The influence of personality on entrepreneurial performance

An investigation of the effects of the big five personality factors and entrepreneurial learning on the subjective performance of start-up entrepreneurs.

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Abstract

This research aims to proof the relationship between the Big Five personality factors to entrepreneurial performance, which was measured using subjective performance measures. Entrepreneurial learning - which has been measured through courses followed at an incubator called Venture Lab - was expected to have a moderating effect on this relationship. First, multiple regression analysis has been used to test the different relationships, secondly, a moderated effect regression analysis has been conducted. The results show that extraversion has a significant positive effect on entrepreneurial performance, while the amount of courses that are followed has a significant negative effect on entrepreneurial performance. No significant moderating effect was found. The positive effect of extraversion was expected and in line with previous research. The result that the amount of courses has a negative effect on subjective company performance was unexpected.

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Chapter 1: Introduction

1.1 Introduction

For years, entrepreneurship research has explored the implications of the entrepreneur's personality. The majority of work has focused on either what personality traits affect an individual's likelihood of becoming an entrepreneur, or the differences between entrepreneurs and managers (Ciavarella, Buchholtz, Riordan, Gatewood, & Stokes, 2004). Ciavarella et al. (2004) started to look at entrepreneurs and their success from another stage of the entrepreneurial lifecycle. They do this by looking at which personality factors contribute to the success of a company and which factors detract success from a company.

An entrepreneur is the founder, owner and manager of a new business venture, who is focused on innovation, new products and markets. Entrepreneurship consists of the competitive behaviors that drive the market process (Davidsson, 2016). An entrepreneur can create an organization, but needs to adapt the way he/she works and the activities that he/she undertakes, when the organization is going through different stages of the life cycle of the company (Smith & Miner, 1983). Entrepreneurs are usually characterized by having limited time and resources.

For start-up entrepreneurs it is useful to participate in so-called incubator programs. An incubator is an organization that realizes a certain process that will lead to an increased growth of a start-up company into a possibly successful organization (Dutch Incubation Association, 2016). The goal of an incubator is to encourage the development of new business in the local community (Lesakova & Lubica, 2012). Incubators can be seen as a remedy for the disadvantages that small and new firms encounter by providing numerous business support services and they are useful in fostering technological innovations and industrial renewal (Akcomak, 2009).

The importance of the personality of an entrepreneur and the participation in incubator programs has been discussed in the nature-nurture debate. First, there is the nature, or biological viewpoint which states that becoming an entrepreneur and starting an own venture is triggered by heritable biological factors, like testosterone. Where on the other hand there is a nurture or sociological viewpoint, like social learning (White, Thornhill, & Hampson, 2007). As both aspects influence the entrepreneur in some level, a biosocial viewpoint might be more desirable. By taking nature and nurture together, the entrepreneur can be understood better (White, Thornhill, & Hampson, 2007). To be successful, both factors are important for the entrepreneur. Where the nature aspect is harder to change over the years, nurture provides more possibilities for improvement.

As personality factors are related to the nature aspect, and the incubator programs are related to the nurture aspect, these two connections will be tested to see what influence the successfulness of start-up companies the most.

The research question for this thesis is as follows:

What personality traits help start-up entrepreneurs to create the most successful companies when receiving training?

The different aspects that have been discussed above have been incorporated in this research question. As each personality factor of the entrepreneur as well as following courses on entrepreneurship influences the performance of the company, these concepts are studied. The personality factors are the independent variable in this thesis and are therefore necessary to be identified. The personality factors are needed to gather the data for this research. When the personality factors are identified, the personality of the entrepreneurs can be analyzed.

Entrepreneurial learning is another important part of this research. In order to become successful, start-up entrepreneurs must first be exposed to the knowledge and find ways to learn or develop it on their own (Aldrich & Yang, 2013). Entrepreneurial learning is the moderating variable, which is tested to see if it influences the results of the start-up company. Furthermore this research tests if entrepreneurial learning has a moderating effect on the relationship between the different personality factors and the results of the start-up company.

The context of this research is Venture Lab, which is an incubator company that is located in Enschede. Venture Lab helps start-up entrepreneurs. People who want to become an entrepreneur or have already started their own company, can sign up with Venture Lab. Mostly the applicants have some ideas about a product or service that they want to get to the market, yet there are so many steps in between, that these applicants can use some help in the process that precedents the go to the market of the product or service. The incubator is the source for the nurturing of the start-up entrepreneurs. At Venture Lab, different types of training and coaching are offered to the applicants, which they can sign up for and attend. These trainings range from finance to technology management and from strategy to organization. The goal of Venture Lab is to prepare these start-up entrepreneurs for the adventure that awaits them. This incubator is a good source for gathering the data necessary for this research.

1.2 Relevance

Scientific research needs to have both theoretical and practical relevance in order to create benefits for future research and the practical world. This thesis has more practical relevance, in comparison to theoretical relevance.

Theoretically speaking, a lot has already been written on the topics of personality factors and entrepreneurial learning. The influence of entrepreneurial learning on the success of start-up companies has had some previous research. A positive correlation is found between education and business creation and success. (Isaacs, Visser, Friedrich, & Brijlal, 2007) The combination of entrepreneurial learning with the personality factors, by using entrepreneurial learning as a moderator variable, can support previous research findings (Zhao, Seibert, & Lumpkin, 2010). Besides finding results that support previous research, new insights may be found. The literature review will also give a good overview of the current knowledge on both subjects.

On the other hand, practically, this research also has impact. Entrepreneurs that possess different personality traits can come to different outcomes as to how successful their start-ups are. If entrepreneurs with certain personality factors gain better entrepreneurial results when taking courses at the Venture Lab program than entrepreneurs with other personality traits, then this shows that entrepreneurs should try to be more open to new experiences or try to be more extravert, to become more successful. But it can always be questioned to what extend some can change their personality.

A single study into these influences would not be enough to actually reject entrepreneurs that possess certain personality traits from joining Venture Lab. On the other hand, such results can give the hosts of Venture Lab reason to point out to participants that possess these personality factors that Venture Lab might benefit them less than other participants. This might also be a reason to try and adjust the Venture Lab program more to the specific needs of the different entrepreneurs with different personalities. This might also raise the questions about the different type of courses that are offered to the entrepreneurs and which are useful for which person. This would be for further research to find out. On the other hand, this research can also provide a reason to investigate the courses that are taught at Venture Lab in more detail, if the courses don't match with the needs of the start-up entrepreneurs.

Chapter 2: Theoretical Framework

2.1 The influence of the Big Five personality factors on entrepreneurial success

2.1.1 The big five personality factors

The Big-Five factor model is the dominant model for representing the human trait structure today (Sagiv, Schwartz, & Knafo, 2002). In table one these five factors are discussed (Goldberg, 1990). The personality traits are different from values. Traits are "dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings and actions" (McCrae & Costa, 1990, p. 29). This means that traits are enduring dispositions. Values on the contrary, are enduring goals. These traits describe what people are like, rather than the intentions that fuel the behavior (Sagiv, Schwartz, & Knafo, 2002).

Personality Factor	Characterized by
Extraversion / Surgency	Sociable, assertive, dynamic and directive
Agreeableness	Friendly, cheerful, accommodating and supportive
Conscientiousness	Achievement-oriented and dependable or conforming
Neuroticism / Emotional Stability	Emotional adjustability and experiencing disparaging
Openness to Experience / Intellect	Inquisitive, creative, nonconforming and independent

Table 1 Personality Factors

The big-five factor model claims to represent comprehensively the basic factors that organize human traits (Saucier & Goldberg, 1998). There is discussion about the existence of different or more factors, yet only a few have been proposed (Tellegen, 1993). This disagreement may be caused by the multi-faceted nature of the factors. Different components and nuances have been suggested as additions or changes to the current five factors by several scientists (Hogan & Ones, 1997) (McCrea & Costa, 1997) (Sackett & Wanek, 1996) (Saucier & Ostendorf, 1999).

2.1.2 The Big Five and entrepreneurial success

Meta-analytical research review tends to be reliable as it focuses on several different sources of data (Babbie, 2007). Therefore this is a good basis for this research. The results show each relationship between entrepreneurial performance and the five personality factors. These relationships will first be discussed and then hypotheses will be formulated.

The first hypothesis is on the relationship between entrepreneurial performance and extraversion. Extraversion can be described as being sociable, assertive and directive. The relationship is expected due to the previous research that has already been done on the subjects. Extraverts tend to score high on risk-taking, energy-level, activity-level, dominance and optimism (Kaczmarek & Kaczmarek-Kurczak, 2016). There are several reasons why an entrepreneur that scores high on extraversion performs better than an entrepreneur that scores low on extraversion. Being extraverted will help develop social networks, which can result in stronger partnerships with customers and suppliers (Barringer & Greening, 1998). The ability to establish long term relationships and networks with suppliers, customers and advisors is a crucial task, which leads to venture survival if it is done effectively (Baron & Markman, Beyond social capital: how social skills can enhance entrepreneurs' success, 2000). Entrepreneurs that are extraverted are less likely to fail, as they tend to strive for

higher sales profits. This is due to the fact that higher extraversion raises the sensitivity for rewards (Cantner, Silbereisen, & Wilfling, 2011).

