal variances assumed

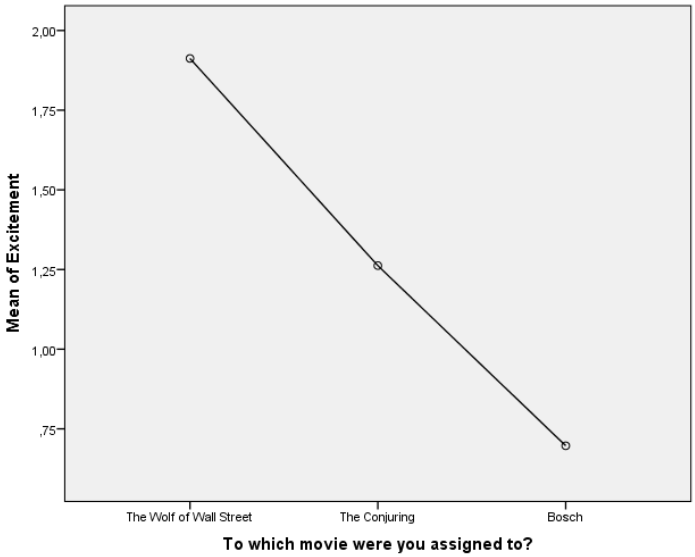
Contrast Coefficients

Contrast	To which movie were you assigned to?		
	The Wolf of Wall Street	The Conjuring	Bosch
1	1	1	-2
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Excitement	Assume equal variances	1	1,78	,243	7,326	313	,000
		2	,65	,136	4,775	313	,000
	Does not assume equal variances	1	1,78	,239	7,457	195,731	,000
		2	,65	,137	4,754	214,375	,000

contrast 1: experimental groups (The Wolf of Wall Street & The Conjuring) versus control group (Bosch)
→ p = 0,000: the means of both groups are significantly different



contrast 2: the two experimental groups are compared against each other (The Wolf of Wall Street versus The Conjuring) → p = 0,000: the means of both groups are significantly different

The trailer of 'The Wolf of Wall Street' significantly (5% level) triggers a higher level of excitement.

Fear

ANOVA + contrast (Field, n.d. and Field, 2012)

Descriptives

Fear

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
The Wolf of Wall Street	114	,47	,743	,070	,34	,61
The Conjuring	103	1,53	1,187	,117	1,30	1,77
Bosch	99	,20	,534	,054	,10	,31
Total	316	,73	1,032	,058	,62	,85

Test of Homogeneity of Variances

Fear

Levene Statistic	df1	df2	Sig.
58,443	2	313	,000

L: **F(2,313) = 58,443; p = 0,000 (< 0,05)**
→ equal variances not assumed

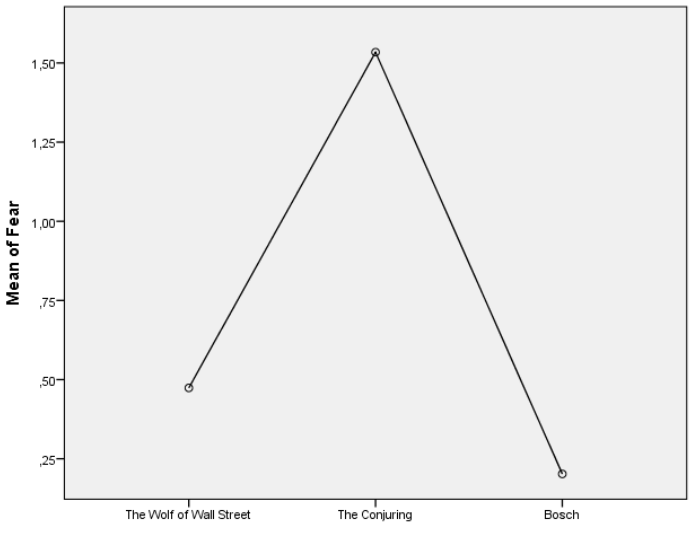
Contrast Coefficients

Contrast	To which movie were you assigned to?		
	The Wolf of Wall Street	The Conjuring	Bosch
1	1	1	-2
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
Fear	Assume equal variances	1	1,60	,210	7,643	313	,000
		2	-1,06	,118	-9,020	313	,000
	Does not assume equal variances	1	1,60	,173	9,252	265,792	,000
		2	-1,06	,136	-7,792	168,061	,000

contrast 1: experimental groups (The Wolf of Wall Street & The Conjuring) versus control group (Bosch) → p = 0,000: the means of both groups are significantly different
contrast 2: the two experimental groups are compared against each other (The Wolf of Wall Street versus The Conjuring) → p = 0,000: the means of both groups are significantly different



The trailer of 'The Conjuring' significantly (5% level) triggers a higher level of fear.

In our framework:
- 'The Wolf of Wall Street' has triggered 'excitement' (95% confidence)
- 'The Conjuring' has triggered 'fear' (95% confidence)

8.4.3.2 *Relationship between the film fragments and the personality traits?*

SDO

ANOVA + contrast (Field, n.d. and Field, 2012)

Descriptives

OverallSDO

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
The Wolf of Wall Street	114	19,8158	6,71620	,62903	18,5696	21,0620
The Conjuring	103	18,4563	5,82216	,57367	17,3184	19,5942
Bosch	99	18,7980	6,03219	,60626	17,5949	20,0011
Total	316	19,0538	6,23102	,35052	18,3641	19,7435

Test of Homogeneity of Variances

OverallSDO

Levene Statistic	df1	df2	Sig.
1,418	2	313	,244

L: **F(2,313) = 1,418; p = 0,244 (> 0,05)**
→ equal variances assumed

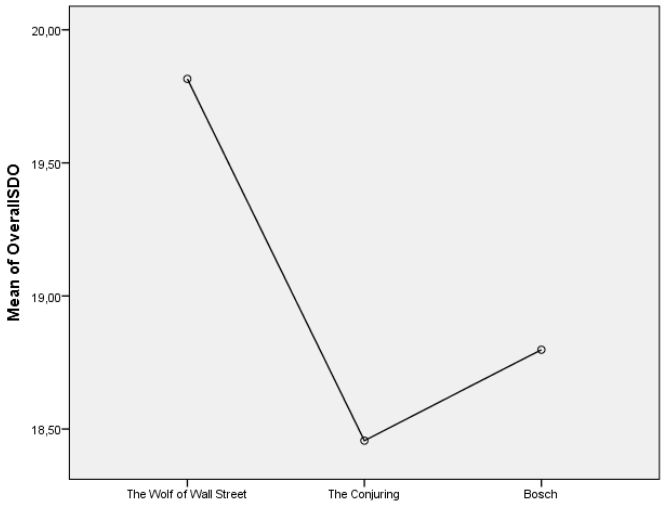
Contrast Coefficients

Contrast	To which movie were you assigned to?		
	The Wolf of Wall Street	The Conjuring	Bosch
1	1	1	-2
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
OverallSDO	Assume equal variances	1	,6761	1,51005	,448	313	,655
		2	1,3595	,84596	1,607	313	,109
	Does not assume equal variances	1	,6761	1,48155	,456	196,624	,649
		2	1,3595	,85134	1,597	214,644	,112

<u>contrast 1:</u> experimental groups (The Wolf of Wall Street & The Conjuring) versus control group (Bosch)
→ p = 0,655: the means of both groups are not significantly different
<u>contrast 2:</u> the two experimental groups are compared against each other (The Wolf of Wall Street versus The Conjuring) → p = 0,109: the means of both groups are not significantly different on the 5% or 10% (but p-value close to 10% level)



'The Wolf of Wall Street' does not significantly trigger SDO on the 5% nor 10% level. However, the p-value is close to the 10% level, namely p = 0,109

IRI

ANOVA + contrast (Field, n.d. and Field, 2012)

Descriptives

OverallIRI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
The Wolf of Wall Street	114	19,9123	6,30432	,59045	18,7425	21,0821
The Conjuring	103	21,5728	5,21612	,51396	20,5534	22,5923
Bosch	99	20,9192	5,87398	,59036	19,7476	22,0907
Total	316	20,7690	5,85544	,32939	20,1209	21,4171

Test of Homogeneity of Variances

OverallIRI

Levene Statistic	df1	df2	Sig.
2,527	2	313	,081

L: **F(2,313) = 2,527; p = 0,081 (> 0,05)**

→ equal variances assumed

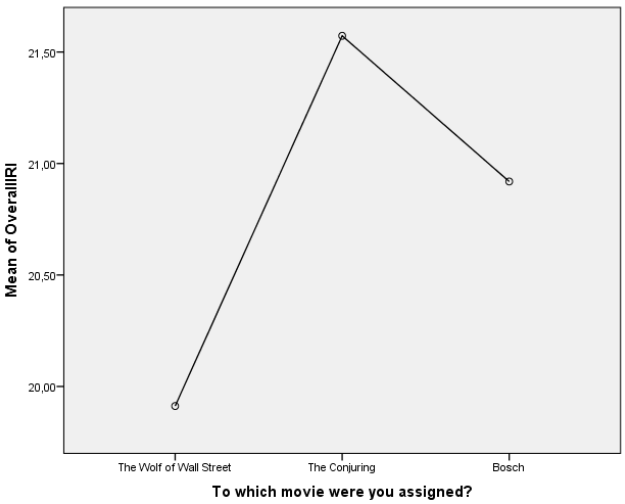
Contrast Coefficients

Contrast	To which movie were you assigned to?		
	The Wolf of Wall Street	The Conjuring	Bosch
1	1	1	-2
2	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
OverallIRI	Assume equal variances	1	-,3533	1,41533	-,250	313	,803
		2	-1,6605	,79289	-2,094	313	,037
	Does not assume equal variances	1	-,3533	1,41664	-,249	186,537	,803
		2	-1,6605	,78281	-2,121	213,392	,035

<u>contrast 1:</u> experimental groups (The Wolf of Wall Street & The Conjuring) versus control group (Bosch)
→ p = 0,803: the means of both groups are not significantly different
<u>contrast 2:</u> the two experimental groups are compared against each other (The Wolf of Wall Street versus The Conjuring) → p = 0,037: the means of both groups are significantly different



'The Conjuring' significantly triggers IRI on the 5% level.

In our framework:
- 'The Wolf of Wall Street' has triggered SDO (90% confidence)
- 'The Conjuring' has triggered IRI (95% confidence)

8.4.3.3 *Correlation between sentiment and personality traits*

Correlation matrix Excitement/Fear SDO/IRI

(Chok, 2010)

→ using Spearman's rho correlation matrix because our sample distribution is non-normal.

Correlations

			Excitement	Fear	OverallSDO	OverallIRI
Spearman's rho	Excitement	Correlation Coefficient	1,000	,171**	,040	-,084
		Sig. (2-tailed)	.	,002	,480	,138
		N	316	316	316	316
	Fear	Correlation Coefficient	,171**	1,000	-,126*	,204**
		Sig. (2-tailed)	,002	.	,025	,000
		N	316	316	316	316
	OverallSDO	Correlation Coefficient	,040	-,126*	1,000	-,258**
		Sig. (2-tailed)	,480	,025	.	,000
		N	316	316	316	316
	OverallIRI	Correlation Coefficient	-,084	,204**	-,258**	1,000
		Sig. (2-tailed)	,138	,000	,000	.
		N	316	316	316	316

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation:

Excitement/SDO: $\rho = 0,40$ Fear/SDO : $\rho = -0,126$ (95% confidence)

Excitement/IRI: $\rho = -0,84$ Fear/IRI : $\rho = 0,204$ (99% confidence)

In our framework:
- positive relation between excitement and SDO
- negative relation between excitement and IRI
- negative relation between fear and SDO
- positive relation between fear and IRI

8.4.4 The actual tests

8.4.4.1 One-way ANOVA

Tests concerning the personality traits (SDO and IRI) and the level of risk-taking

SDO

Descriptives

RiskTaking

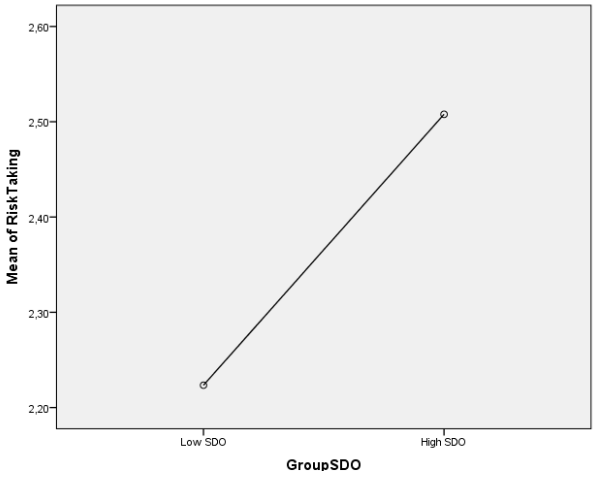
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Low SDO	156	2,2235	1,40936	,11284	2,0006	2,4464
High SDO	159	2,5078	1,50648	,11947	2,2718	2,7438
Total	315	2,3670	1,46381	,08248	2,2047	2,5293

ANOVA

RiskTaking

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,366	1	6,366	2,990	,085
Within Groups	666,453	313	2,129		
Total	672,819	314			

F(1,313) = 2,990; p = 0,085



On a 5%-significance level, there is no significant difference in the mean of level of risk-taking between people with a high and people with a low SDO.
On a 10%-significance level, there is a significant difference in the level of risk-taking between the two groups.