In previous research, a statistically significant relationship is found between the entrepreneurial personality and performance, yet the different factors of the personality have not been studied separately (Gupta & Muita, 2013). The so-called entrepreneurial personality shows that entrepreneurs tend to score high on Extraversion (Schmitt-Rodermund, 2004). When looking at the personality of entrepreneurs, it is found that they score higher on *Extraversion* than managers (Zhao & Seibert, 2006). Other, more recent research shows that *Extraversion* has a positive relationship with entrepreneurial performance (Zhao, Seibert, & Lumpkin, The relationship of personality to entrepreneurial intentions and performance: A meta-analytical review, 2010) (Brandstätter, 2011). With the use of meta-analysis, it is found that ambition, which is an aspect of extraversion, has a positive effect on adaptive performance (Huang, Zabel, Ryan, & Palmer, 2014). Being able to adapt quickly is important in the fast-changing environments in which entrepreneurs operate. Ambition is the most important predictor of proactive adaptive performance (Huang, Zabel, Ryan, & Palmer, 2014). Extraversion is a significant indicator of business performance, when looking at the different indicators of business performance (Kaczmarek & Kaczmarek-Kurczak, 2016). These results also came forward in research done with online recruited participants. It is found that extraversion correlates significantly with entrepreneurial success, besides other aspects of entrepreneurial participation (Leutner, Ahmetoglu, Akhtar, & Chamorro-Premuzic, 2014). The following hypothesis will therefore be researched:

H1: Entrepreneurs that score high on Extraversion are more successful than entrepreneurs that score low on Extraversion.

The second hypothesis is on the relationship between entrepreneurial performance and openness to experience. Openness to experience can be described as being creative and independent. When looking at the previous research, this relationship is expected to exist. Because of this independence, creativity and curiosity, a positive relationship is expected (Kaczmarek & Kaczmarek-Kurczak, 2016). Openness can be described with three dimensions. Entrepreneurs who are more open to new experience are more likely to be successful because of these three dimensions (Slavec, 2014).

The first dimension is the learning dimension, which is seen as the tendency for striving towards knowledge about novel business approaches and learning from other people's experiences. This learning can be done formally and informally, either through seminars, conferences and workshops, or through following successful entrepreneurs and talking to experienced relevant public (Arthurs & Busenitz, 2007). When an entrepreneur is more open, he/she tends to be more willing to learn from other people that have already been successful. By following seminars and workshops, the entrepreneur can learn how to deal with certain situations and challenges. By learning from other people about this and preparing for the future, the entrepreneur tends to be more successful.

The second dimension is the feedback dimension. This dimension describes the entrepreneur's need for seeking opinions and suggestions, elaborating on proposals for improvement and changes during the evaluation of new opportunities, products and markets (Arthurs & Busenitz, 2007) (Frese, 2007). When the entrepreneur is more open, he/she is more inclined to request feedback. By seeking opinions from others, evaluating opportunities and elaborating on new proposals for improvement and changes of the product, opportunities and markets, the entrepreneur can provide a better service or product to the market. This feedback can come from other successful entrepreneurs, experienced persons or possible customers. This will make the entrepreneur more successful, than being less open and not seeking feedback.

The third dimension is novelty, which is described by the search for new opportunities, products, services and business partners (Burmeister & Schade, 2007) (Harper, 2006). As an entrepreneur is more open, he/she will search more for new opportunities and possibilities. By recognizing these new opportunities and possibilities, the entrepreneur can create new ways to gather more income or lower the costs of delivering the product or service to the market. This will lead the entrepreneur to a more successful company.

When looking at the differences between entrepreneurs and managers, entrepreneurs score higher on *Openness to Experience* (Zhao & Seibert, 2006). When looking at the general entrepreneurial personality, openness to experience has a high score overall (Schmitt-Rodermund, 2004). There is a strong and positive relationship between *Openness to Experience* and entrepreneurial performance (Zhao, Seibert, & Lumpkin, The relationship of personality to entrepreneurial intentions and performance: A meta-analytical review, 2010) (Brandstätter, 2011). Although the findings had only limited support, there is a positive relationship between Openness to Experience and adaptive performance (Huang, Zabel, Ryan, & Palmer, 2014). Looking at the influence of openness on market share growth, which is an objective performance measurement, a positive and significant relationship is found (Slavec, 2014). The relationship between openness to experience and entrepreneurial performance was also found to be correlating in other recent work (Leutner, Ahmetoglu, Akhtar, & Chamorro-Premuzic, 2014). The previous research results on entrepreneurial performance are used for the formulation of the second hypothesis.

H2: Entrepreneurs that score high on Openness to Experience are more successful than entrepreneurs that score low on Openness to Experience.

The third hypothesis is on the relationship between entrepreneurial performance and emotional stability. Emotional stability is characterized by being unworried, unanxious and unenvious. This relationship is expected, when looking at research that already been conducted. Due to the acceptance of risk-taking and stress tolerance, a positive relationship is expected (Kaczmarek & Kaczmarek-Kurczak, 2016). There are several reasons why entrepreneurs that are emotionally stable are more successful. First entrepreneurs that are emotional stable are steady, firm and optimistic when facing pressure, stress and uncertainty. They are not discouraged by obstacles or setbacks and they take these burdens and press ahead (Locke, 2000) (Baron, 1999). Furthermore, entrepreneurs that are emotionally stable are more likely to cope with issues, stress and challenges through optimistic thinking, focus and direct action (Costa & McCrea, 1985). Being more emotionally stable, will allow an entrepreneur to act better on the different challenges and opportunities that the start-up company will face. Therefore entrepreneurs that are more emotionally stable will perform better (Rafi, Arzu, Khan, ul Haq, & Kashif, 2013).

Previous research shows that entrepreneurs tend to score low on *Neuroticism,* which is the reserved version of *Emotional Stability* (Zhao & Seibert, 2006). This also comes back when looking at the entrepreneurial personality, which states that a high score on Emotional stability is expected for an entrepreneur (Schmitt-Rodermund, 2004). *Emotional Stability* has shown a positive relationship with entrepreneurial performance (Zhao, Seibert, & Lumpkin, The relationship of personality to entrepreneurial intentions and performance: A meta-analytical review, 2010) (Brandstätter, 2011). Emotional stability is related to overall adaptive performance. The reactive form of adaptive performance is mostly predicted by emotional stability. Comparing these results between managers and employees, it is found that managers are influenced stronger by emotional stability (Huang, Zabel, Ryan, & Palmer, 2014). Emotional stability is also found to predict some indicators of entrepreneurial performance. It predicts the income and higher number of clients and business partners positively (Kaczmarek & Kaczmarek-Kurczak, 2016). A correlation was also found between emotional stability and performance in more recent work (Leutner, Ahmetoglu, Akhtar, & Chamorro-

Premuzic, 2014). Following this relationship from previous research, the hypothesis that is tested here will also suspect a positive relationship.

H3: Entrepreneurs that score high on Emotional Stability are more successful than entrepreneurs that score low on Emotional Stability.

The fourth hypothesis is on the relationship between entrepreneurial performance and conscientiousness. Conscientiousness can be characterized by being organized, efficient and neat. This relationship is expected, as previous research has already found a relationship to exist. As conscientiousness causes motivation to achieve, work hard and tenacity, a positive relationship is expected (Kaczmarek & Kaczmarek-Kurczak, 2016). An entrepreneur that scores high on conscientiousness performs better than an entrepreneur that scores low. This is because scoring high on conscientiousness causes the entrepreneur to be more organized and following norms and rules, which leads to better managerial performance (Hurtz & Donovan, 2001). Furthermore, entrepreneurs that score high on conscientiousness are better able to build beneficial and sustainable relationships with other people, such as investors, suppliers and other stakeholders (Cantner, Silbereisen, & Wilfling, 2011). Total dedication and perseverance to succeed as an entrepreneur can overcome any obstacle that is in the way (Timmons, 1989). When an entrepreneur is persevering, that should result in higher productivity, while being organized leads to increased efficiency and effectiveness (Ciavarella, Buchholtz, Riordan, Gatewood, & Stokes, 2004). All these reasons will make that the entrepreneur that scores high on conscientiousness performs better.

For *Conscientiousness* it is shown that entrepreneurs score higher, when comparing them to managers (Zhao & Seibert, 2006). This contrast also comes back within the entrepreneurial personality, which shows that entrepreneurs score high on *Conscientiousness* (Schmitt-Rodermund, 2004). *Conscientiousness* shows the strongest and most consistent association with entrepreneurial performance (Zhao, Seibert, & Lumpkin, The relationship of personality to entrepreneurial intentions and performance: A meta-analytical review, 2010) (Brandstätter, 2011). There is also a positive relationship between *Conscientiousness* and both job performance and long term company survival (Ciavarella, Buchholtz, Riordan, Gatewood, & Stokes, 2004) (Hurtz & Donovan, 2001). Recent research found that there is a correlation between conscientiousness and performance (Leutner, Ahmetoglu, Akhtar, & Chamorro-Premuzic, 2014). Given these previous findings, it is expected that for this research the following relationship will be present.

H4: Entrepreneurs that score high on Conscientiousness are more successful than entrepreneurs that score low on Conscientiousness.

The fifth hypothesis is on the relationship between entrepreneurial performance and agreeableness. Agreeableness can be described as being cooperative, warm and kind. As previous research showed, there is a relationship between agreeableness and entrepreneurial performance. This relationship is expected to be negative, due to dominance, independence and competitiveness that are associated with low agreeableness (Kaczmarek & Kaczmarek-Kurczak, 2016). Scoring low on agreeableness makes an entrepreneur perform better, as this makes the entrepreneur less dupable, which can be disadvantageous as others can exploit this in a competitive area as entrepreneurship (Rafi, Arzu, Khan, ul Haq, & Kashif, 2013). Entrepreneurs that are agreeable are unlikely to compete for limited resources or are focused on avoiding conflict and confrontations. An agreeable person is more easily manipulated and influenced by others for their gain (Liang, Peng, Yao, & Liang, 2015). This causes that the entrepreneur tends to perform worse than entrepreneurs that score low on agreeableness.

Entrepreneurs score lower on *Agreeableness* opposed to managers (Zhao & Seibert, 2006). Overall, the entrepreneurial personality also expects that an entrepreneur scores low on *Agreeableness* (Schmitt-Rodermund, 2004). *Agreeableness* does not provide a positive relationship in previous

research. There is even a small, statistically significant result that there is a negative relationship between *Agreeableness* and entrepreneurial performance, as tested with multiple regression analysis (Zhao, Seibert, & Lumpkin, The relationship of personality to entrepreneurial intentions and performance: A meta-analytical review, 2010) (Brandstätter, 2011). On the contrary, high scores of *Agreeableness,* tends to decrease the rate of failure for entrepreneurs in highly innovative industries (Cantner, Silbereisen, & Wilfling, 2011). However, the hypothesis here will also follow the relationship which found most support.

H5: Entrepreneurs that score low on Agreeableness are more successful than entrepreneurs that score high on Agreeableness.

2.2 The influence of (entrepreneurial) learning on entrepreneurial success

Several different researchers found that there is a positive correlation between education and business creation (Isaacs, Visser, Friedrich, & Brijlal, 2007). There used to be some skepticism about this, but there is a growing acknowledgement that entrepreneurial education and training is a source that improves the start-up intentions, survival rates and growth, despite of the myth that still exists, that entrepreneurs are born and not formed (Katz, 2007). Entrepreneurs must develop "know-how," "know what," and "know who" knowledge in a context substantially different than managers in established firms (Argote & Ella, 2012).

In more recent work a positive relation between education and business creation has also been found. There is a robust positive link between education and entrepreneurial performance (Raposa & do Paco, 2011). With the use of a sample of 170 entrepreneurs and prospective entrepreneurs, it has been shown that entrepreneurial training and education are outstanding factors for success and have significant value for any entrepreneurship venture. Causal linkages between entrepreneurial education, social competence, basic entrepreneurial training skills and organizational effectiveness are found to be statistically significant (Elmuti, Khoury, & Omran, 2012).

Several reasons, why an entrepreneur performs better when following more courses, can be provided. These reasons are based on the influence that entrepreneurial learning has on entrepreneurial performance. First of all, the ability to discover and develop business opportunities is considered amongst the most important abilities of a successful entrepreneur (Ardichvili, Cardozo, & Ray, 2003). People can be taught how they can discover these opportunities and how to make sure that they get the highest profit out of it. Secondly, the entrepreneur will learn to better cope with the liabilities of newness. Starting a new company will consequently learn the entrepreneur to recognize that financial and marketing problems are the main reason for venture failure (Politis, 2005). The entrepreneur will be better equipped to deal with these uncertainties and obstacles, after he/she has been taught about this. The entrepreneur will be more determined to proceed after setbacks, in contrast to entrepreneurs that have not received much training and coaching (Tseng, 2013).

After a discussion about previous research on the use of education, entrepreneurial performance and venture creation, a new approach towards the education of students of entrepreneurship is created. By combining the two relevant approaches, *the conventional approach* and *the enterprising approach,* and building further on it, they created a *venture creation approach.* The different characteristics of each approach have been set out in table two. By following this approach in the education of start-up entrepreneurs, these entrepreneurs are better prepared for the real-life opportunities and threats of being an entrepreneur (Ollila & Williams-Middleton, 2011).

There are three dimensions of entrepreneurship education. These viewpoints from which entrepreneurship education can be looked at are; education focused on entrepreneurial mindset,

spirit or identity; education focused on behavior which deals with seizing opportunities, making decisions and social skills; and finally education focused on the creation of specific situations, as might be with creating new ventures (Fayolle & Klandt, 2006). Most of the focus entrepreneurial education nowadays lies on the latter type of education. The real challenge yet is to develop the education for the first two types of education. This way it will be more learning for entrepreneurship instead of learning about entrepreneurship (Lans, Hulsink, Baert, & Mulder, 2008).

Conventional Approach	Enterprising Approach	Venture Creation Approach
Focus on content	Focus on process delivery	Focus on reflection-in-action
Led and dominated by teacher	Ownership of learning by participant	Learning facilitated by integrated environment
Expert hands-down knowledge	Teacher as fellow learner/facilitator	Multiple learning stimulators
Participants passively receiving knowledge	Participants generating knowledge	Participants seeking and co-creating knowledge
Sessions heavily programmed	Sessions flexible and responsive to needs	Sessions emerging from venture related activities
Mistakes looked down upon	Mistakes to be learned from	Mistakes encouraged
Emphasis upon theory	Emphasis upon practice	Emphasis upon creation
Subject/functional focus	Problem/multidisciplinary focus	Combination of problem-oriented and solutions-focused

Table 2 Entrepreneurial Education Approaches

A key theme that keeps coming back in research about entrepreneurial learning is the importance of certain key entrepreneurial skills, heuristics and acquiring and developing frameworks that can help to meet the demands of the business. This means that these themes should become the center of attention in research, instead of the entrepreneurs themselves. Especially when the organization is expanding, focusing on just the entrepreneur would fail to tackle the emerging challenges and opportunities that arise with the expansion (Breslin & Jones, 2012).

Entrepreneurial competence plays a key role in connecting the first two types of education. Being competent as an entrepreneur means to be able to recognize opportunities and act upon these, taking initiative and action and being able to connect with possible investors, suppliers and buyers. The long run needs to have more attention, instead of just focusing on writing a business plan for instance. 'Being competent' can be attained and developed by learning through experience, experimentation or observation (Lans, Hulsink, Baert, & Mulder, 2008).

Following these findings, the following hypothesis will be tested.

H6: Entrepreneurs that follow more entrepreneurial courses are more successful than entrepreneurs that follow less entrepreneurial courses.

Another important theory that analyzes the performance of people and thus also of entrepreneurs, is the trait activation theory (Tett & Burnett, 2003). This theory, states that employees will look for intrinsic satisfaction from the work environment. This satisfaction allows the employee to express their unique personality traits. For entrepreneurs, this satisfaction comes from the creation of their own company (Tett, Simonet, Walser, & Brown, 2013).

There are three principles on which this theory is based. First off, traits are expressed in work behavior as responses to trait-relevant situational cues. Secondly, sources of trait relevant cues can be grouped into three broad categories; being task, social and organizational. Thirdly, trait expressive

work behavior is distinct from job performance, as the latter is defined in the simplest form, as valued work behavior. By activating these traits that are valued on the job, the job performance increases (Tett, Simonet, Walser, & Brown, 2013) (Christiansen, Lievens, Chasteen, & Day, 2006).

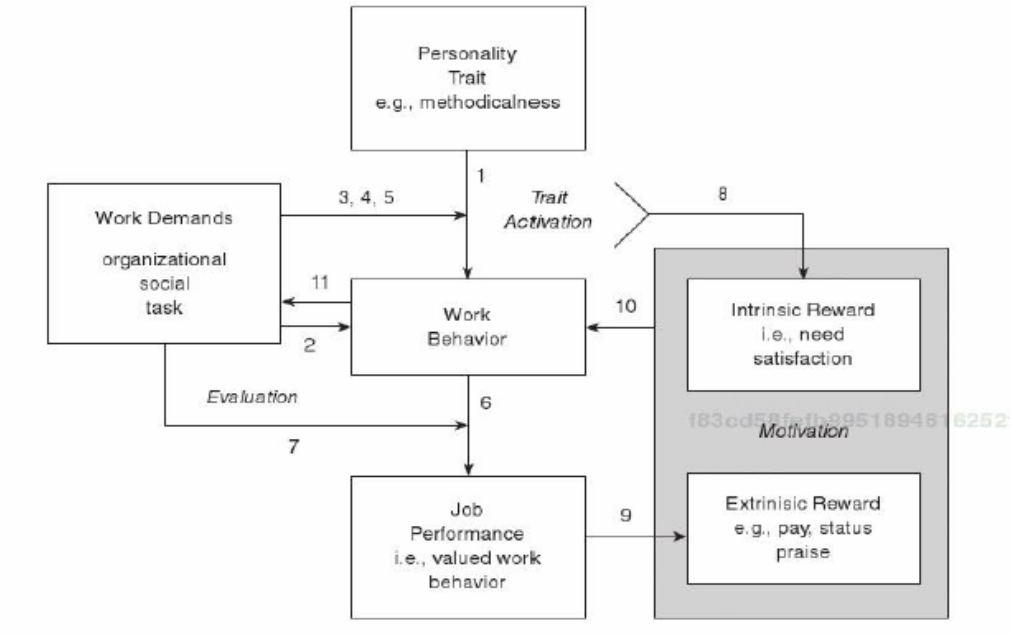

Figure 1 Trait Activation Theory

As entrepreneurs can create their own company and the environment in which they work, the job performance due to activation of the traits that they possess will be higher. After being more educated, as was discussed before, these entrepreneurs can better utilize their personality traits and create the situational cues that improve the performance of the company.

Several reasons can be given why the relationship between the personality factors that entrepreneurs possess and company performance is moderated by entrepreneurial learning. As mentioned above, as an entrepreneur is educated, the entrepreneur can better utilize the personality traits that improve company performance. Further, previous research has shown that personality traits are subject to change, due to an interaction between natural and environmental behavior (Frank, Lueger, & Korunka, 2007). This means that with an interaction of natural and environmental behavior, the personality of an entrepreneur can change towards a personality that better fits that of an entrepreneur. The entrepreneur can for instance become more extraverted, instead of staying more introverted. Having a personality that fits better for an entrepreneur, will make the entrepreneur more successful.

The last set of hypotheses are based on the moderating effect that *Entrepreneurial learning* is expected to have on hypotheses one through five. Each hypothesis follows the relationship from personality factor to entrepreneurial success. There is an influencing variable that moderates the relationship; this is the *'learning'* variable.

H7: Entrepreneurial learning moderates positively the relationship between Extraversion and entrepreneurial success.

H8: Entrepreneurial learning moderates positively the relationship between Openness to Experience and entrepreneurial success.

H9: Entrepreneurial learning moderates positively the relationship between Emotional Stability and entrepreneurial success.

H10: Entrepreneurial learning moderates positively the relationship between Conscientiousness and entrepreneurial success.