IRI

Descriptives

RiskTaking

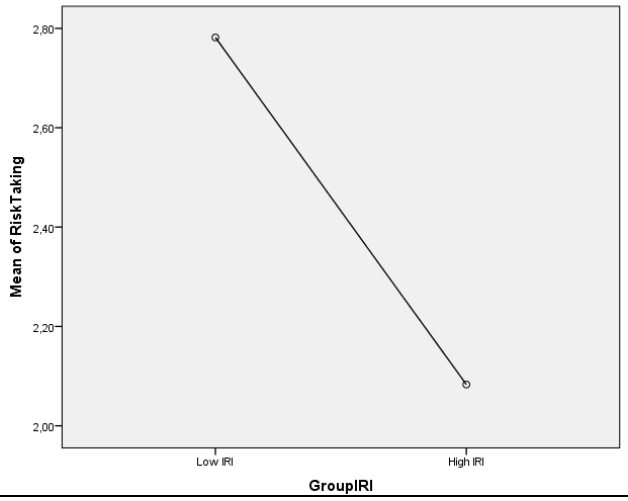
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Low IRI	128	2,7817	1,53281	,13548	2,5136	3,0498
High IRI	187	2,0831	1,34673	,09848	1,8888	2,2774
Total	315	2,3670	1,46381	,08248	2,2047	2,5293

ANOVA

RiskTaking

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37,087	1	37,087	18,260	,000
Within Groups	635,732	313	2,031		
Total	672,819	314			

F(1,313) = 18,260; p = 0,000 (< 0,05)



On a 5%-significance level, there is a significant difference in the mean of the level of risk-taking between people with a high and people with a low IRI.

Our tests assume:

High SDO → High Risk-Taking (90% confidence)
Low SDO → Low Risk-Taking (90% confidence)
High IRI → Low Risk-Taking (95% confidence)
Low IRI → High Risk-Taking (95% confidence)

8.4.4.2 *Two-way ANOVA*

GroupSDO
GroupIRI
(High-Low)

Tests of Between-Subjects Effects

Dependent Variable: RiskTaking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	40,684[a]	3	13,561	6,672	,000
Intercept	1733,902	1	1733,902	853,051	,000
GroupSDO	3,237	1	3,237	1,592	,208
GroupIRI	32,543	1	32,543	16,010	,000
GroupSDO * GroupIRI	,893	1	,893	,439	,508
Error	632,135	311	2,033		
Total	2437,642	315			
Corrected Total	672,819	314			

a. R Squared = ,060 (Adjusted R Squared = ,051)

GroupSDO: F(1,314) = 1,592; p = 0,208 → not significant
GroupIRI: F(1,314) = 16,010; p = 0,000 → significant
GroupSDO*GroupIRI: F(1,314) = 0,439; p = 0,508 → not significant

OverallSDO
OverallIRI

Tests of Between-Subjects Effects

Dependent Variable: RiskTaking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	510,635[a]	228	2,240	1,188	,179
Intercept	710,436	1	710,436	376,717	,000
OverallSDO	79,349	34	2,334	1,238	,214
OverallIRI	111,926	29	3,860	2,047	,006
OverallSDO * OverallIRI	299,503	165	1,815	,963	,588
Error	162,184	86	1,886		
Total	2437,642	315			
Corrected Total	672,819	314			

a. R Squared = ,759 (Adjusted R Squared = ,120)

GroupSDO: F(1,311) = 1,592; p = 0,214 → not significant
GroupIRI: F(1,311) = 16,010; p = 0,006 → significant
GroupSDO*GroupIRI: F(1,311) = 0,588 → not significant

Robustness test:
Two-way ANOVA with the personality traits as a group (high versus low) and the total level of the personality traits
→ both test indicate the same: SDO is not significant, IRI is significant
→ robust

8.4.4.3 ANCOVA

Tests of Between-Subjects Effects

Dependent Variable: RiskTaking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	533,251[a]	235	2,269	1,284	,097
Intercept	6,712	1	6,712	3,799	,055
Gender	4,023	1	4,023	2,277	,135
Age	,801	1	,801	,453	,503
StockMarket	,028	1	,028	,016	,900
Job	8,823	1	8,823	4,994	,028
Studies	1,476	1	1,476	,836	,363
Dexcitement	6,353	1	6,353	3,596	,062
Dfear	1,675	1	1,675	,948	,333
OverallSDO	78,410	34	2,306	1,305	,166
OverallIRI	83,876	29	2,892	1,637	,045
OverallSDO * OverallIRI	274,692	165	1,665	,942	,629
Error	139,568	79	1,767		
Total	2437,642	315			
Corrected Total	672,819	314			

a. R Squared = ,793 (Adjusted R Squared = ,176)

Dependent variable:
- RiskTaking

Fixed factors:
- OverallSDO
- OverallIRI

Covariates:
- Gender
- Age
- Experience
  - Stock Market
  - Job
  - Studies
- Sentiment
  - Dexcitement
  - Dfear

Significant on a 5%-level	Experience: having a job in the financial sector Overall IRI
Significant on a 10%-level	Sentiment: being in an exciting mood
Not significant	Gender Age Experience: actively investing in the stock market and having financial courses in one's studies Sentiment: being in a fearful mood

8.4.4.4 Multiple linear regression

Assumptions (Laerd Statistics, 2013 & Inghelbrecht, 2014)	Test
Independence of observations i.e. independence of residuals	Durbin-Watson Statistic
Linear relationship between the independent variable and each of the independent variables Linear relationship between the independent variable and the independent variables collectively	Scatterplots
Homoscedasticity i.e. errors are independent from the explanatory variables	White's test
No multicollinearity multicollinearity: when two or more independent variables are highly correlated with each other	VIF/Tolerance
No significant outliers	Boxplot
The errors are normally distributed	Kolmogorov-Smirnov
Analysis of the residuals	$E(e_t) = 0 \rightarrow$ Errors have zero mean $Var(e_t) = \sigma^2 \rightarrow$ Variance of the errors is constant $Cov(e_t, e_{t-1}) = 0 \rightarrow$ Errors are statistically independent $Cov(e_t, X_t) = 0 \rightarrow$ No relationship between error and X variable

	e_t is normally distributed → To make inferences about parameters

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,403[a]	,163	,138	1,35922	,163	6,576	9	305	,000	1,742

a. Predictors: (Constant), OverallIRI, Job, Dexcitement, StockMarket, Dfear, OverallSDO, Age, Gender, Studies

b. Dependent Variable: RiskTaking

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109,341	9	12,149	6,576	,000[b]
	Residual	563,478	305	1,847		
	Total	672,819	314			

a. Dependent Variable: RiskTaking

b. Predictors: (Constant), OverallIRI, Job, Dexcitement, StockMarket, Dfear, OverallSDO, Age, Gender, Studies

Coefficients[a]

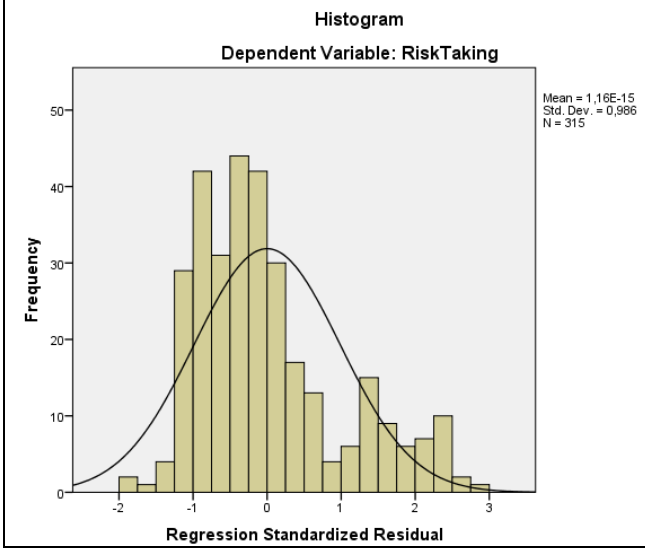
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3,305	,636		5,194	,000	2,053	4,557					
	Gender	-,115	,176	-,039	-,652	,515	-,461	,232	-,189	-,037	-,034	,766	1,306
	Age	-,023	,013	-,109	-1,759	,080	-,049	,003	-,156	-,100	-,092	,717	1,395
	StockMarket	1,042	,442	,142	2,356	,019	,172	1,912	,160	,134	,123	,758	1,319
	Job	,827	,493	,094	1,679	,094	-,142	1,796	,012	,096	,088	,871	1,148
	Studies	,429	,215	,134	1,997	,047	,006	,852	,121	,114	,105	,610	1,639
	Dexcitement	,772	,213	,196	3,621	,000	,352	1,191	,234	,203	,190	,936	1,068
	Dfear	,009	,271	,002	,034	,973	-,523	,542	-,073	,002	,002	,929	1,076
	OverallSDO	,006	,013	,026	,459	,646	-,020	,033	,160	,026	,024	,844	1,184
	OverallIRI	-,046	,015	-,183	-2,994	,003	-,076	-,016	-,263	-,169	-,157	,737	1,358

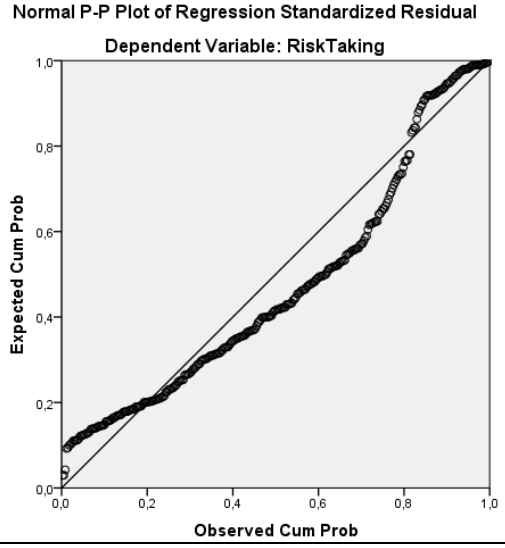
a. Dependent Variable: RiskTaking

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	,6713	4,5133	2,3670	,59010	315
Residual	-2,57249	3,85958	,00000	1,33960	315
Std. Predicted Value	-2,874	3,637	,000	1,000	315
Std. Residual	-1,893	2,840	,000	,986	315

a. Dependent Variable: RiskTaking





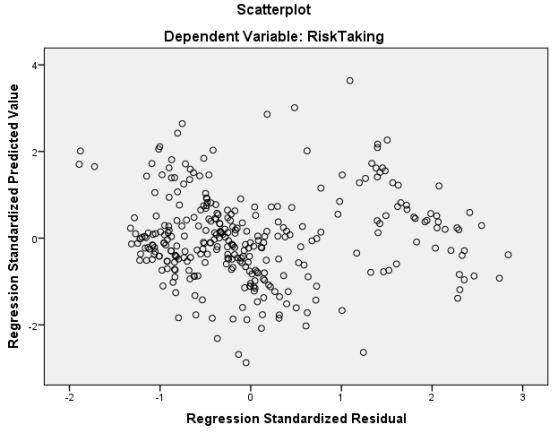
One-Sample Kolmogorov-Smirnov Test

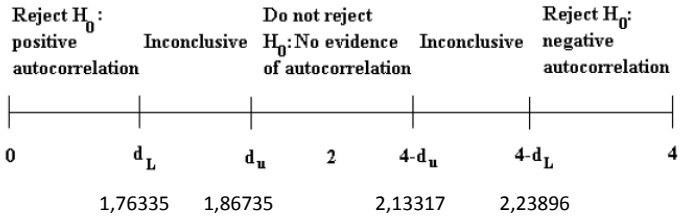
		Standardized Residual
N		315
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	,98556460
Most Extreme Differences	Absolute	,133
	Positive	,133
	Negative	-,082
Test Statistic		,133
Asymp. Sig. (2-tailed)		,000[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Conclusions (Verhofstadt, Werkcollege Kwantitatieve Methoden, 2013)	
Explanatory power of the model	Adjusted $R^2 = 0,138$ $\rightarrow$ 13,8% of the variance in dependent variable is explained by the model, i.e. the chosen independent variables
Statistical significance	ANOVA: F(9, 305) = 6,576; p = 0,000 $\rightarrow$ p < 0,05: reject H_0 $\rightarrow$ the regression model is a good fit of the data (95% confidence): model can be used
Estimated model $\rightarrow$ unstandardized coefficients $\rightarrow$ standardized coefficients	 $y = 3,305 - 0,115x_1 - 0,023x_2 + 1,042x_3 + 0,827x_4 + 0,429x_5 + 0,772x_6 + 0,009\,x_7 + 0,006x_8 - 0,046x_9 + \varepsilon$ $y = -0,039x_1 - 0,109x_2 + 0,142x_3 + 0,094x_4 + 0,134x_5 + 0,196x_6 + 0,002x_7 + 0,459x_8 - 0,183x_9 + \varepsilon$ Significant at 5%-level (p < 0,05): Constant, x_3, x_5, x_6, x_9 Significant at 10%-level (p < 0,10): Constant, x_3, x_5, x_6, x_9, x_2, x_4 x_1 = gender; x_2 = age; x_3 = stock market; x_4 = job; x_5 = studies; x_6 = Dexcitement; x_7 = Dfear; x_8 = OverallSDO; x_9 = OverallIRI
Outliers	There are some « extreme » values because of the formula that is used to define the dependent variable. (see 8.4.2) No outliers bigger than 3 times the standard deviation.
No multicollinearity	<u>VIF/Tolerance</u> Threshold: Tol < 0,1: problem VIF > 10: problem $\rightarrow$ no problem of multicollinearity (because our values of Tol > 0,1 and our values of VIF < 10) $\rightarrow$ no correlation between the independent variables
Analysis of resduals	
$E(e_t) = 0 \rightarrow$ Errors have zero mean $Var(e_t) = \sigma^2 \rightarrow$ Variance of the errors is constant	 Errors are not fully randomly dispersed. This is due to the artificial definition of the dependent variable.