H11: Entrepreneurial learning moderates positively the relationship between Agreeableness and entrepreneurial success.

2.3 Conceptual model of entrepreneurial success

The theoretical framework provided, permits us to conduct a research that studies the effect of entrepreneurial learning on the relationship between the big five factors of personality and entrepreneurial performance. In order to answer the research question that has been formulated, a conceptual model has been developed. In this conceptual model the relationships between the different hypotheses that have been formulated can be found.

The literature review pointed out that there are several relationships between the concepts that are studied in this research. First, the Big Five personality factors each have some influence on entrepreneurial success. Second, there is also an influence of (entrepreneurial) learning on the relationship between the Big Five personality factors and the success of the entrepreneur. Finally, entrepreneurial learning has a direct influence on entrepreneurial success.

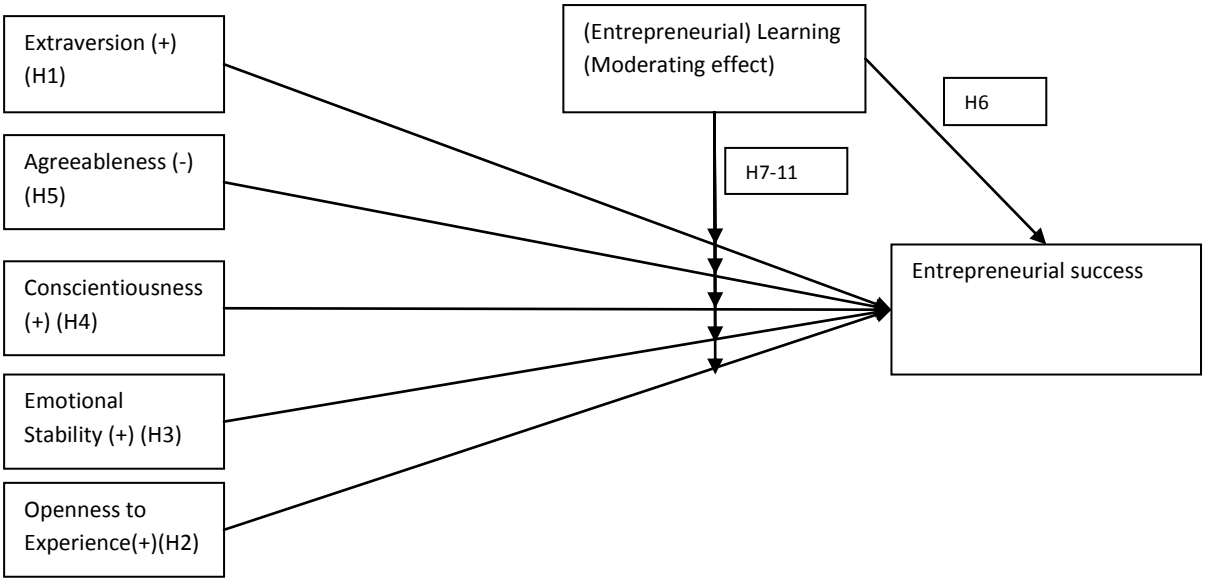

Figure 2 Conceptual Model

With this knowledge the conceptual model as shown in figure 2 has been developed. Within the model the different factors of personality are the independent variables that influence the success of the entrepreneur. The extent to which an entrepreneur learns, is expected to also have an influence on the relationship between the personality factor and success, yet this variable has a moderating effect between this relationship and might therefore influence the relationship between the different personality factors and the entrepreneurial success. Finally the direct line between entrepreneurial learning and entrepreneurial success describes the influence of entrepreneurial learning on entrepreneurial success.

Chapter 3: Methodology

3.1 The research sample

A sample for social research can be gathered in a probability or non-probability manner. Probability sampling requires random selection. Most of the time there is no list or database available with research subjects that can be used to randomly select a sample from. As such databases are usually not available, the selection of subjects can often not be done on a random basis. The researcher has to select the subjects by himself. Then the non-probability sampling method is used. In this case the sample is selected from a non-randomized group of people, that are in some way connected to each other because of some common characteristic or feature that they possess (Babbie, 2007).

For this research the sample has been gathered from people that have enlisted in the Venture Lab program that is hosted by the University Twente. Here, novice entrepreneurs enlist to receive proper training and coaching with the launch of their company. As this is not a group selected by random selection and therefore is of non-probable manner, the possibility to generalize the final results over a larger population is less than would have been the case when the research sample was gathered by random sampling. By selecting a sample from this group of people, the sample consists of people that have the same feature, namely the wish to start a successful company. Each person wants to become a successful entrepreneur that has already started or is about to start his own company. By selecting the sample from people that joined Venture Lab, the homogeneity is high. With high homogeneity, the possibility to generalize the results is higher. On the other hand, as the sample is made up of people that joined Venture Lab, the results can't be generalized over a larger population than people joining Venture Lab, or similar incubator programs. Within the research data, 129 people who participated in Venture Lab filled in the surveys that are used in this research.

3.2 Operationalization of the concepts

3.2.1 The big five factors of personality

40 so called mini-markers have been identified in previous research. These mini-markers will be used to map the personality of people, by asking about characteristics and how accurately they describe them (Thompson, 2008). With eight characteristics for each of the factors, each factor will be mapped out for the participants, see the *Appendix* for the survey questions on personality. In order to give a general idea about the questions for each personality factor, an example will be presented here, for each factor.

Personality Factor	**Example Question (on a five-point scale of inaccurate to accurate)**
Extraversion	I am shy
Openness to Experience	I am creative
Emotional Stability	I am envious
Conscientiousness	I am efficient
Agreeableness	I am kind

Table 3: Example questions for the Big Five Personality Factors

At the start of the participation within the Venture Lab program, all participants are asked to fill in several surveys. The first survey is used to map the profile of the participant. This survey is used for the operationalization of the big five factors of personality. With the use of a Likert-scale, different questions on the same subject or in this case personality factor can be asked (Babbie, 2007). With the use of multiple questions on the same personality factor, the reliability of the answers is safeguarded.

3.2.2 Descriptive Statistics

For each of the five personality factors a distribution of the sample is created. In this distribution, the scores on each personality factor will be displayed by using a factor analysis. The scores of each participant on the different personality factors have been inserted into SPSS. This results in N=129, with scores on each of the five personality factors.

The five factors that have been discussed in chapter two have been surveyed, using eight different items for each factor. These eight characteristics are however, not all pointing in the same direction, which means that the outcome of the eight questions on the Likert Scale, cannot simply be added up.

There are some characteristics that point to a low score on a factor and some characteristics that point to a high score on a factor. In order to add each up, one out of these two needs to be adjusted. Each personality factor is checked and if necessary the adjustments have been made. With the total score of each personality factor, for each participant, the distribution can be set out in a graph. The graphs can be found in the *Appendix*. Table four shows the mean, standard deviation and correlation for and between each personality factor.

	Mean	**S.D.**	**α**	**1.**	**2.**	**3.**	**4.**	**5.**	**6.**	
1. Subjective Performance	11,93	4,946								
2. Extraversion	28,56	5,167	0,84	0,198*						
3. Openness to Experience	29,89	4,132	0,74	0,089	0,024					
4. Emotional Stability	28,43	4,643	0,74	0,120	0,201*	0,126				
5. Conscientiousness	29,11	5,237	0,86	-0,036	-0,092	0,205*	0,247*			
6. Agreeableness	32,52	3,724	0,76	-0,053	0,232*	0,198*	0,118	0,294*		
7. Courses Followed	21,69	19,459	0,85	-0,249*	-0,065	0,054	0,059	0,164*	-0,057	

Table 4: Descriptive statistics and correlations
N = 129; * = statistically significant (α<0,05)

Looking at the mean for each personality factor, it can be seen that the research sample scores about the same on each factor. When looking at the distribution of each personality factor and the corresponding normal curve, which can be found in the appendix, it can be seen that each factor follows the normal distribution curve. For the courses that have been followed, the distribution also follows the normal curve.

What can as well be seen is that there is some statistically significant correlation between the different personality factors and the number of courses that have been followed. With the exception of subjective performance and courses followed, the statistically significant correlations are all of a positive nature. This means that the different variables strengthen each other. Only the relationship between subjective performance and the amount of courses that have been followed correlates negative, which means that an increase in courses followed, decreases the subjective performance.

3.2.3 Factor Analysis

Factor analysis is built on a number of statistical techniques with the aim of simplifying complex sets of data (Kline, 1994). In the factor analysis there are factors and so called factor loadings. The factor is a construct or dimension which might account for a relationship between variables. Factor loading is the correlation between variables and the factor (Kline, 1994). Factor analysis is important as it shows that the different traits for each personality factor are based on a related measurement.

The table that has been created with the use of Factor Analysis can be found in the Appendix. There are several blank spaces, which indicate that there are scores on these spaces that are below 0,3. As can be seen, the Factor Analysis shows the factors and its corresponding traits. There are a few traits that have some overlap with other personality factors, but the scores are lying between the 0,3 and 0,4. In comparison, the scores for the matching traits lie higher than these overlapping traits.

The factor analysis gives reason to believe that the five factors, which are identified within the literature, are accurate. With scores ranging from 0,3 to even as high as 0,84, the reliability is high. In order to test this reliability further, another analysis is performed in order to identify Cronbach's Alpha for each of the factors. The value of Cronbach's Alpha needs to be at least 0,65 to support internal consistency among the variables (George & Mallery, 2003). As shown in table four, Cronbach's Alpha also suggests that the reliability is high enough to say that the variables are consistent. This supports the use of five factors of personality.

3.2.4 Entrepreneurial success

The performance of a company can be measured by objective and subjective measurement variables. These variables can be used both, or be used as an either/or question. 'Subjective measures have tended to focus on overall performance, whereas objective measurement has typically used more specific financial indicators' (Wall, et al., 2004, p. 97).