Independence of observations i.e. independence of residuals $Cov(e_i , e_{i-1}) = 0 \rightarrow$ Errors are statistically independent	Durbin-Watson: **DW = 1,742** Critical values (Standford.edu, n.d.): N = 310: D_L = 1,76104 / D_u = 1,86683 N = 320: D_L = 1,76563 / D_u = 1,86804 Our sample consists of 315 subjects, so the mean value of both thresholds are calculated: N = 315: D_L = 1,76335 / D_H = 1,86735  DW = 1,742 $\rightarrow$ There is an indication of positive autocorrelation. The model still has some predictive power, but the usability is somehow dwindled. "The estimated regression parameters remain unbiased. So, point estimates can be made and the model can be used for predicting values of Y for any given set of X values. However, the standard errors of the estimates of the regression parameters are significantly underestimated. This may lead to erroneously inflated t-values" (Wake Forest University, n.d., p.1). The causes may be: "omitted variables, ignoring nonlinearities, measurement errors, misspecification of the functional form and systematic errors in measurement" (National Cheng Kung University, 2002, p. 2).
Homoscedasticity i.e. errors are independent from the explanatory variables $Var(e_t) = \sigma^2 \rightarrow$ Variance of the errors is constant	White's test for heteroskedasticity OLS, using observations 1-316 (n = 315) Missing or incomplete observations dropped: 1 Dependent variable: uhat^2 Omitted due to exact collinearity: X4_X8

White's Test	coefficient	std. error	t-ratio	p-value
Constant	3,05709	8,99077	0,3400	0,7341
Gender	1,86756	3,33133	0,5606	0,5755
Age	-0,125028	0,362569	-0,3448	0,7305
StockMarket	16,0824	29,1269	0,5521	0,5813
Job	12,3707	13,4785	0,9178	0,3595
Studies	-2,05362	4,83168	-0,4250	0,6711
Dexcitement	0,672317	5,94193	0,1131	0,9100
Dfear	3,31548	4,26993	0,7765	0,4381
OverallSDO	0,0958661	0,262645	0,3650	0,7154
OverallIRI	-0,218100	0,298518	-0,7306	0,4656
X2_X3	0,0329091	0,0698351	0,4712	0,6378
X2_X4	0,903784	5,90599	0,1530	0,8785
X2_X5	-1,48105	2,51019	-0,5900	0,5557
X2_X6	-0,538864	1,01017	-0,5334	0,5942
X2_X7	0,459100	1,07526	0,4270	0,6697
X2_X8	-3,65706	1,48987	-2,455	0,0147**
X2_X9	-0,00530395	0,0677243	-0,07832	0,9376
X2_X10	-0,0648981	0,0801995	-0,8092	0,4191
sq_Age	7,91816e-05	0,00356982	0,02218	0,9823
X3_X4	-0,519091	1,19763	-0,4334	0,6650
X3_X5	-0,161748	0,191007	-0,8468	0,3978
X3_X6	0,164299	0,160250	1,025	0,3061
X3_X7	0,0442520	0,188021	0,2354	0,8141
X3_X8	-0,100416	0,0851857	-1,179	0,2395
X3_X9	-9,17438e-05	0,00445367	-0,02060	0,9836
X3_X10	0,00543617	0,00727264	0,7475	0,4554
X4_X7	-1,87543	2,21108	-0,8482	0,3971
X4_X9	-0,0275176	0,175450	-0,1568	0,8755
X4_X10	-0,198279	0,262289	-0,7560	0,4503

	X5_X8	-1,84606	2,76459	-0,6678	0,5049
	X5_X9	-0,208255	0,293442	-0,7097	0,4785
	X5_X10	-0,0421824	0,306231	-0,1377	0,8905
	X6_X7	-0,225905	1,21221	-0,1864	0,8523
	X6_X8	-1,03472	1,73810	-0,5953	0,5521
	X6_X9	-0,0103447	0,0744379	-0,1390	0,8896
	X6_X10	-0,000429663	0,0889744	-0,004829	0,9962
	X7_X9	0,00202824	0,0802814	0,02526	0,9799
	X7_X10	-0,0462698	0,102011	-0,4536	0,6505
	X8_X9	0,0643048	0,100299	0,6411	0,5220
	X8_X10	0,0444403	0,119853	0,3708	0,7111
	sq_OverallSDO	-0,00227757	0,00351996	-0,6470	0,5181
	X9_X10	-7,08550e-05	0,00582371	-0,01217	0,9903
	sq_OverallIRI	0,00269462	0,00452731	0,5952	0,5522
	Unadjusted R-squared = 0,097970 Test statistic: **TR^2 = 30,860422**; with **p-value =** P(Chi-square(42) > 30,860422) = **0,897742** → p > 0,005: no heteroskedacity				
The errors are normally distributed	Kolmogorov-Smirnov: **D(315) = 0,133; p = 0,000** → p < 0,05: reject H_0 → significantly non-normal distribution				

8.4.5 Additional tests

Gender

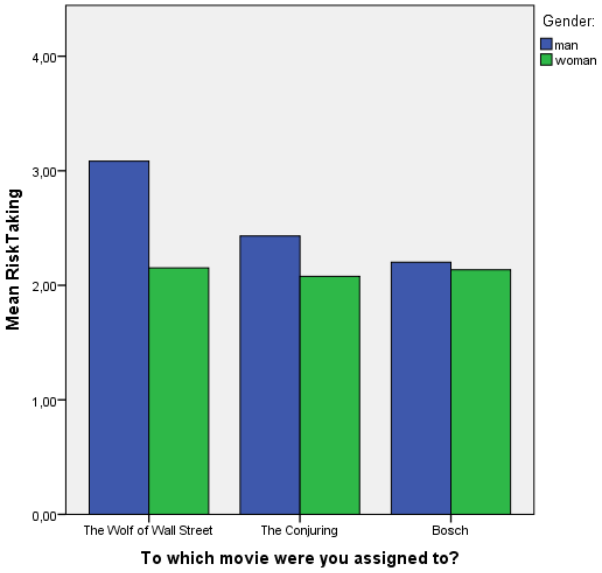
t-test

Group Statistics

	Gender:	N	Mean	Std. Deviation	Std. Error Mean
RiskTaking	man	141	2,6744	1,46026	,12298
	woman	174	2,1179	1,42270	,10785

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RiskTaking	Equal variances assumed	,753	,386	3,412	313	,001	,55652	,16312	,23556	,87748
	Equal variances not assumed			3,402	296,326	,001	,55652	,16357	,23461	,87843



Levene's test:
F(2, 313) = 0,753; p = 0,386
→ p > 0,05: equal variances assumed
Independent samples t-test:
t (313) = 3,412; p = 0,001
→ reject H_0
→ the means of the two groups are significantly different from each other: the mean level of risk-taking significantly differs between men and women

→ origin of the difference in the mean level of risk taking:
- Is there a real difference in the mean level of risk-taking between men and women?
- Is the difference due to the influence of the film fragments? In other words: Do the film fragments provoke a different behavior in terms of taking risk?

t-tests per film fragment

The Wolf of Wall Street

Group Statistics

	Gender:	N	Mean	Std. Deviation	Std. Error Mean
RiskTaking	man	66	3,0833	1,56710	,19290
	woman	47	2,1513	1,47146	,21463

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RiskTaking	Equal variances assumed	1,649	,202	3,196	111	,002	,93206	,29167	,35409	1,51003
	Equal variances not assumed			3,230	102,839	,002	,93206	,28858	,35972	1,50439

Levene's test:
F(2, 111) = 1,649; p = 0,202
→ p > 0,05: equal variances assumed
Independent samples t-test:
t (111) = 3,196; p = 0,002

→ reject H_0
→ the means of the two groups are significantly different from each other: the mean level of risk-taking significantly differs between men and women when subjected to the film fragment of 'The Wolf of Wall Street'

→ significant: men (M = 3,0833; SD = 1,56710) are more risk-taking than women (M = 2,1513; SD = 1,47146)

The Conjuring:

Group Statistics

	Gender:	N	Mean	Std. Deviation	Std. Error Mean
RiskTaking	man	37	2,4303	1,26419	,20783
	woman	66	2,0780	1,35067	,16626

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RiskTaking	Equal variances assumed	,103	,749	1,299	101	,197	,35224	,27120	-,18574	,89022
	Equal variances not assumed			1,323	78,918	,190	,35224	,26615	-,17752	,88200

Levene's test:
F(2, 101) = 0,103; p = 0,749
→ p > 0,05: equal variances assumed
Independent samples t-test:
t (111) = 1,299; p = 0,197
→ accept H_0
→ the means of the two groups are not significantly different from each other: the mean level of risk-taking does not significantly differ between men and women when subjected to the film fragment of 'The Conjuring'

→ not significant: men (M = 2,4303; SD = 1,2641) are more risk-taking than women (M = 2,0780; SD = 1,35067)

Bosch:

Group Statistics

	Gender:	N	Mean	Std. Deviation	Std. Error Mean
RiskTaking	man	38	2,2018	1,26961	,20596
	woman	61	2,1352	1,48218	,18977

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RiskTaking	Equal variances assumed	1,698	,196	,229	97	,819	,06660	,29034	-,50965	,64284
	Equal variances not assumed			,238	87,571	,813	,06660	,28006	-,49000	,62319

Levene's test:
F(2, 97) = 1,698; p = 0,196
→ p > 0,05: equal variances assumed
Independent samples t-test:
t (97) = 0,229; p = 0,819
→ accept H_0
→ the means of the two groups are not significantly different from each other: the mean level of risk-taking does not significantly differ between men and women when subjected to the film fragment of 'Bosch'

→ not significant: men (M = 2,2018; SD = 1,25951) are more risk-taking than women (M = 2,1352; SD = 1,48218)

Experience

ANOVA + contrast

Descriptives

RiskTaking

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
yes, I invest actively on the stock market in my spare time	13	3,4962	1,45566	,40373	2,6165	4,3758	1,90	6,00
yes, my job is situated in the financial sector	9	2,4722	1,86181	,62060	1,0411	3,9033	,50	5,25
yes, I have financial courses in my studies	222	2,4816	1,48716	,09981	2,2849	2,6783	,40	6,00
no, I don't have experience in the financial market	71	1,7885	1,11823	,13271	1,5238	2,0531	,20	5,46
Total	315	2,3670	1,46381	,08248	2,2047	2,5293	,20	6,00

Test of Homogeneity of Variances

RiskTaking

Levene Statistic	df1	df2	Sig.
4,320	3	311	,005

Levene's test:

F(3, 311) = 4,320; p = 0,005

→ p < 0,05: equal variances not assumed

Contrast Coefficients

Contrast	Do you have experience in the financial sector?			
	yes, I invest actively on the stock market in my spare time	yes, my job is situated in the financial sector	yes, I have financial courses in my studies	no, I don't have experience in the financial market
1	1	1	1	-3
2	1	1	-2	0
3	1	-1	0	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
RiskTaking	Assume equal variances	1	3,0846	,80390	3,837	311	,000
		2	1,0051	,64579	1,556	311	,121
		3	1,0239	,61691	1,660	311	,098
	Does not assume equal variances	1	3,0846	,84653	3,644	24,320	,001
		2	1,0051	,76681	1,311	16,651	,208
		3	1,0239	,74037	1,383	14,476	,188

1: experience versus no experience: p = 0,001

→ the mean level of risk-taking significantly differs between the two groups (experience versus no experience)

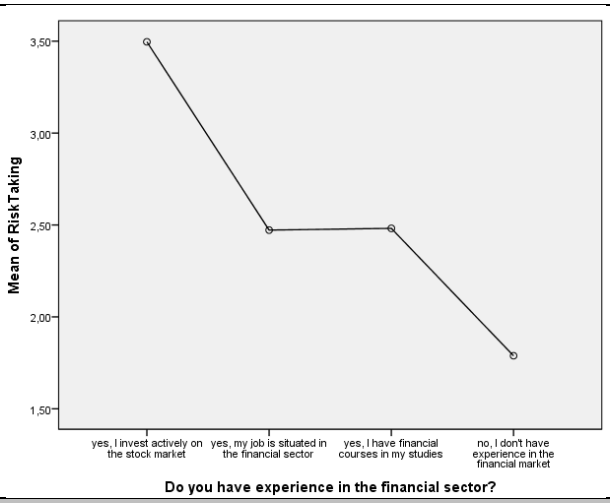
→ people with some experience are more risk-taking than people without experience

2: experience in professional life (stock market and job) versus experience due to studies (school): p = 0,208

→ the mean level of risk-taking does not significantly differ between the two groups

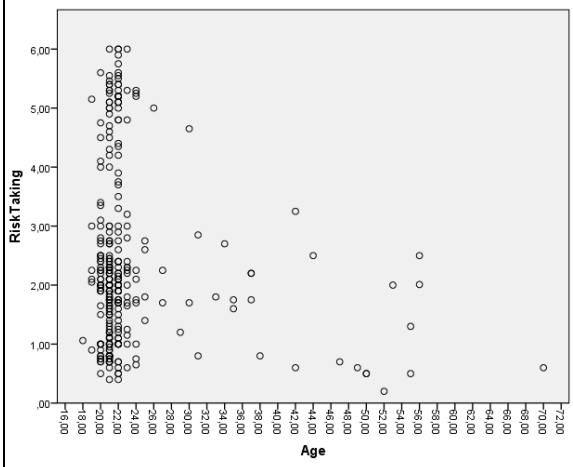
3: actively investing in the stock market versus having a job in the financial sector: p = 0,188

→ the mean level of risk-taking does not significantly differ between the two groups



Age

Graph



→ amount of observations is highly concentrated in the low age category (survey is mainly carried out with students)
→ divide the observations in several groups:
- 18 → 30
- 31 → 50
- 51 → 70

All groups cover approximately the same interval of age. The first group has a smaller interval because the subjects of first category are highly represented in our sample.

Descriptives

RiskTaking

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
18-30	291	2,4378	1,47959	,08674	2,2671	2,6085	,40	6,00
31-50	17	1,5941	,92261	,22377	1,1198	2,0685	,50	3,25
51-70	7	1,3014	,89201	,33715	,4765	2,1264	,20	2,50
Total	315	2,3670	1,46381	,08248	2,2047	2,5293	,20	6,00

Test of Homogeneity of Variances

RiskTaking

Levene Statistic	df1	df2	Sig.
2,044	2	312	,131

Levene's test:
F(2, 312) = 2,044; p = 0,131
→ p > 0,05: equal variances assumed

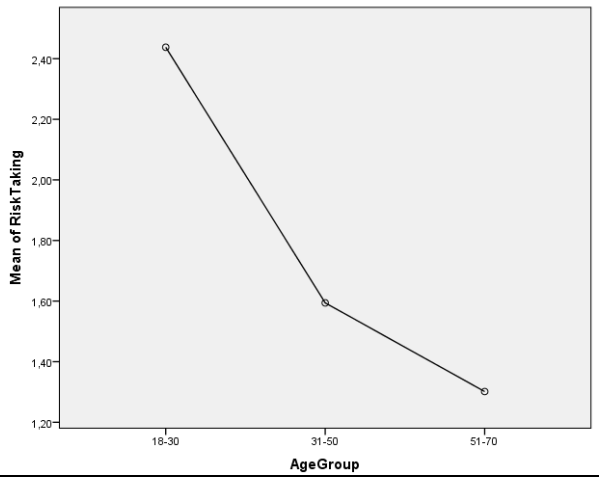
Contrast Coefficients

Contrast	AgeGroup		
	18-30	31-50	51-70
1	2	-1	-1
2	1	0	-1
3	1	-1	0

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
RiskTaking	Assume equal variances	1	1,9800	,67161	2,948	312	,003
		2	1,1363	,55345	2,053	312	,041
		3	,8436	,36105	2,337	312	,020
	Does not assume equal variances	1	1,9800	,44026	4,497	16,242	,000
		2	1,1363	,34813	3,264	6,820	,014
		3	,8436	,23999	3,515	21,143	,002

1: 'young' (18-30) versus 'old'(31-70): p = 0,003
→ the mean level of risk-taking significantly differs between the two groups (young versus old)
2: 'young' (18-30) versus 'old' (51-70): p = 0,41
→ the mean level of risk-taking significantly differs between the two groups (young versus old)
3: 'young' (18-30) versus 'old' (31-50): p = 0,002
→ the mean level of risk-taking significantly differs between the two groups (young versus old)



→ the mean level of risk-taking decreases as age increases

The age category of 18-30 (M = 2,4378; SD = 1,47959) is significantly more risk-taking than the age category of 31-50 (M = 1,5941; SD = 0,92261) and the age category of 51-70 (M = 1,3014; SD = 0,89201).

8.4.6 References

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8.5 Saliva samples: Checklist

ID :

CHECKLIST saliva collection

- Visiting dentist 48 h before drooling? YES / NO
- Injuries in mouth? YES / NO
- Teeth brushed YES / NO
- Fasting? YES / NO
- Alcohol 12h before? YES / NO
- Smoker? YES / NO
- Eating 1u before? YES / NO
- Dairy products less than 20' before? YES / NO
- Food with high content sugar or acidity or caffeine just before sample? YES / NO
- Night shifts? YES / NO
- Medical history?

  .....

  .....

Actual medication/hormonal anticonceptiva? YES/NO

Name medication	Dose	Daily/prn

Instructions saliva collection (passive drooling)

1. Rinse mouth with water 10 minutes before collection
2. Let patient collect saliva in the mouth (thinking of his favourite food).
3. Instruct patient to bend over the head fore over and let the saliva pass by the straw into the tube. Be careful to have enough sample although there can be a lot of foam.
4. Repeat until tube is full.
5. Keep the samples cool (4°C) and store as soon as possible below -20°C.

4/4/2014

Testosteron in speeksel Rks 7 + studie Magalie 030414 in pg/mL										T0480	
						DATA					
Standaardcurve	250 ul		mg testo	1.049072 mg/ml		13/05/13					
			ug testo			14/05/13					
			A/B/C/D			09/10/13					
									pg/mL		
Sample Type	Analyt	IS	Actual Conc	Area	IS Area	Ratio	etention Tin	Sample Name	Calculated Conc	Onjuistheid	ng/dL
Standard	TESTO	TESTO	0	10859.2	1734522.3	0.0063	10.16	Stand 0	< 0	N/A	#VALUE!
Standard	TESTO	TESTO	2.62	18370.1	1491524.3	0.0123	10.16	Stand 1	2.761	105.4	0.276
Standard	TESTO	TESTO	5.25	31903.7	1798321.7	0.0177	10.18	Stand 2	5.234	99.7	0.523
Standard	TESTO	TESTO	10.49	44045.7	1492926.4	0.0295	10.18	Stand 3	10.596	101.0	1.060
Standard	TESTO	TESTO	18.9	86045.6	1797089.7	0.0479	10.17	Stand 4	18.974	100.4	1.897
Standard	TESTO	TESTO	52.4	224444.8	1919327.5	0.1169	10.17	Stand 5	50.457	96.3	5.046
Standard	TESTO	TESTO	105	449002.3	1900501.9	0.2363	10.18	Stand 6	104.850	99.9	10.485
Standard	TESTO	TESTO	189	805082.8	1900665.0	0.4236	10.18	Stand 7	190.249	100.7	19.025
Standard	TESTO	TESTO	525	2072539.6	1793417.8	1.1556	10.17	Stand 8	523.981	99.8	52.398
Standard	TESTO	TESTO	1049	4393571.7	1828629.7	2.4027	10.17	Stand 9	1092.476	104.1	109.248
Standard	TESTO	TESTO	1888	7460932.2	1839603.0	4.0557	10.17	Stand 10	1846.083	97.8	184.608
Unknown	TESTO	TESTO	N/A	N/A	N/A	#VALUE!	N/A	MeOH	N/A	N/A	#VALUE!
Unknown	TESTO	TESTO	N/A	9361.3	1720589.7	0.0054	10.18	Stand Nieuw S0	< 0	N/A	#VALUE!
Unknown	TESTO	TESTO	N/A	19037.2	1641060.0	0.0116	10.17	Stand Nieuw S1	2.434	N/A	0.243
Unknown	TESTO	TESTO	N/A	26744.2	1638397.1	0.0163	10.18	Stand Nieuw S2	4.587	N/A	0.459
Unknown	TESTO	TESTO	N/A	57707.0	1860225.6	0.0310	10.19	Stand Nieuw S3	11.288	N/A	1.129
Unknown	TESTO	TESTO	N/A	83811.6	1778132.3	0.0471	10.20	Stand Nieuw S4	18.634	N/A	1.863
Unknown	TESTO	TESTO	N/A	211241.6	1769430.0	0.1194	10.19	Stand Nieuw S5	51.571	N/A	5.157
Unknown	TESTO	TESTO	N/A	451646.7	1880152.6	0.2402	10.20	Stand Nieuw S6	106.657	N/A	10.666
Unknown	TESTO	TESTO	N/A	781003.0	1788909.0	0.4366	10.20	Stand Nieuw S7	196.175	N/A	19.618
Unknown	TESTO	TESTO	N/A	2166999.4	1776023.8	1.2201	10.20	Stand Nieuw S8	553.387	N/A	55.339
Unknown	TESTO	TESTO	N/A	3290780.2	1356286.4	2.4263	10.20	Stand Nieuw S9	1103.262	N/A	110.326
Unknown	TESTO	TESTO	N/A	7870653.9	1909100.7	4.1227	10.21	Stand Nieuw S10	1876.615	N/A	187.662
Unknown	TESTO	TESTO	N/A	N/A	N/A	#VALUE!	N/A	MeOH	N/A	N/A	#VALUE!
Unknown	TESTO	TESTO	N/A	4549.6	N/A	#VALUE!	11.40	Blanc	N/A	N/A	#VALUE!
Unknown	TESTO	TESTO	N/A	147315.9	1911417.2	0.0771	10.21	SP M 22u 211112	32.282	N/A	3.228
Unknown	TESTO	TESTO	N/A	78821.9	1845124.4	0.0427	10.24	SP V 8u 211112	16.621	N/A	1.662
Unknown	TESTO	TESTO	N/A	159946.0	1788689.6	0.0894	10.23	SP M 22u 050314	37.911	N/A	3.791
Unknown	TESTO	TESTO	N/A	68812.5	1739082.2	0.0396	10.25	SP V 8u 050314	15.184	N/A	1.518
Unknown	TESTO	TESTO	N/A	77100.4	1899662.2	0.0406	10.23	140326-1719 130	15.649	N/A	1.565
Unknown	TESTO	TESTO	N/A	20918.8	1774669.4	0.0118	10.23	140328-1843	2.520	N/A	0.252
Unknown	TESTO	TESTO	N/A	26221.4	1693153.1	0.0155	10.23	140331-1761	4.206	N/A	0.421
Unknown	TESTO	TESTO	N/A	57636.2	1837064.6	0.0314	10.24	140331-1768	11.449	N/A	1.145
Unknown	TESTO	TESTO	N/A	157816.8	1825251.8	0.0865	10.24	140401-1763	36.563	N/A	3.656

Testosteron in speeksel Rks 7 + studie Magalie 030414 in pg/mL — **T0480**

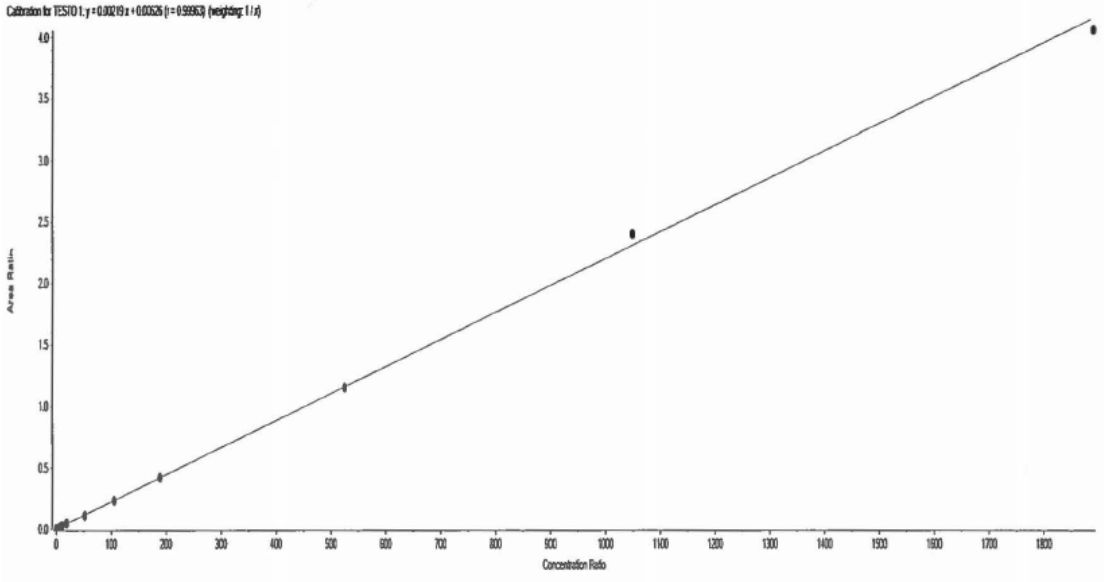
					DATA
Standaardcurve	250 ul		mg testo	1.049072 mg/ml	13/05/13
			ug testo		14/05/13
			A/B/C/D		09/10/13