Several reasons have been given for the use of subjective measures. One reason is be that the use of subjective performance factors is more cost effective, as such data can be collected by questionnaires or interview surveys. Another more fundamental reason is that in some cases, there is no viable alternative. The data is just not available. This can be the case for public services, or small enterprises, where the financial records are not available (Wall, et al., 2004).

For this thesis start-up companies are the unit of analysis, which have limited financial records. Due to the fact that these companies have only yet a short existence (or no existence at all so far), the records on revenues, funding or even growth in personnel might not be available. As expressed by Wall et al. (2004), subjective performance measures are most useful in this case. Therefore performance will be measured by using subjective measurement variables. However the use of subjective performance measurement does not make this research less valuable or trustworthy, as the entrepreneurs themselves are best able to judge the situation of their start-up business (Wall, et al., 2004).

For the operationalization of subjective entrepreneurial success, the success that the entrepreneurs have at the end of the project is analyzed. The survey on the 'current situation' is used for the analysis of the subjective success that entrepreneurs with different personality factors have. The analysis uses the ambitions section of this survey. In this section the ambitions of the entrepreneur, over the period that they are participating within the Venture Lab program, are questioned.

During the Venture Lab program, the participants usually have a business that is in an early stage, or did not even start their business yet. To measure the success in this stage with financial results would give unsatisfying answers, as the amount of ‘successful’ start-up entrepreneurs would be very low in this situation. Therefore the success of the entrepreneurs of the Venture Lab program will be measured by measuring where the business is growing towards according to the entrepreneur, thus subjective measures. The questions have been answered on a Likert-scale, ranging from strongly disagree to strongly agree. The following questions, as stated in table six, have been asked. The correlation among the different questions has been tested with the use of Cronbach's Alpha in order to see if there is internal consistency. With a Cronbach's Alpha score of 0,853 the internal consistency among the questions is guaranteed.

Questions on subjective performance:
1. My business is currently heading towards a business that will grow rapidly
2. My business is currently heading towards a business that becomes an industry leader
3. My business is currently heading towards a business that has multiple locations
4. My business is currently heading towards a business that is listed on a major stock market
5. My business is currently heading towards a business that is known worldwide

Table 5: Subjective performance questions

3.2.5 Entrepreneurial learning

Looking at entrepreneurial learning, there are two approaches that can be distinguished. The individualistic approach, which focuses on the individual and the cognitive capabilities and personal experiences and the collectivist approach, which focuses on the organizational context and the collective activities (Erdelyi, 2012).

The unit of analysis here is the entrepreneur. The development of the entrepreneur plays a central role in the Venture Lab program. Thus the individualistic approach is taken. Entrepreneurial learning is done with the use of the training sessions that the start-up entrepreneurs received in the Venture Lab program. These entrepreneurs have the ability to follow courses that can improve their capabilities and knowledge about starting a business and how to get from the start-up phase to being a successful business.

Within this research, no distinction has been made between different types of courses that can be followed. The entrepreneurs are just distinguished on whether or not they have followed courses in the Venture Lab program and the number of courses that they have followed. The number of courses that the start-up entrepreneur has followed during the Venture Lab program is used. The normal courses and the extra courses are taken together and based on this, the total number of courses that each entrepreneur has followed, is calculated.

3.3 Linear regression methods

In order to use linear regression modeling, the data that is being used, has to meet several assumptions. Six assumptions are given, yet in real-world data it is not uncommon that one (or more) assumptions are violated (Montgomery, Peck, & Vining, 2012). The first assumption states that the variables need to be measured on a continuous level. The variables tested in this thesis are all measured on a continuous level, so this first assumption is confirmed.

The second assumption states that the relationship between the variables needs to be a linear one. Assumption three states that there should be no significant outliers in the data, as these outliers can have a negative effect on the regression analysis. Both assumption two and three can be checked by visualizing and analyzing a scatter plot of the data. This scatter plot can be found in Appendix 6.4. Looking at the linearity in the scatter plot, it can be seen that the scores are scattered. This means that the second assumption is met. Yet there seems to be some overlap on several points in the scatter plot. This makes the fit a little less certain. The scatter plot shows that there are only a few outliers. These outliers are too few to fear for a violation of this third assumption.

Within the fourth assumption independence of observations is tested. This can be tested with the Durbin-Watson statistic. With a score between 1,5 and 2,5 the observations are independent and thus the assumption is not violated. With a Durbin-Watson score of 1,987 the fourth assumption is also safeguarded.

The fifth assumption states that there needs to be homoscedasticity. This can also be tested with the use of a scatter plot. If the scatter plot shows a distribution that lies between two straight lines in the scatter plot, then there is homoscedasticity. If the distribution has a parabolic end on either side, the data is heteroscedastic and it will violate the fifth assumption. Just as with the second and third assumption, the homoscedasticity is also secured by the scatter plot.

The final assumption checks for residuals. These residuals need to be normally distributed. This assumption can be tested with the use of a Normal P-P plot, which can be found in the Appendix. This plot shows that all the scores lie close to the regression line, thus this assumption is also met. Given all of these checks, the six assumptions are all - more or less - passed, yet for some of the assumptions there are some side notes. These side notes are insignificant and can be explained due to the fact that the data is based on the real world, which makes it hard to have a complete fit over each of the assumptions. This means that the use of linear regression is validated.

3.3.1 OLS regression

Ordinary least-squares (OLS) regression is a generalized linear modeling technique that can be used to model a single response variable which has been recorded on at least an interval scale. Furthermore, it can be used to do multiple regression modeling. The OLS regression analysis in this thesis is used to predict the dependent variable (subjective performance) with the different independent variables (the personality factors). The regression modeling searches for statistically significant predictors in the relationship.

It is important to discuss the method of entry for regression analysis. The aim of the selection method is to reduce the set of predictor variables. Only those that are necessary for explaining the variance of the whole set are accounted for. Stepwise selection is used here, as this method determines the contribution of each predictor step by step. This way for each added variable the contribution of the previous variables can be understood. The variables can be retained from the regression analysis based on their statistical contribution.

3.3.2 Moderated effect regression

The moderator is a variable that has influence on the relationship between the dependent and the independent variable. The moderator explains ‘when’ the dependent variable and independent variable have a relationship. Moderation implies an interaction effect. This means that when the moderator effect is introduced into the relationship between the dependent variable and independent variable, the relationship changes.

There are three types of effects that a moderator variable can have. First, the moderator variable can have an enhancing effect; this means that the effect between the dependent variable and independent variable is increased. The second effect is a buffering effect, which means that the effect that exists between the dependent variable and independent variable is buffered and thus decreased. The final effect is an antagonistic effect, which means that the effect that exists between the dependent variable and independent variable is reversed (Montgomery, Peck, & Vining, 2012).

To test for moderated effect regression, the model is tested to see if there is significantly more variance accounted for with the new model, in comparison to the old model, where the moderator variable was not present. This is tested with the R^2 change and the significance of this change.

Chapter 4: Results

4.1 OLS Regression

	Model 1
Extraversion	0,198*
Openness to Experience	0,113
Emotional Stability	0,093
Conscientiousness	0,024
Agreeableness	-0,154
Courses Followed	-0,260*
Adjusted R^2	0,089
R^2	0,133
F	3,031

Table 6: Regression results on subjective performance
N = 129; * = statistically significant (p<0,05)

Table seven shows the results of the regression analysis that has been conducted. The adjusted R^2 shows the amount of variance that is explained by the different variables that are added into the model. Thus almost 9% of the variance of the subjective performance is explained by the personality factors and the courses that are being followed. Looking at the variables that are used in the model, only Extraversion and courses followed have a statistically significant beta-score. The negative beta-score of courses followed, shows that there is a negative relationship between the amount of courses that a start-up entrepreneur follows and the subjective performance of the company.

Following these results, hypothesis one through six are analyzed. Hypothesis one, *Entrepreneurs that score high on Extraversion are more successful than entrepreneurs that score low on Extraversion,* is supported. With a beta-score of 0,198 the relationship between extraversion and subjective performance is a positive one. This means that with a higher score on extraversion, the subjective performance of the company will also be higher. Subsequently there is a p-score of 0,033, which means that there is statistical significance. With these two facts, the hypothesis is supported.

Hypothesis two, *Entrepreneurs that score high on Openness to Experience are more successful than entrepreneurs that score low on Openness to Experience,* is rejected. As there is no statistical significance for the beta-score, the hypothesis is rejected. Hypothesis three, *Entrepreneurs that score high on Emotional Stability are more successful than entrepreneurs that score low on Emotional Stability,* is also rejected. There is again no statistical significance found and therefore the hypothesis cannot be supported.

Hypothesis four, *Entrepreneurs that score high on Conscientiousness are more successful than entrepreneurs that score low on Conscientiousness,* also has no statistical significance to be supported. Just like hypothesis two and three, this hypothesis is also rejected. For hypothesis five, *Entrepreneurs that score low on Agreeableness are more successful than entrepreneurs that score high on Agreeableness,* the relationship that is found, matches the hypothesis, yet there is no statistical significance to support the hypothesis.

Finally, hypothesis six, *Entrepreneurs that follow more entrepreneurial courses are more successful than entrepreneurs that follow less entrepreneurial courses,* can also not be supported. A negative relationship is found, between the amount of courses that are followed and subjective performance. This means that there is evidence found, that instead of being more successful after following

courses, entrepreneurs are less successful after following more courses. This is of course based on the subjective performance of the entrepreneur.