Sample Type	Analyt	IS	Actual Conc	Area	IS Area	Ratio	etention Tin	Sample Name	Calculated Conc pg/mL	Onjuistheid	ng/dL
Unknown	TESTO 1	sTESTO	N/A	254117.2	1637313.4	0.1552	10.21	LVDB 23	67.901	N/A	6.790
Unknown	TESTO 1	sTESTO	N/A	206669.0	1685982.7	0.1226	10.23	WH 59	53.028	N/A	5.303
Unknown	TESTO 1	sTESTO	N/A	193861.0	1751074.6	0.1107	10.24	LVDB 63	47.617	N/A	4.762
Unknown	TESTO 1	sTESTO	N/A	254236.5	1728699.6	0.1471	10.26	JC 24	64.192	N/A	6.419
Unknown	TESTO 1	sTESTO	N/A	70301.5	1940394.1	0.0362	10.24	SP V 8u 211112	13.663	N/A	1.366
Unknown	TESTO 1	sTESTO	N/A	145266.9	1804479.6	0.0805	10.24	SP M 22u 050314	33.846	N/A	3.385
Unknown	TESTO 1	sTESTO	N/A	59734.2	1856402.1	0.0322	10.21	SP V 8u 050314	11.815	N/A	1.182

Results Saliva Samples Masterthesis - ,TESTOSTERONE

Testosteron in speeksel Rks 7 + studie Magalie 030414 in pg/mL — T0480

Standaardcurve 250 ul — mg testo 1.049072 mg/ml — DATA 13/05/13 — ug testo 14/05/13 — A/B/C/D 09/10/13



Cortisol in speeksel	Routine Rks 7 + studie Magalie	030414	curve in ng/mL					T0480	
			DATA						
Standaardcurve	250 ul	mg cortisol	0.900403 mg/ml	13/05/13					
		ug cortisol		23/05/13					
		A/B/C/D		9/10/2013					
							ng/mL		

Sample Type	Analyt	IS	Actual Conc	Area	IS Area	Ratio	Retention Time	Sample Name	Calculated Conc	Onjuistheid	µg/dL
Standard	CORT 1	sCORT	0	1596.4	4366913.3	0.0004	6.74	Stand 0	< 0	N/A	#VALUE!
Standard	CORT 1	sCORT	0.13	27394.0	3791363.6	0.0072	6.75	Stand 1	0.130	100.2	0.013
Standard	CORT 1	sCORT	0.26	131131.9	9191194.0	0.0143	6.76	Stand 2	0.264	101.5	0.026
Standard	CORT 1	sCORT	0.51	255292.3	9373465.6	0.0272	6.72	Stand 3	0.510	100.0	0.051
Standard	CORT 1	sCORT	0.92	511333.3	10739624.7	0.0476	6.75	Stand 4	0.897	97.5	0.090
Standard	CORT 1	sCORT	2.56	1380188.9	9579125.4	0.1441	6.76	Stand 5	2.728	106.6	0.273
Standard	CORT 1	sCORT	5.12	3414896.6	12298180.9	0.2777	6.76	Stand 6	5.265	102.8	0.526
Standard	CORT 1	sCORT	9.21	6094807.1	12530753.8	0.4864	6.76	Stand 7	9.227	100.2	0.923
Standard	CORT 1	sCORT	25.6	10449999.8	7796520.3	1.3403	6.75	Stand 8	25.440	99.4	2.544
Standard	CORT 1	sCORT	51.2	39037138.4	14516097.3	2.6892	6.74	Stand 9	51.049	99.7	5.105
Standard	CORT 1	sCORT	92.1	59674235.9	12870496.9	4.6365	6.75	Stand 10	X ~~88.018~~ +	95.6	8.802
Unknown	CORT 1	sCORT	N/A	3567.9	N/A	#VALUE!	6.75	MeOH	N/A ↓	N/A	#VALUE!
Unknown	CORT 1	sCORT	N/A	1641.5	4226960.3	0.0004	6.71	Stand Nieuw S0	0.000	N/A	0.000
Unknown	CORT 1	sCORT	N/A	27431.3	4411744.3	0.0062	6.75	Stand Nieuw S1	0.111 0,114	N/A	0.011
Unknown	CORT 1	sCORT	N/A	44208.0	3389030.5	0.0130	6.76	Stand Nieuw S2	0.241 0,246	N/A	0.024
Unknown	CORT 1	sCORT	N/A	270618.0	10330602.2	0.0262	6.76	Stand Nieuw S3	0.490 0,501	N/A	0.049
Unknown	CORT 1	sCORT	N/A	490823.3	10099759.2	0.0486	6.76	Stand Nieuw S4	0.916 0,936	N/A	0.092
Unknown	CORT 1	sCORT	N/A	966280.7	7233222.7	0.1336	6.76	Stand Nieuw S5	2.529 2,586	N/A	0.253
Unknown	CORT 1	sCORT	N/A	3106173.1	11663467.1	0.2663	6.77	Stand Nieuw S6	5.049 5,161	N/A	0.505
Unknown	CORT 1	sCORT	N/A	5408891.6	11409200.1	0.4741	6.76	Stand Nieuw S7	8.994 9,194	N/A	0.899
Unknown	CORT 1	sCORT	N/A	14308158.3	10518892.9	1.3602	6.78	Stand Nieuw S8	25.817 26,398	N/A	2.582
Unknown	CORT 1	sCORT	N/A	26280253.2	9523704.2	2.7595	6.74	Stand Nieuw S9	52.382 53,547	N/A	5.238
Unknown	CORT 1	sCORT	N/A	66924610.0	14992851.8	4.4638	6.78	Stand Nieuw S10	84.738 86,673	N/A	8.474
Unknown	CORT 1	sCORT	N/A	4043.6	708.2	5.7099	6.78	MeOH	108.397	N/A	10.840
Unknown	CORT 1	sCORT	N/A	3750.5	N/A	#VALUE!	6.78	Blanc	N/A	N/A	#VALUE!
Unknown	CORT 1	sCORT	N/A	112697.0	11611028.5	0.0097	6.79	SP M 22u 211112	0.177	N/A	0.018
Unknown	CORT 1	sCORT	N/A	1114591.5	13179279.3	0.0846	6.80	SP V 8u 211112	1.599	N/A	0.160
Unknown	CORT 1	sCORT	N/A	103159.0	11438276.7	0.0090	6.79	SP M 22u 050314	0.164	N/A	0.016
Unknown	CORT 1	sCORT	N/A	1100128.6	12414139.3	0.0886	6.79	SP V 8u 050314	1.676	N/A	0.168
Unknown	CORT 1	sCORT	N/A	31949.6	12727734.9	0.0025	6.79	140326-1719 130ul	0.041	N/A	0.004
Unknown	CORT 1	sCORT	N/A	195949.2	12178813.5	0.0161	6.79	140328-1843	0.299	N/A	0.030
Unknown	CORT 1	sCORT	N/A	141929.7	11195000.7	0.0127	6.80	140331-1761	0.234	N/A	0.023
Unknown	CORT 1	sCORT	N/A	46245.8	11167108.9	0.0041	6.80	140331-1768	0.072	N/A	0.007
Unknown	CORT 1	sCORT	N/A	71095.6	12180542.9	0.0058	6.80	140401-1763	0.104	N/A	0.010

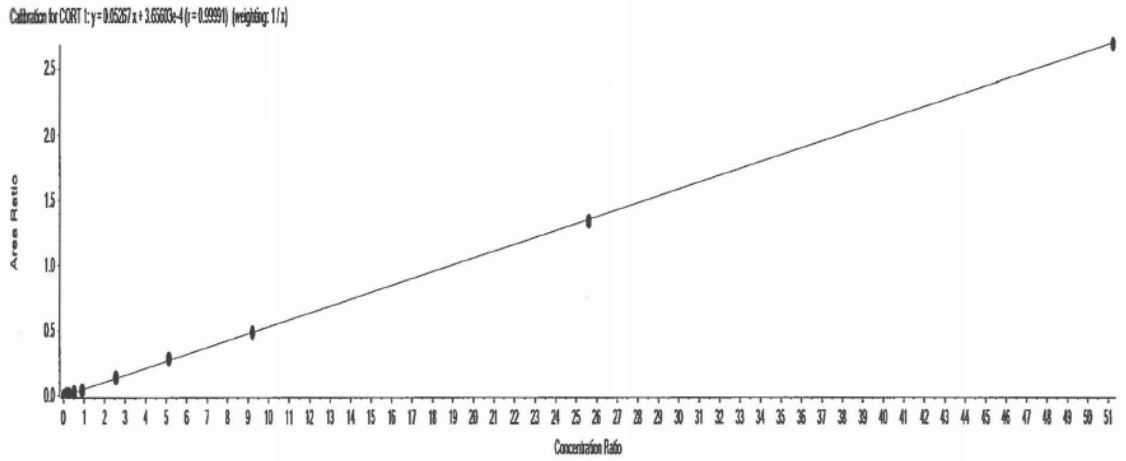
2nde stand reeks

Derde stand reeks

Cortisol in speeksel Routine Rks 7 + studie Magalie 030414					curve in ng/mL				T0480	
					DATA					
Standaardcurve	250 ul		mg cortisol	0.900403 mg/ml	13/05/13					
			ug cortisol		23/05/13					
			A/B/C/D		9/10/2013					
								ng/mL		
Sample Type	Analyt	IS	Actual Conc	Area	IS Area	Ratio	Retention Tim(	Sample Name	Calculated Conc	Onjuistheid	µg/dL
Unknown	CORT 1	sCORT	N/A	59377.8	11817880.1	0.0050	6.78	140402-1629	0.088	N/A	0.009
Unknown	CORT 1	sCORT	N/A	1146466.3	10935241.6	0.1048	6.77	LVDB 23	1.983	N/A	0.198
Unknown	CORT 1	sCORT	N/A	1399885.9	11350489.0	0.1233	6.78	WH 59	2.335	N/A	0.233
Unknown	CORT 1	sCORT	N/A	1163280.7	12213909.9	0.0952	6.80	LVDB 63	1.801	N/A	0.180
Unknown	CORT 1	sCORT	N/A	4058499.3	12470568.4	0.3254	6.81	JC 24	6.172	N/A	0.617
Unknown	CORT 1	sCORT	N/A	124182.4	12211246.8	0.0102	6.79	SP M 22u 211112	0.186	N/A	0.019
Unknown	CORT 1	sCORT	N/A	1245371.9	14421691.8	0.0864	6.79	SP V 8u 211112	1.633	N/A	0.163
Unknown	CORT 1	sCORT	N/A	108247.9	12372277.1	0.0087	6.77	SP M 22u 050314	0.159	N/A	0.016
Unknown	CORT 1	sCORT	N/A	1154355.4	12950347.9	0.0891	6.79	SP V 8u 050314	1.685	N/A	0.169

Results Saliva Samples Masterthesis - CORTISOL

Cortisol in speeksel Routine Rks 7 + studie Magalie 030414 curve in ng/mL T0480
DATA
Standaardcurve 250 ul mg cortisol 0.900403 mg/ml 13/05/13
ug cortisol 23/05/13
A/B/C/D 9/10/2013



8.7 Reports: Meetings with our promoter

Master Handelswetenschappen

Afstudeerrichting Finance en Risk Management

Verslag afspraak met promotor

Naam promotor: de heer Garo Garabedian

Naam studenten: Eveline Van Berlamont en Magalie Breda

Tijdstip: week 3; academiejaar 2013 – 2014
8 oktober 2013; 17u15 – 19u30
Campus Mercator: G1.029

Voorafgaand aan het gesprek werd een tekst ingediend: ~~ja~~/neen

Inhoud van de bespreking

Onderwerp: Aandachtspunten en deadlines van de masterproef
Bijlage: PowerPoint Presentatie (vooraf ter beschikking gesteld door de heer Garabedian)

Algemeen
- Overlopen van de planning, de aanpak en de algemene richting van de masterproef.
- Er werd nadruk gelegd op het feit dat de bachelorproef slechts een schrijfoefening was. De masterproef is een uitdaging op een hoger niveau.
- Onze promotor wil de last voor ons laag houden in het eerste semester. Dit impliceert dat we gedurende het eerste semester onze tijd nuttig dienen te gebruiken en dat we efficiënt horen te werken. Het doel is namelijk om in het tweede semester meteen van start te kunnen gaan. We dienen reeds te weten: WAT we bespreken, HOE we het aanpakken, … Semester 1 dient, met andere woorden, als voorbereiding voor semester 2.
- De kerngedachte van een goede thesis kan worden samengevat in enkele woorden: simpel, basic idee, goed onderbouwd, verzorgde taal, af. Resultaten, afgeleid uit het gevoerde onderzoek, dienen we te interpreteren en terug te koppelen naar wetenschappelijke literatuur. Ook is het noodzakelijk bronnen en/of resultaten te combineren.
- Het voornaamste blijkt het interpreteren en toepassen van resultaten en wetenschappelijke kennis. Als tip kregen we mee om er iets leuks en aangenaams van te maken. Het is echter niet nodig iets vernieuwends in een bepaalde niche te vinden.
- Het is nuttig om mensen aan te spreken die iets van het onderwerp afweten. Kom in contact met mensen die daadwerkelijk betrokken zijn in dit vak.
- Ons onderwerp: 'Topics in Neuroeconomics' legt de link tussen standaardeconomie, behavioral econmics en neuroeconomics. Het zou leuk en interessant zijn om een game/spel/experiment uit te voeren. We moeten dit echter goed bedenken en voorbereiden.

Deadlines
- week 4: specifiëren van het onderwerp (1 pagina) – 18 oktober 2013
- week 8: literatuur bestuderen
- week 9: presentatie over de stand van zaken in het bijzijn van de andere studenten – 19 november

- week 12: voorbereiden en begrijpen: waar halen we onze data, wat zijn de methodologieën, ... ($^1/_2$ pagina) – 13 december

Extra
- Gouden tip: Niet twijfelen!
- Bij de verdediging hoor je alles te snappen (begrijp wat je schrijft, begrijp je topic).
- Beslissingen dienen in het eerste semester genomen te worden. Na de examens kunnen we slechts 4 weken (februari) intensief aan de masterproef werken. Tijdens de maanden maart-april-mei zullen we vooral tijd besteden aan onze stage en dient ook om de masterproef te finetunen.

Belangrijke aandachtspunten en verbeterpunten

niet van toepassing

Persoonlijk woord studenten

Ik, Eveline Van Berlamont, vind persoonlijk dat onze promotor, de heer Garabedian, enorm motiverend en inspirerend werkt. Na dit gesprek had ik onmiddellijk zin om er stevig in te vliegen.

Doordat ik, Magalie Breda, in het buitenland verblijf naar aanleiding van een Erasmusopleiding, is communicatie heel erg belangrijk. De heer Garabedian bezorgde ons de PowerPoint presentatie voor de bijeenkomst. Mijn partner, Eveline, verstrekte eveneens tijdig de nodige informatie. Ze bracht me op de hoogte van de samenkomst, de aandachtspunten en de to-do's. We poogden zo goed mogelijk te communiceren zodat we wisten waar we stonden en wat het eerstvolgende doel was.
Ondertussen contacteerde ik het hoofd van het Finance departement in ESC Dijon. De heer Guillermo Mateu is o.a. gespecialiseerd in experimentele economie. Hopelijk kan hij ons wat bijbrengen over het uitvoeren van experimenten. Een afspraak werd vastgelegd op donderdag 17 oktober om 14h. (Zie appendix A voor het verslag.)

Handtekening van de studenten

handtekening van de promotor(en)

Master Handelswetenschappen

Afstudeerrichting Finance en Risk Management

Verslag afspraak met promotor

Naam promotor: de heer Garo Garabedian

Naam studenten: Eveline Van Berlamont en Magalie Breda

Tijdstip: week 9; academiejaar 2013 – 2014
19 november 2013; 16u00 – 19u00

Voorafgaand aan het gesprek werd een tekst ingediend: ja/~~neen~~

→ tussentijdse evaluatie van de masterproef: PowerPoint Presentatie (current state of topic)

- onderzoeksvraag en hypothesen
- literatuur
- experiment
- eventuele samenwerking

Inhoud van de bespreking

<u>Commentaar op onze PowerPoint</u>

- Er is een optie tussen 2 soorten experimenten:
OFWEL gaan we een samenwerking aan met professoren in Dijon (de heer Guillermo Mateu Bartolomé en de heer Roger Muñoz i Navarro). → Double Auction Experiment
OFWEL doen we een uitbreiding op het bestaande experiment van Kuhnen and Knutson (2005). → na het bekijken van een filmpje (opwekken van angst, hebzucht of neutrale ingesteldheid) laten we de participanten een keuze maken tussen een goed/slecht aandeel of obligatie
⇒ We dienen goed te weten wat we doen, hoe we het doen en of het mogelijk is.
(Experiment? Enquête? Gebruik van Qualtrics?)
- Onze PowerPoint bevatte een uitgebreide (voorlopige) literatuurlijst, dewelke bestond uit wetenschappelijke papers en boeken. → Dit werd positief bevonden door onze promotor.
- te meten variabelen in onze enquête: karakter, gemoedstoestand, intelligentie, financiële kennis,... (leeftijd, geslacht, ervaring/financiële kennis, SDO- en empathy-scales,...)
- de verdeling (steekproef) dienen we te veralgemenen naar de populatie
(steekproef: studenten 3e bachelor, professionelen, volwassenen zonder financiële kennis, intercultureel,...)
⇒ We moeten opletten dat het niet te ingewikkeld word.
- Om het double auction experiment te kunnen uitvoeren, is er nood aan een incentive. Onze promotor raadde aan de heer Jos Meir en/of de heer Mustafa Disli te contacteren i.v.m. de incentive (deelname van de studenten zou hen 1/20 opleveren of het experiment integreren als een taak)
- Om het neurologische aspect van ons experiment te onderbouwen, willen we gebruik maken van saliva samples
→ In het eerste semester moet de haalbaarheid en kostprijs van de saliva samples worden onderzocht.

Belangrijk: De samenwerking met de professoren in Dijon ziet onze promotor zitten, maar hij ziet erop toe dat we niet hun 'slaafjes' worden, nl. wij doen al het werk terwijl zij niet/amper onze naam vermelden op de paper. De heer Garabedian stelt voor dat we het enthousiast aanpakken, dat we hen moeten zeggen dat ook onze promotor het ziet zitten en enthousiast is, mits de samenwerking eerlijk verloopt, nl. zwart op wit vermelden dat wij ook eigenaar zijn (mits het werk ongeveer 50-50 wordt verdeeld), het verkrijgen van 'credits' voor ons werk (bv. onze namen vermelden indien het gepubliceerd wordt). Concreet: We doen niet het slavenwerk voor iemand anders.

- Het doel van onze masterproef is mensen leren hun keuzes rationeel te maken. Dit doen we onder meer door hen, na een enquête/experiment, bewust te maken dat emoties (angst/hebzucht) invloed hebben op hun keuzes, dewelke uiteindelijk irrationeel zijn, en hen tips geven hoe hun 'gedrag' te wijzigen, namelijk rationele keuzes maken (d.m.v. hen te informeren, onze resultaten voor te stellen, en te confronteren). We zouden hen een nieuwe test kunnen laten uitvoeren (moet niet, want dit is veel extra werk). Op die manier kunnen we hun gedrag sturen door een bepaalde nadruk in de vragenlijst/het experiment te leggen (cfr. Behavioral Economics (Disli, M., 2013): bv. Een baseball bat kost x€ samen met dat voorwerp, hoeveel kosten ze elk?' → als je op voorhand vermeldt dat er punten mee gepaard gaan of een andere beloning, dan gaan mensen meer nadenken en beter hun best doen)

- tips/ideeën van medestudenten:
bv. leeftijd, het gedrag van oude mensen (rusthuizen) → persoonlijk zien we dit minder zitten: de enquête/het experiment gebeurt via de computer, verstaanbaarheid... [leeftijdscategorie steekproef: 20-70]

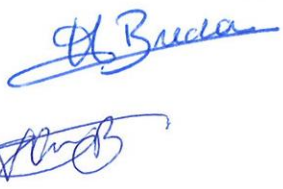
Belangrijke aandachtspunten en verbeterpunten

- concreet zijn en niet twijfelen; durven keuzes maken
- goede overeenkomst m.b.t. samenwerking nodig
- communicatie
- Wij zijn ambitieus, wat goed is. We moeten wel goed doorwerken en alles goed uitdenken binnen de beperkte tijd die we hebben.

Extra

- na de examens in februari: elke vrijdag samenkomen met onze promotor
- formaliteiten om de masterproef in het Engels te mogen schrijven: OK
  opmerking: . enquêtes/experiment mogen wel in het Nederlands (doel: De participanten zullen het beter begrijpen en goed kunnen invullen; cfr. Voorwaarden goede vragenlijst – boeken Wetenschappelijk Werk)
  . wel een Engelse versie, als bijlage, in de masterproef
- We moeten professioneel handelen. Een strakke aanpak en een perfecte argumentatie is noodzakelijk. Dit alles is zeker van belang bij de verdediging van de masterproef. We moeten alles kunnen motiveren en argumenteren.

Handtekening van de studenten



handtekening van de promotor(en)

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Tussentijdse evaluatie masterproef

Master Finance & Risk Management
Academiejaar 2013-2014

Topics in Neuroeconomics

Magalie Breda en Eveline Van Berlamont
Garo Garabedian

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

De invloed van angst en hebzucht op financiële beslissingen

Gebaseerd op de bachelorproef: 'Angst, hebzucht en financiële beslissingen'

Hypothese: angstige mensen nemen risicoaverse beslissingen, hebzuchtige mensen nemen risicovolle beslissingen

- In welke mate hebben angst en hebzucht een invloed op financiële beslissingen?
- Zijn vrouwen vatbaarder dan mannen?
- Heeft leeftijd een invloed?

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Literatuurstudie

- meest interessante en relevante delen bachelorproef
  - Standaard-, gedrags- en neuro-economie
- aangevuld met nieuwe en meer specifieke literatuur
  - Hormonen en angst en hebzucht
  - Hoe worden angst en hebzucht gemeten in de bestaande literatuur?
  - Eerdere experimenten i.v.m. angst en hebzucht
  - SDO scale (greed) en empathy scale (fear) (questionaires)

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Steekproef:

- Mannen en vrouwen
- 20 (opbouwen financiële rijkdom) – 70 jaar (nog in staat portefeuille te beheren) (hangt wel af van individu tot individu)
- Bereiken via Facebook, UGent Bachelor 3, kennissen en familie, banken, bedrijven, ...

Enquête

Karakter

Experiment/Game

O.b.v. enquête (psychologie) en experiment (besluitvorming) zouden we kunnen verklaren welk soort mensen (enquête) welke inversteringen doen (experiment). Later koppelen we dit aan bevindingen uit papers i.v.m. neuro-economie.

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Experiment

Dijon (Magalie Erasmus):

- Collaboration with Dr. Guillermo Mateu Bartolomé (Experimental and Behavioural Economics) (professor Market Finance school Magalie) and M.D. Roger Muñoz i Navarro (Neuroscientist)
- Initieel: tips, aanbevelingen experiment financiële beslissingen
- Enthousiast: samenwerking paper → link financiële beslissingen, gedragseconomie en neuro-economie
- Masterproef in het Engels

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Samenwerking:

Dhr. Mateu en Dhr. Muñoz: double auction experiment tijdens hun lessen in Dijon

Magalie en Eveline: toegang data

Experiment via computer: ook uitvoerbaar in België
(zelfde incentive? Geld of punt op examen?)

Magalie en Eveline: samenvatting bachelorproef, aanvulling nieuwe/uitgebreide wetenschappelijke literatuur, data Dijon + data België, paper ter beschikking stellen van Dhr. Mateu en Dhr. Muñoz

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Dijon:

Double auction experiment

- Decision in financial context via experiment
  (sellers/buyers, opgaande prijzen (boom): greed, neergaande prijzen (bust): fear)
- Psychological variables via scales (SDO -greed- and empathy –fear-)
  (questionaires)
- Link these observable factors with the theory of neuro-economy

· Dhr. Mateu en Dhr. Muñoz: navraag in ziekenhuis m.b.t. saliva samples → doel: hormoonniveaus meten (testosteron, cortisol, oxytocine) ⇒ duiden op angst of hebzucht. Magalie en Eveline ook al in België gepolst.
⇒ té verregaand? Ingewikkeld? Kosten?)

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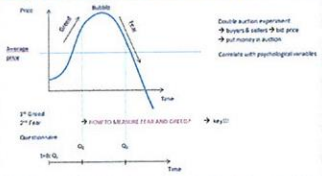
Belgium:

- Same experiment can be done if we use the same incentive (mark or money or gift???)