4.2 Moderation

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Extraversion	0,198*	0,187*	0,212*	0,198*	0,198*	0,198*
Openness to Experience	0,113	0,100	0,151	0,113	0,112	0,113
Emotional Stability	0,093	0,094	0,099	0,094	0,094	0,093
Conscientiousness	0,024	0,028	0,020	0,025	0,026	0,024
Agreeableness	-0,154	-0,159	-0,156	-0,154	-0,154	-0,154
Courses Followed	-0,260*	-0,264*	-0,275*	-0,263*	-0,263*	-0,260*
Extraversion - Courses		-0,095				
Openness - Courses			0,132			
Emotional - Courses				0,013		
Conscientiousness - Courses					0,010	
Agreeableness - Courses						0,002
Adjusted R^2	0,089	0,090	0,098	0,081	0,081	0,081
R^2	0,133	0,141	0,148	0,133	0,133	0,133
F	3,031	2,772	2,931	2,579	2,578	2,576

Table 7: Moderation results on subjective performance
N = 129; * = statistically significant (p<0,05)

Table eight shows the results of the Moderated Effect Regression. Model one of the moderation results shows the relationship between the different independent variables and the dependent variable. This model is still without a moderation variable. Model two to six each have a moderation variable added to model one. The influence of adding a moderation variable can be seen in the other models, where the beta-scores have changed. For each personality factor an extra moderator variable is created. Looking at the adjusted R^2 of each model, the influence of adding this extra variable, is small. In some models there is even a negative influence on the ability to explain the variance of the dependent variable.

Model two of the moderation results shows the results for the first moderator relationship. This model tests the seventh hypothesis; *Entrepreneurial learning moderates positively the relationship between Extraversion and entrepreneurial success.* The moderator variable has no statistically significant influence on the relationship between extraversion and subjective performance of the entrepreneur. The moderation effect also is of a negative nature and therefore hypothesis seven will be rejected.

In model three of the moderation results the next moderator relationship is added. Model three tests hypothesis eight; *Entrepreneurial learning moderates positively the relationship between Openness to Experience and entrepreneurial success.* The moderator variable in this hypothesis is positive, yet it is not statistically significant. Therefore hypothesis eight is rejected. Model four of the moderation results has the same results as model three. Hypothesis nine; *Entrepreneurial learning*

moderates positively the relationship between Emotional Stability and entrepreneurial success, is therefore also rejected, as there is no statistical significant moderating effect.

Model five of the moderation results has the next moderator added. This model tests hypothesis ten, *Entrepreneurial learning moderates positively the relationship between Conscientiousness and entrepreneurial success.* As there is no statistical significance for the moderator variable, the hypothesis is rejected. Finally model six of the moderation results shows the results for the eleventh and last hypothesis, *Entrepreneurial learning moderates positively the relationship between Agreeableness and entrepreneurial success.* Just as with hypothesis ten, this hypothesis is also rejected, as there is no statistical significance for the moderator variable.

To summarize, table nine shows each hypothesis with the corresponding findings, whether the hypothesis has been accepted or rejected. This table gives a quick overview of the results.

Hypothesis:	**Supported / Rejected:**
1. *Entrepreneurs that score high on Extraversion are more successful than entrepreneurs that score low on Extraversion*	Supported
2. *Entrepreneurs that score high on Openness to Experience are more successful than entrepreneurs that score low on Openness to Experience*	Rejected
3. *Entrepreneurs that score high on Emotional Stability are more successful than entrepreneurs that score low on Emotional Stability*	Rejected
4. *Entrepreneurs that score high on Conscientiousness are more successful than entrepreneurs that score low on Conscientiousness*	Rejected
5. *Entrepreneurs that score low on Agreeableness are more successful than entrepreneurs that score high on Agreeableness*	Rejected
6. *Entrepreneurs that follow more entrepreneurial courses are more successful than entrepreneurs that follow less entrepreneurial courses*	Rejected
7. *Entrepreneurial learning moderates positively the relationship between Extraversion and entrepreneurial success*	Rejected
8. *Entrepreneurial learning moderates positively the relationship between Openness to Experience and entrepreneurial success*	Rejected
9. *Entrepreneurial learning moderates positively the relationship between Emotional Stability and entrepreneurial success*	Rejected
10. *Entrepreneurial learning moderates positively the relationship between Conscientiousness and entrepreneurial success*	Rejected
11. *Entrepreneurial learning moderates positively the relationship between Agreeableness and entrepreneurial success*	Rejected

Table 8: Summarized results

Chapter 5: Discussion

5.1 Discussion and conclusions

Within this thesis the influence of the Big Five personality factors on subjective performance has been studied. It was expected that entrepreneurial learning had a moderating effect on this relationship, which has been tested using the amount of courses followed about the entrepreneurial process. Research into the relationship between personality factors and subjective performance has already been done before, by Ciavarella et al. (2014) for instance who studied the survival rate of companies. By studying the influence of training on the relationship, the trust that an entrepreneur has in the success of his own company is tested. The next table presents a summary of the results, after which these results will be discussed further.

Hypothesis	Found	Not Found	Unexpected
1. *Entrepreneurs that score high on Extraversion are more successful than entrepreneurs that score low on Extraversion*	X		
2. *Entrepreneurs that score high on Openness to Experience are more successful than entrepreneurs that score low on Openness to Experience*		X	
3. *Entrepreneurs that score high on Emotional Stability are more successful than entrepreneurs that score low on Emotional Stability*		X	
4. *Entrepreneurs that score high on Conscientiousness are more successful than entrepreneurs that score low on Conscientiousness*		X	
5. *Entrepreneurs that score low on Agreeableness are more successful than entrepreneurs that score high on Agreeableness*		X	
6. *Entrepreneurs that follow more entrepreneurial courses are more successful than entrepreneurs that follow less entrepreneurial courses*			**Following more courses statistically leads to less successful companies (subjectively)**
7. *Entrepreneurial learning moderates positively the relationship between Extraversion and entrepreneurial success*		X	
8. *Entrepreneurial learning moderates positively the relationship between Openness to Experience and entrepreneurial success*		X	
9. *Entrepreneurial learning moderates positively the relationship between Emotional Stability and entrepreneurial success*		X	
10. *Entrepreneurial learning moderates positively the relationship between Conscientiousness and entrepreneurial success*		X	
11. *Entrepreneurial learning moderates positively the relationship between Agreeableness and entrepreneurial success*		X	

Table 9: Found results of the hypotheses.

First of all, there is a statistical significant relationship between extraversion and subjective performance. This is in line with previous research, which also found that extraversion and performance are positively related. The relationship with subjective performance can be explained, as people who are extravert, are usually more certain about their capabilities. Therefore the performance that they perceive tends to be better than someone who is more introverted. An introverted person tends to be more skeptical about his/her abilities. This is also pointed out by Mortan et al. (2014), as they state that to be successful as an entrepreneur, an optimistic view of the personal efficacy is often a key factor. To be successful, subjectively, an entrepreneur needs to believe in his/her own capabilities. Being extravert also helps the entrepreneur with the networking that needs to be done. It is shown in previous research that networking appears to be significantly positively associated with both company survival and with growth of the company (Watson, 2007).

Next, the amount of courses that are followed by the entrepreneurs has a negative statistically significant effect on the subjective performance of the company. This is unexpected, as previous literature found a positive relationship (Elmuti, Khoury, & Omran, 2012) (Raposa & do Paco, 2011). Several reasons might be the cause of this. First, there might be some coherence with the previous findings on extraversion. Entrepreneurs who are more certain about their company and the progress that they make, might expect that they don't need too much training. Thus they follow fewer courses and perceive their performance as higher than entrepreneurs that do follow more courses. The entrepreneurs that follow more courses can be more uncertain about their capabilities and therefore score lower on subjective performance.

Another reason might be that the courses that are being offered, do not match the needs of the start-up entrepreneurs. Next, following more courses might also overwhelm the entrepreneur with more insecurity. The start-up entrepreneur is faced with more issues than expected beforehand. This can create more insecurity about the fact if they can fulfill all the tasks that need to be done as an entrepreneur. And finally, it can also be the possibility that the people that have joined Venture Lab are not qualified enough to be an entrepreneur and therefore do not perceive themselves to be successful. Yet these underlying reasons can only be speculated at this point.

These results on the courses that are followed give the need for future research into these issues. Future research needs to focus on the courses that are taught to start-up entrepreneurs. Also a focus on entrepreneurs that have a business further in the company lifecycle might prove useful. With more developed entrepreneurs and companies, subjective performance can be changed for objective performance as the dependent variable. Future research might be done by finding the entrepreneurs that have been studied here, to see how their companies are doing now. As a period of time has passed since the data was collected, the entrepreneurs and their companies are further developed or have gone bankrupt.

The other direct relationships, between the personality factors and subjective performance, have not found statistically significant results. Hypotheses two, three, four and five have all been rejected. There was no statistical significant influence of the different personality factors that have been tested in these hypotheses and the subjective performance of the company. This does not mean that such a relationship doesn't exist, yet this research just hasn't found this relationship. Previous research on the relationship is not questioned, based on these results.

Also the influence of a moderator variable, which was tested with the amount of courses followed upon the relationship between the personality factors and subjective performance, has not found statistical significant results. Hypothesis seven, eight, nine, ten and eleven have all been rejected. Here again this does not mean that previous research that has found such a significant relationship has to be questioned.

5.2 Limitations

There are several limitations to this research that bound the generalizability of the results to a much larger population. First of all the sample is made up out of people who have attended the Venture Lab program. Because the sample was made up out of this selective group, there was no randomization in the selection process.

The total amount of participants which has been surveyed consisted of 209 participants that entered the Venture Lab program. In this program, the different entrepreneurs have filled in different surveys and participated in different courses and entered diaries. From this set of 209 participants, 41 participants have not filled in the surveys and are therefore not useful for this research. In the remaining set of 168 participants, less than 1% of the questions related to ones personality were not answered. This can either be due to the fact that the entrepreneurs forgot to answer these questions, or that they skipped the question on purpose. As this percentage is so small, it is considered as being negligible. From the 168 participants that have filled in the personality survey, 129 have filled in the statements on the progression of their business. With a sample size of around 130 respondents, the sample size is small. With such a small sample, it is again harder to generalize the results over a large population. With a larger sample the results may change a bit, due to the fact that outlying scores weigh heavier when the sample is small in contrast to a larger sample.