OR



- 'similar' experiment that measures the same (evt. o.b.v. Kuhnen & Knutsen: decision between safe bond vs. risky stock)

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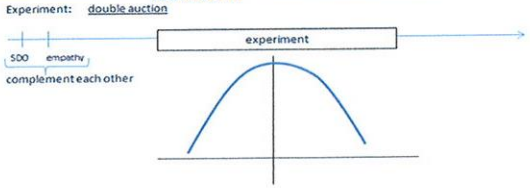
Experiment: double auction



High SDO (correlate with greed) people will... → buy a lot
High empathy (correlate with fear) → sell quickly

Scale to explain fear and greed
- Greed: SDO
- Fear: empathy

1st questionnaire
2nd double auction experiment

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Doel/Meerwaarde

Mensen financiële keuzes laten maken op een rationele manier; zodat ze zich niet laten beïnvloeden door hun emoties

⇒Oplossing zoeken hoe mensen angst/hebzucht kunnen weren uit hun financiële beslissingen

⇒Rationele-keuzetheorie (afwezig tijdens recente financiële crisis)

⇒Interessante samenwerking met experts in Dijon

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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Literature

Shefrin, H. (2002). ***Beyond greed and fear: Understanding behavioral finance and the psychology of investing.*** Oxford University Press.
- Reference in many papers
- Ordered the book and will examine it in December/January

Lo, A. (2011). ***Fear, Greed, and Financial Crises: A Cognitive Neurosciences Perspective.*** Massachusetts Institute of Technology (MIT).
- Explains fear, greed and risk in a neuroscientific point of view
- Has many good references which can help us search useful and interesting papers
  - **Camerer, C., Loewenstein, G., and Prelec, D., 2005,** "Neuroeconomics: How neuroscience can inform economics", Journal of Economic Literature 43, 9–64.
  - **Knutson, B. and Bossaerts, P., 2007,** " Neural antecedents of financial decisions", The Journal of Neuroscience 27, 8174–8177.
  - **Loewenstein, G., 2000,** "Emotions in economic theory and economic behavior", American Economic Review 90, 426–432. Loewenstein, G. has also written a lot of papers → might be interesting to investigate them

- **Lo, A.** has written different papers concerning fear, greed and financial markets → they should be investigated thoroughly

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Lo, A., 1999, "The three P's of total risk management", *Financial Analysts Journal* 55, 13–26.

Lo, A., 2004, "The adaptive markets hypothesis: Market efficiency from an evolutionary perspective", *Journal of Portfolio Management* 30, 15–29.

Lo, A., 2005, "Reconciling efficient markets with behavioral finance: The adaptive markets hypothesis", *Journal of Investment Consulting* 7, 21–44.

Lo, A., 2010, "a complete theory of human behavior", *American Economic Association, Ten Years and Beyond: Economists Answer NSF's Call for Long-Term Research Agendas.* Available at SSRN: http://ssrn.com/abstract=1889318

Lo, A. and MacKinlay, C., 1999, *A non-random walk down wall street.* Princeton, NJ: Princeton University Press.

Lo, A. and Repin, D., 2002, " The psychophysiology of real-time financial risk processing", *Journal of Cognitive Neuroscience* 14, 323–339.

Lo, A., Repin, D. and Steenbarger, B., 2005, "Fear and greed in financial markets: An online clinical study", *American Economic Review* 95, 352–359.

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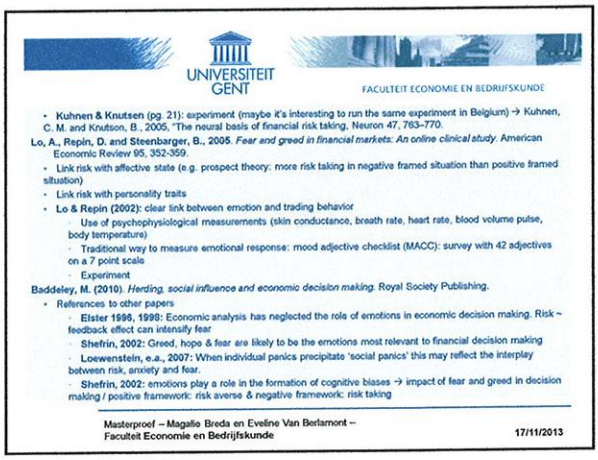

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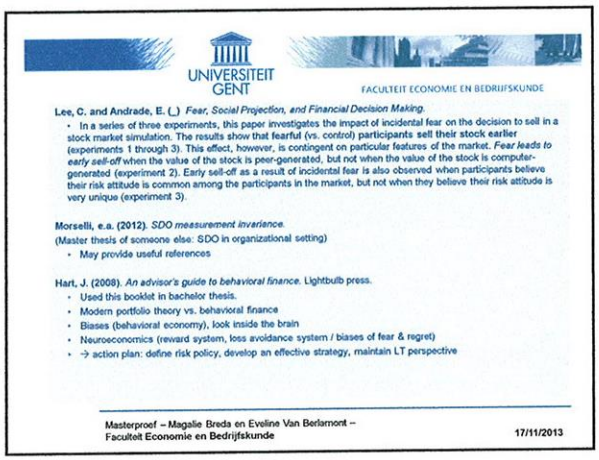
- **Kuhnen & Knutsen** (pg. 21): experiment (maybe it's interesting to run the same experiment in Belgium) → Kuhnen, C. M. and Knutson, B., 2005, "The neural basis of financial risk taking, Neuron 47, 763–770.

Lo, A., Repin, D. and Steenbarger, B., 2005. *Fear and greed in financial markets: An online clinical study.* American Economic Review 95, 352-359.

- Link risk with affective state (e.g. prospect theory: more risk taking in negative framed situation than positive framed situation)
- Link risk with personality traits
- **Lo & Repin (2002):** clear link between emotion and trading behavior
  - Use of psychophysiological measurements (skin conductance, breath rate, heart rate, blood volume pulse, body temperature)
  - Traditional way to measure emotional response: mood adjective checklist (MACC): survey with 42 adjectives on a 7 point scale
  - Experiment

Baddeley, M. (2010). *Herding, social influence and economic decision making.* Royal Society Publishing.

- References to other papers
  - **Elster 1996, 1998:** Economic analysis has neglected the role of emotions in economic decision making. Risk ~ feedback effect can intensify fear
  - **Shefrin, 2002:** Greed, hope & fear are likely to be the emotions most relevant to financial decision making
  - **Loewenstein, e.a., 2007:** When individual panics precipitate 'social panics' this may reflect the interplay between risk, anxiety and fear.
  - **Shefrin, 2002:** emotions play a role in the formation of cognitive biases → impact of fear and greed in decision making / positive framework: risk averse & negative framework: risk taking



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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Lee, C. and Andrade, E. (_) *Fear, Social Projection, and Financial Decision Making.*

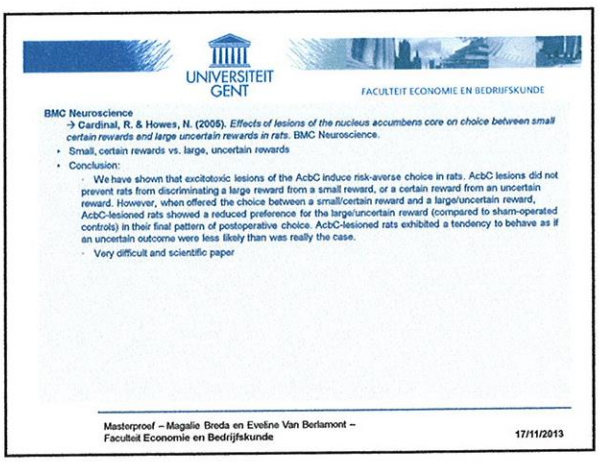
- In a series of three experiments, this paper investigates the impact of incidental fear on the decision to sell in a stock market simulation. The results show that fearful (vs. control) participants sell their stock earlier (experiments 1 through 3). This effect, however, is contingent on particular features of the market. *Fear leads to early sell-off* when the value of the stock is peer-generated, but not when the value of the stock is computer-generated (experiment 2). Early sell-off as a result of incidental fear is also observed when participants believe their risk attitude is common among the participants in the market, but not when they believe their risk attitude is very unique (experiment 3).

Morselli, e.a. (2012). *SDO measurement invariance.*
(Master thesis of someone else: SDO in organizational setting)

- May provide useful references

Hart, J. (2008). *An advisor's guide to behavioral finance.* Lightbulb press.

- Used this booklet in bachelor thesis.
- Modern portfolio theory vs. behavioral finance
- Biases (behavioral economy), look inside the brain
- Neuroeconomics (reward system, loss avoidance system / biases of fear & regret)
- → action plan: define risk policy, develop an effective strategy, maintain LT perspective



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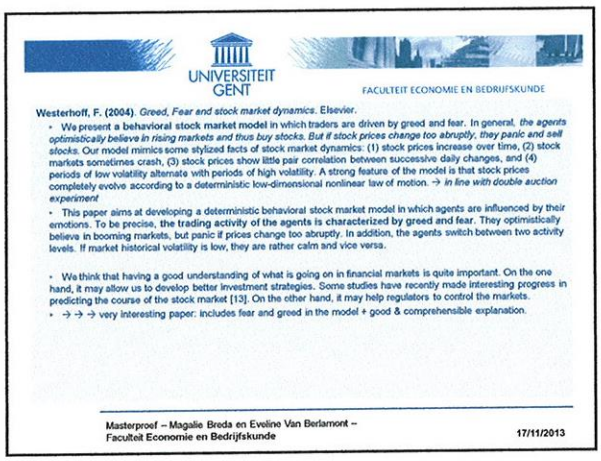
FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

BMC Neuroscience
→ **Cardinal, R. & Howes, N. (2005).** *Effects of lesions of the nucleus accumbens core on choice between small certain rewards and large uncertain rewards in rats.* BMC Neuroscience.

- Small, certain rewards vs. large, uncertain rewards
- Conclusion:
  - We have shown that excitotoxic lesions of the AcbC induce risk-averse choice in rats. AcbC lesions did not prevent rats from discriminating a large reward from a small reward, or a certain reward from an uncertain reward. However, when offered the choice between a small/certain reward and a large/uncertain reward, AcbC-lesioned rats showed a reduced preference for the large/uncertain reward (compared to sham-operated controls) in their final pattern of postoperative choice. AcbC-lesioned rats exhibited a tendency to behave as if an uncertain outcome were less likely than was really the case.
  - Very difficult and scientific paper



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FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

Westerhoff, F. (2004). *Greed, Fear and stock market dynamics.* Elsevier.

- We present **a behavioral stock market model** in which traders are driven by greed and fear. In general, *the agents optimistically believe in rising markets and thus buy stocks. But if stock prices change too abruptly, they panic and sell stocks.* Our model mimics some stylized facts of stock market dynamics: (1) stock prices increase over time, (2) stock markets sometimes crash, (3) stock prices show little pair correlation between successive daily changes, and (4) periods of low volatility alternate with periods of high volatility. A strong feature of the model is that stock prices completely evolve according to a deterministic low-dimensional nonlinear law of motion. → *in line with double auction experiment*
- This paper aims at developing a deterministic behavioral stock market model in which agents are influenced by their emotions. To be precise, **the trading activity of the agents is characterized by greed and fear.** They optimistically believe in booming markets, but panic if prices change too abruptly. In addition, the agents switch between two activity levels. If market historical volatility is low, they are rather calm and vice versa.

- We think that having a good understanding of what is going on in financial markets is quite important. On the one hand, it may allow us to develop better investment strategies. Some studies have recently made interesting progress in predicting the course of the stock market [13]. On the other hand, it may help regulators to control the markets.
- → → → very interesting paper: includes fear and greed in the model + good & comprehensible explanation.

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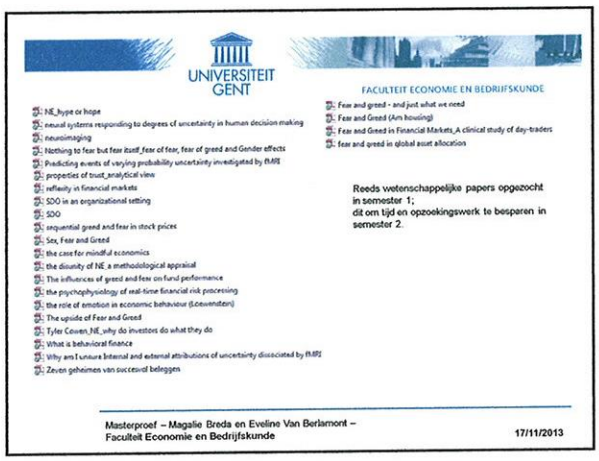

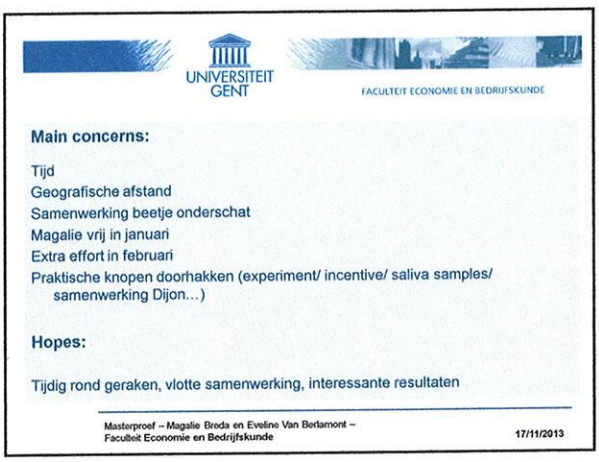

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Master Handelswetenschappen

Afstudeerrichting Finance en Risk Management

Verslag afspraak met promotor

Naam promotor:	de heer Garo Garabedian
Naam studenten:	Magalie Breda en Eveline Van Berlamont
Tijdstip:	9 januari 2014; 14u30 – 15u30 Campus Mercator

Voorafgaand aan het gesprek werd een tekst ingediend: ~~ja~~/neen

Inhoud van de bespreking

- Haalbaarheid/kostprijs Saliva Samples:

→ het uitvoeren van de speekseltesten is doenbaar voor ons (verzamelen en labelen van stalen, stalen naar UZ Gent brengen en interpreteren van de resultaten), maar het is onmogelijk voor ons dit te financieren zonder tussenkomst van UGent. Mevrouw Smolders, coördinerend docent voor de vakgroep Finance and Risk, deed navraag bij de vakgroep, maar er zijn geen financiële middelen beschikbaar. €20 per staal (informatie verkregen door de heer Tom Fiers – UZ Gent) is te hoog gegrepen voor ons .