Besides the issues with the sample that limit the ability to generalize the results of this research, there is another limitation that has arisen. The use of five factors of personality is a point of discussion, as can be seen in the scree plot that is created. The *scree plot,* which can be found in the *Appendix*, shows the number of factors that can be found with the data that is collected.

As the choice was made here to go for five factors, the *Scree plot* is a good tool to discuss whether it was a good choice or not. The point of inflexion is where the curve takes off. At the point of inflexion, the number of factors that are before this point should be number of factors that are present in the data. Just looking at the eigenvalues, there are more than ten factors that score above a score of one. This is too much compared to what the literature review has found. It is possible that there are several points of inflexion. There are two additional spots where the curve takes off to a more or less straight line.

From the first point in the figure, it can be seen that there is reason to believe that five factors exist. The second point might even be a better point of inflexion, where six factors are found. Here the curve of the line slows down even more. When looking at the literature for this, it is found that there is support for having a sixth personality factor. As this scree plot points out, the use of six personality factors should be investigated further, to either exclude that there are five or six personality factors (Hogan & Ones, 1997) (Sackett & Wanek, 1996) (Saucier & Ostendorf, 1999).

As found in previous research, the use of narrow traits in contrast to the broad traits of the Big Five can predict entrepreneurial success better. This can be a reason to make use of this so-called META, to measure the relationship between personality and entrepreneurial success (Leutner, Ahmetoglu, Akhtar, & Chamorro-Premuzic, 2014). For future research the use of narrow traits, based on the META model, can predict the entrepreneurial success even better and is thus recommended. Other recent research also uses narrow traits, in contrast to the Big Five traits in order to test the influence on entrepreneurial performance (Mould, 2013).

5.3 Implications

As mentioned already in the discussion, this research provides some implications. As it is hard for people to change their personality, entrepreneurs will not be able to profit much from the results. In

order to perform better from a subjective viewpoint, the entrepreneurs should adopt a more extravert personality and try to be more confident. Yet the question remains if it is possible to change people, just so they fit into a personality scale that is most successful according to science. Although personality can't be changed that easily, it is possible to change the behavior of people. If entrepreneurs are aware of the traits and behavior that produces more successful firms, they can learn to behave in a certain way in certain situations. By offering courses that are directed at boosting the self-confidence of these entrepreneurs, the (subjective) performance might be improved as well (Hmieleski & Baron, 2008).

The results that are found have implications for incubators, such as Venture Lab. Although the results are only testing the subjective performance, the results are already a good indicator for incubators to focus on creating a good self-image for the entrepreneur self. As pointed out before, being optimistic and believing in your own capabilities is often a key factor in the success of an entrepreneur (Mortan, Ripoll, Carvalho, & Bernal, 2014).

Furthermore, the incubators should make a better assessment of the capabilities of the participants. Next the incubator should offer more tailor-made types of training that fits the personalities of the different participants. For instance, if the participant lacks confidence, focus should lie on confidence building, whereas if the participant lacks networking skills, this should be taught. With the large number of courses that are given in Venture Lab, it is seen that the entrepreneurs become less confident after following a lot of them. After assessing the capabilities and the lack of capabilities, the offer of courses can be more focused on each participants needs.

The same goes for the entrepreneur, who can try and improve his/her confidence. If the entrepreneur knows that he/she is introvert and also lacks self-confidence, this can be boosted with following courses that work on being more self-confident.

With the use of a larger sample and a more randomized selection process, can give better-generalizable results. This would be for future research(ers) to decide. Also the use of start-up entrepreneurs may have influenced the results, as they are only able to provide subjective performance measures. Although these measures are not worse than objective measures, the use of entrepreneurs that are already a few years working with their company, might provide different results. So for future research, the same entrepreneurs can be asked about the performance of their company in a later stage.

This research shows that the discussion over the number of personality factors, whether there are five or six, is logical and that it is not a given that there are either five or six personality factors (or even more). Also evidence for the support of previous research on the influence of personality factors on the performance of entrepreneurs and their company has been found.

6. Appendix

6.1 Personality survey questions

Please use the below list of common human traits to describe yourself as accurately as possible. Describe yourself as you really are compared to other people you know of the same age and sex, not as you wish to be. Please rate each of the characteristics in terms of how accurately (or inaccurately) it describes you.

Inaccurate					**Accurate**	**Inaccurate**					**Accurate**
	1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
01. Shy	0	0	0	0	0	21. Jealous	0	0	0	0	0
02. Talkative	0	0	0	0	0	22. Unenvious	0	0	0	0	0
03. Energetic	0	0	0	0	0	23. Moody	0	0	0	0	0
04. Quiet	0	0	0	0	0	24. Unanxious	0	0	0	0	0
05. Extraverted	0	0	0	0	0	25. Efficient	0	0	0	0	0
06. Outgoing	0	0	0	0	0	26. Disorganized	0	0	0	0	0
07. Reserved	0	0	0	0	0	27. Careless	0	0	0	0	0
08. Untalkative	0	0	0	0	0	28. Untidy	0	0	0	0	0
09. Creative	0	0	0	0	0	29. Neat	0	0	0	0	0
10. Intellectual	0	0	0	0	0	30. Inefficient	0	0	0	0	0
11. Unimaginative	0	0	0	0	0	31. Systematic	0	0	0	0	0
12. Artistic	0	0	0	0	0	32. Organized	0	0	0	0	0
13. Intelligent	0	0	0	0	0	33. Kind	0	0	0	0	0
14. Philosophical	0	0	0	0	0	34. Sympathetic	0	0	0	0	0
15. Deep	0	0	0	0	0	35. Harsh	0	0	0	0	0
16. Uncreative	0	0	0	0	0	36. Cooperative	0	0	0	0	0
17. Envious	0	0	0	0	0	37. Unkind	0	0	0	0	0
18. Emotional	0	0	0	0	0	38. Warm	0	0	0	0	0
19. Anxious	0	0	0	0	0	39. Rude	0	0	0	0	0
20. Unworried	0	0	0	0	0	40. Inconsiderate	0	0	0	0	0