→ Onze promotor raadde aan het Instituut voor Neuroscience te contacteren. Indien we onze paper aan hen kunnen 'verkopen' (m.a.w. hun interesse opwekken), dan zouden we kunnen samenwerken en zouden we de saliva samples aan een lagere kostprijs kunnen uitvoeren.

→ We kunnen ook een beperkt aantal speekseltesten afnemen en deze resultaten vermelden in onze masterproef. Deze resultaten zouden echter niet representatief zijn (vanwege de te kleine steekproef), maar het zou wel een indicatie kunnen geven van verbanden en aanleiding geven tot het aanraden van verder onderzoek.

- Experiment:

→ Onze promotor wees erop dat het noodzakelijk is dat we op voorhand het programma in bezit hebben zodat we weten hoe het werkt, wat onze output is,... Eventueel kunnen we zelf hetzelfde experiment opstellen (via Qualtrics)

- Testen van onze data:

→ gebruik van SPSS (schattingen, F-tests): Repeated Measures Anova
(relevantie, verband, significantie, verschil tussen mensen die greedy/niet greedy zijn: bv. 3 groepen: nagaan of de gemiddeldes van die 3 groepen al dan niet significant verschillen)

- Literatuuroverzicht:

→ enkel wat relevant is (niet te veel uitweiden): gelijkaardig experiment, link SDO/greed, empathy/fear, hormonen,...

Correspondentie achteraf

- probleem i.v.m. samenwerking:

Doordat de professor van Dijon bleef aandringen op het gebruik van een incentive, maar wij dit niet kunnen aanbieden, raadde onze promotor aan om t.a.v. de buitenlandse prof te communiceren dat

het experiment als taak wordt opgenomen. (Het experiment valt dan ook in de lijn met de leerstof van Behavioral Economics.) De heer Mateu was hiermee akkoord en de communicatie is terug opgenomen. Ondertussen voorzagen wij ook in een back-up plan, nl. de uitwerking van het tweede experiment.

- contact met Instituut voor Neuroscience in Gent:

Onze promotor stuurde me de contactgegevens door (het is het namelijk waard om te polsen of een eventuele samenwerking erin zat). Tot op heden nog geen reactie.

- Repeated Measures Anova

Onze promotor zond me YouTube linken met interessante informatie en wist me te vertellen dat hij ook in het bezit was van een boek.

Handtekening van de studenten

handtekening van de promotor(en)

Master Handelswetenschappen

Afstudeerrichting Finance en Risk Management

Verslag afspraak met promotor

Naam promotor(en): de heer Garo Garabedian

Naam student(en): Eveline Van Berlamont en Magalie Breda

Tijdstip: academiejaar 2013-2014
7 februari 2014; 14u00 – 17u30
Campus Mercator: G3.014

Voorafgaand aan het gesprek werd een tekst ingediend: ~~ja~~/neen

Inhoud van de bespreking

Onderwerp: Waar staan we? Wat zijn (eventuele) probleempunten? Wat zijn de mogelijke oplossingen?

<u>Algemeen:</u>
- aangeven wat de meerwaarde is van de Masterproef / wat werd er gepubliceerd in eerdere onderzoeken? / zijn er hiaten?

(- econometrie: shock modelleren a.d.h.v. VAR, lineaire trend indien er iets is dat continu stijgt, information criterium → niet echt van toepassing op ons)
- verdediging van Masterproef → key vraag: "Waarom?"
  └ Waarom heb je iets gekozen?
  → alle keuzes kunnen motiveren
  bv. beschikbaarheid data
  academische literatuur doet dit ook zo
- scherpe onderzoeksvraag
  bv. als er iets actueel is

! weten wat de lezer wil
- grafieken kunnen een meerwaarde zijn voor de paper; pas op: bladvulling valt op
  extra's horen in bijlage
- ! hypothesen moeten onderbouwd worden door academische literatuur

<u>dus</u>: bij hypotheses vermelden hoe je daarop gekomen bent
- Econometrie: Wat kan mijn resultaten beïnvloeden/storen
  bv. karakteristieken die de relatie kan beïnvloeden
- rapporteren van coëfficiënten
  ~ test meet _____ & dit is het resultaat
  └ appendix met uitgebreide print-screens
  ! niet alles kan in uw voordeel zijn
  └ alles juist rapporteren, ook als het niet is zoals je wou
- (rapporteren van output van VAR → NEE; estimation output, daar ben je niets mee)
- model schatten: y = _____
  o.b.v. dingen die je vindt in papers

- enquête: # groot genoeg → representatief
  └ zo groot mogelijk OF dezelfde mensen verschillende dingen na elkaar laten doen
  Hoe meer mensen, hoe meer de verschillende groepen op elkaar zullen lijken
  → representatief beeld
  → men zal (ongeveer) op dezelfde manier reageren
- alles wat zorgt voor verschil opnemen in de enquête: bv. oud/jong, man/vrouw, ervaring/geen ervaring, leeftijd, (getrouwd), (het hebben van kinderen),...
→ alles wat invloed heeft op de resultaten moet erin
! relatieve dingen zijn soms belangrijker dan het absolute niveau van iets
  bv. het verschil in niveau tussen groepen i.p.v. het effectieve niveau van de groepen
- *Basispsychologie*
  * *Loss aversion*: results framed as losses → risk aversion // results framed as gains → risk seeking
  * *Elssberg paradox* ≈ *ambiguity aversion*: EV(risk) = EV (~~risk~~) → mensen kiezen ~~risk~~
- *repeated measures*: 1 persoon bv. 3 vragen stellen & daarop repeated measures toepassen
want: 1 persoon te veel laten doen → ze raken het gewend of antwoorden niet meer accuraat
- basis: portfolio diversifiëren
  home bias: mensen gaan relatief gezien meer investeren in aandelen van hun eigen land, want ze hebben meer kennis van die markt

Specifiek:
- delen van de Bachelorproef mogen overgenomen worden indien ze nut hebben
  bv. situering is OK
- Hoe kunnen we de enquête online laten verlopen en ervoor zorgen dat de filmpjes automatisch en at random aan de participanten wordt toegewezen?
→ Promotor zal dit navragen bij docenten van een andere afstudeerrichting
- Kunnen we een incentive aanbieden zodat mensen sneller geneigd zijn om deel te nemen aan een online enquête?
→ Vanessa Bombeeck contacteren om te vragen om het mogelijk is om aan cinematickets te geraken
- Praktische regeling met betrekking tot het experiment op vrijdag 21 februari?
→ Promotor contacteren voor lokalenbeheer en eventueel medewerking van de andere studenten
- Zijn de filmpjes goed voor ons experiment? Wekken ze de juiste emoties op, nl. angst, hebzucht en neutraal?
→ neutraal: Bosch; angst: The Conjuring; hebzucht: The Wolf of Wall Street → OK
- Staat de enquête op punt? Zijn er opmerkingen?
→ enquête is OK, eventueel moeilijkheden i.v.m. keuze tussen aandeel X en Y m.b.t. verwachte waarde maar onze redenering klopt
  * probleem: EV(~~risk~~) > EV (risk)
  * redenering: indien de EV(risk) te aantrekkelijk is, zullen ook angstige mensen hiervoor kiezen
→ Wij meten: mate waarin iemand aandeel Y kiest zal toenemen als ze de trailer van The Wolf of Wall Street hebben bekeken, m.a.w. we gaan na wie het meest naar aandeel Y neigt.
→ vraag 7: onderzoeken wie risico-zoekend is (hebzuchtig) → angst/rationeel vs. hebzucht
  vraag 8: onderzoeken wie risico-avers is (angst)
- ! Soms voelen mensen zich neutraal, maar de resultaten van de financiële keuzes zijn significant
→ als we meten of de filmpjes effect hebben gehad, zal de F-test niet significant zijn, terwijl de F-test

van de financiële keuze wel significant zal zijn
→ opnemen in de regressie: variabele die weergeeft hoe mensen zich voelen: angstig/opgewonden
- repeated measures
    * vraag 7: 2 keuzes
    * vraag 8: 3 keuzes
→ verschillende groepen, nl. The Wolf of Wall Street, The Conjuring, Bosch → vergelijken met elkaar
~ afwijkingen in gemiddelde waarde
! tip: bekijk de filmpjes i.v.m. repeated measures
- als we een regressie opstellen zal onze Y een nominale variabele zijn (aandeel X/aandeel Y/obligatie of cash/aandeel/obligatie)

Handtekening van de studenten

handtekening van de promotor(en)

Master Handelswetenschappen

Afstudeerrichting Finance en Risk Management

Verslag afspraak met promotor

Naam promotor(en): de heer Garo Garabedian

Naam student(en): Eveline Van Berlamont en Magalie Breda

Tijdstip: academiejaar 2013-2014
13 februari 2014; 14u00 – 18u00
Campus Mercator: G3.014

Voorafgaand aan het gesprek werd een tekst ingediend: ~~ja~~/neen

Inhoud van de bespreking

Onderwerp: Waar staan we? Wat zijn (eventuele) probleempunten? Wat zijn de mogelijke oplossingen?

Algemeen:

- bij output: geen overbodige zaken rapporteren

- constant keuzes maken, gebaseerd op literatuur! Goed rapporteren en argumenteren; bij verdediging blijven ze doorvragen: waarom voor iets gekozen?

Specifiek:

- **mail** promotor: Random Procedure enquête + goedkeuring enquêtes

- **mail** sturen naar groep voor vrijdag 21 februari afname enquêtes

- voorstel **regressie**: doenbaar maar misschien problemen

via SPSS (sociale wetenschappen)
baseren op literatuur: K&K: Hoe doet Knutson het? Hoe schatten?
significantie van groep op variabele

Ofwel: 'of...of... verhaal', 0 of 1 => Logit (zie slides OMF)
kan ambigu zijn, allebei + of –
Ofwel: genuanceerder, concreet, contrasten, bv. Risicoavers maar niet volledig
concreet hoeveel invloed? Continu. Vergelijken over groepen: compare means

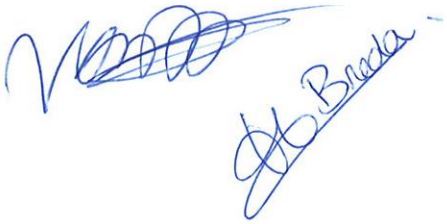
=> **KIEZEN** wat we willen doen, allebei niet moeilijk (zie filmpjes Andy Field + Users Guide)

significiant < 0,05 (zie WW + OMF), F-test, P-value
Analyze – compare means Anova

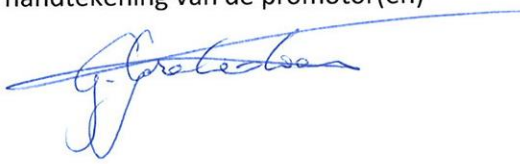
- regression multinomial log. Regr.

coefficients => verschillende groepen (-1, 1) (0,1(2))
y beperkt: limited dependent variable
Covariate: Dummy (is impact bij ... anders?); bv. Geslacht => exogeen, invloed, het is meer een controle-variabele, afwijkingen meten
x_3, x_4 en x_5 => als 1 variabele! ~ Logit

Handtekening van de studenten



handtekening van de promotor(en)



8.8 Agreement: Writing in English

Universiteit Gent
Faculteit Economie en Bedrijfskunde

Overeenkomst Engelstalige masterproef Handelswetenschappen

Academiejaar: 2013 - 2014

De student

Naam en voornaam: Van Berlamont Eveline en Breda Magalie

Afstudeerrichting: Finance and Risk

verklaart dat ~~hij~~/zij

- er voor kiest de masterproef in het Engels uit te schrijven.
- de goedkeuring van de promotor heeft verkregen om de masterproef in het Engels uit te werken.
- er van op de hoogte is dat de begeleiding in het Nederlands gebeurt.
- er van op de hoogte is dat de verdediging van de masterproef in het Nederlands zal gebeuren.

Datum: 14/11/2013

Handtekening student

Datum: 14/11/2013

Handtekening promotor