6.2 Sample distribution

6.2.1 Extraversion

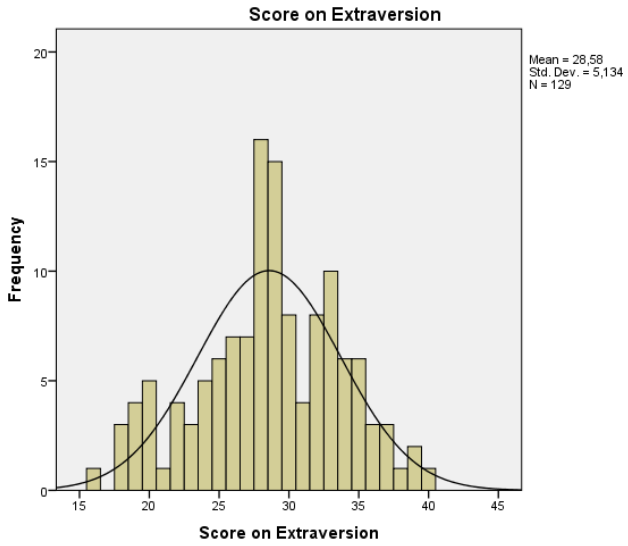

Figure 3: Histogram Extraversion

6.2.2 Openness to Experience

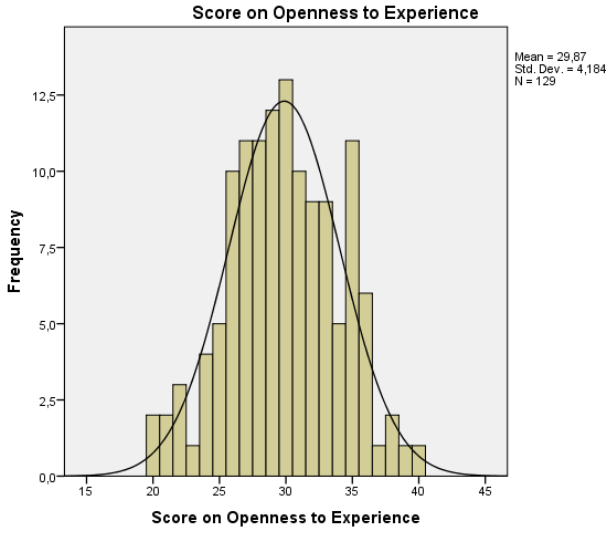

Figure 4: Histogram Openness to Experience

6.2.3 Emotional stability

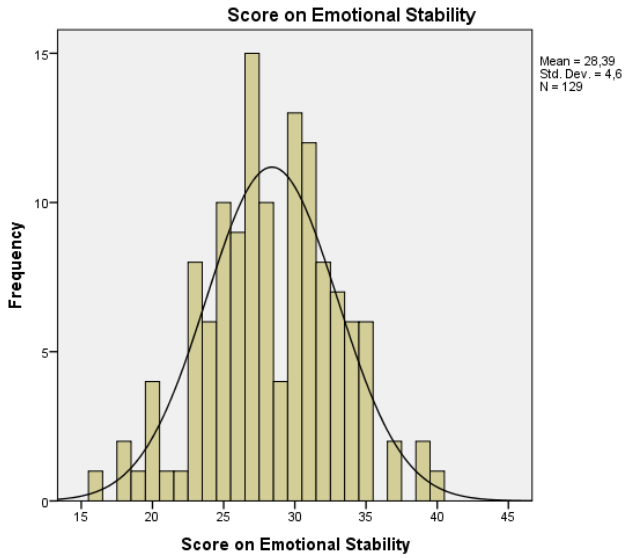

Figure 5: Histogram Emotional Stability

6.2.4 Conscientiousness

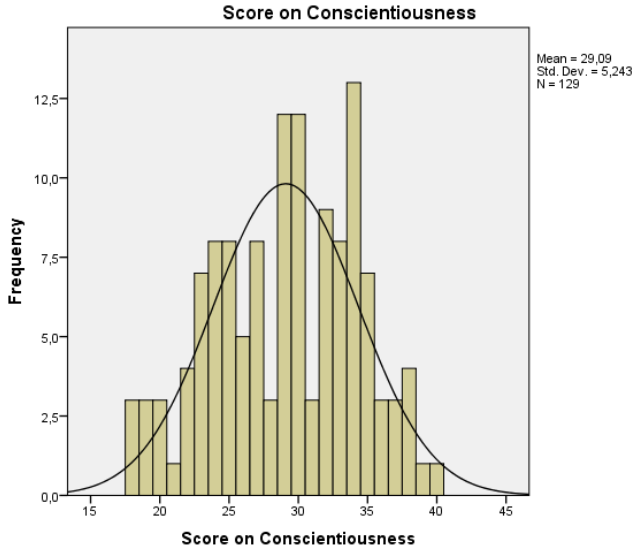

Figure 6: Histogram Conscientiousness

6.2.5 Agreeableness

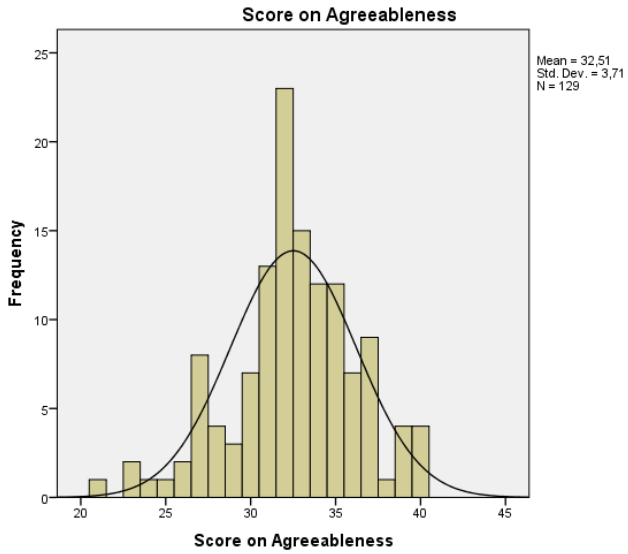

Figure 7: Histogram Agreeableness

6.2.6 Courses Followed

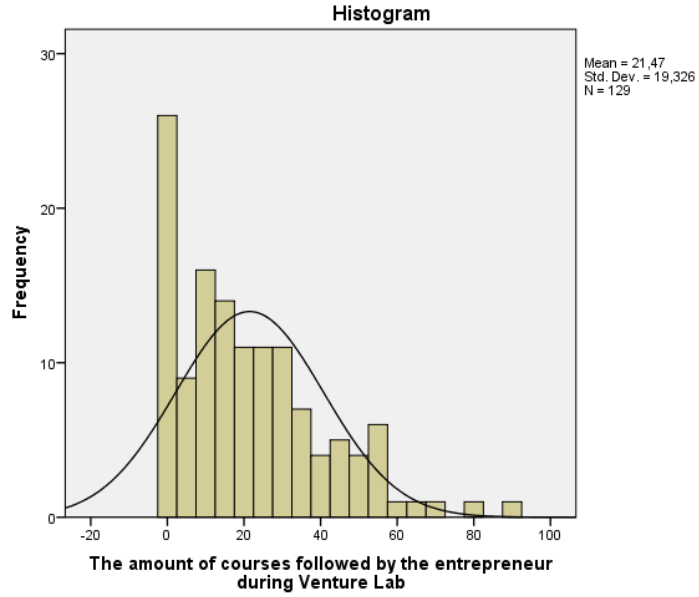

Figure 8: Histogram Courses Followed

6.3 Factor Analysis

Personality Trait	Extraversion	Openness to Experience	Emotional Stability	Conscientiousness	Agreeableness
Shy	0,449				
Talkative	0,704				
Energetic	0,464				
Quiet	0,608				
Extraverted	0,642				
Outgoing	0,598				
Reserved	0,569				
Untalkative	0,585				
Creative		0,677			
Intellectual	-0,445	0,345			0,329
Unimaginative		0,539			
Artistic		0,580			
Intelligent	-0,381	0,302			0,330
Philosophical		0,624			
Deep		0,310			0,325
Uncreative		0,725			
Envious			0,603		
Emotional			0,485		
Anxious			0,676		
Unworried			0,452		
Jealous			0,372		
Unenvious			0,613		
Moody					
Unanxious			0,685		
Efficient				0,526	
Disorganised				0,841	
Careless				0,489	0,398
Untidy				0,691	
Neat				0,709	
Inefficient				0,455	
Systematic				0,711	0,336
Organised				0,826	
Kind	0,379				0,732
Sympathetic					0,711
Harsh					0,372
Cooperative					0,652
Unkind					0,627
Warm		0,313			0,451
Rude					0,386
Inconsiderate				0,303	0,354

Table 10: Factor Analysis

6.4 Scatter plot

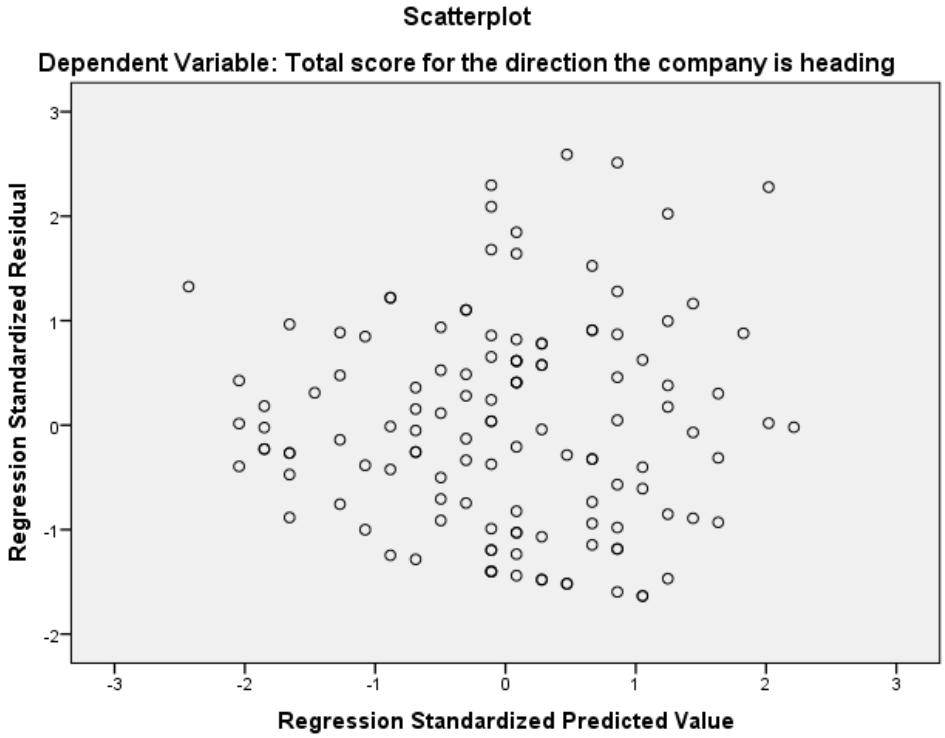

Figure 9: Scatter Plot

6.5 Normal P-P Plot of Regression

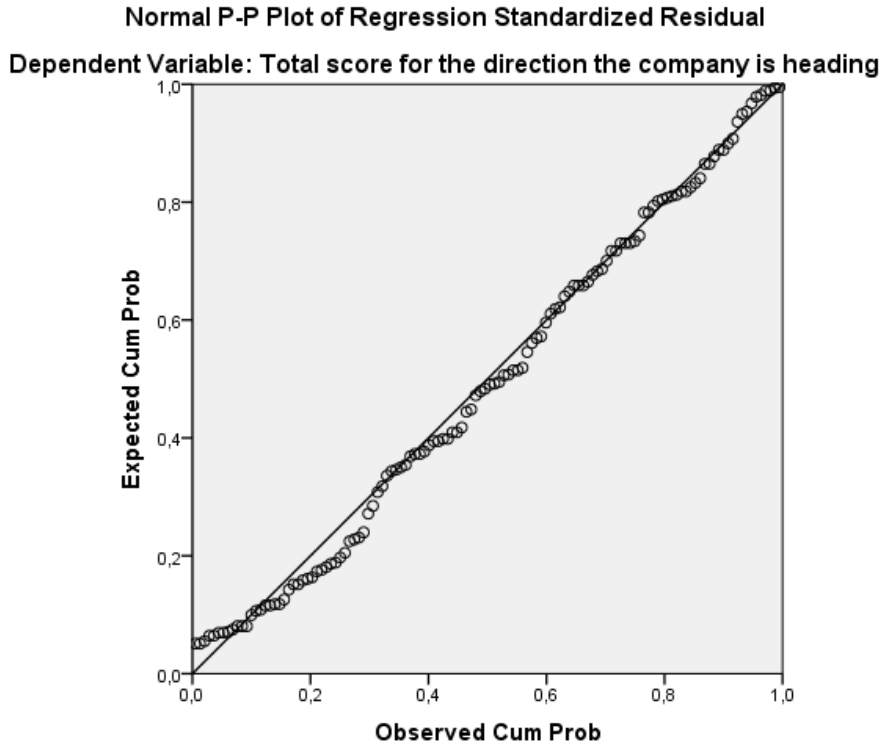

Figure 10: Normal P-P Plot of Regression

6.6 Scree plot

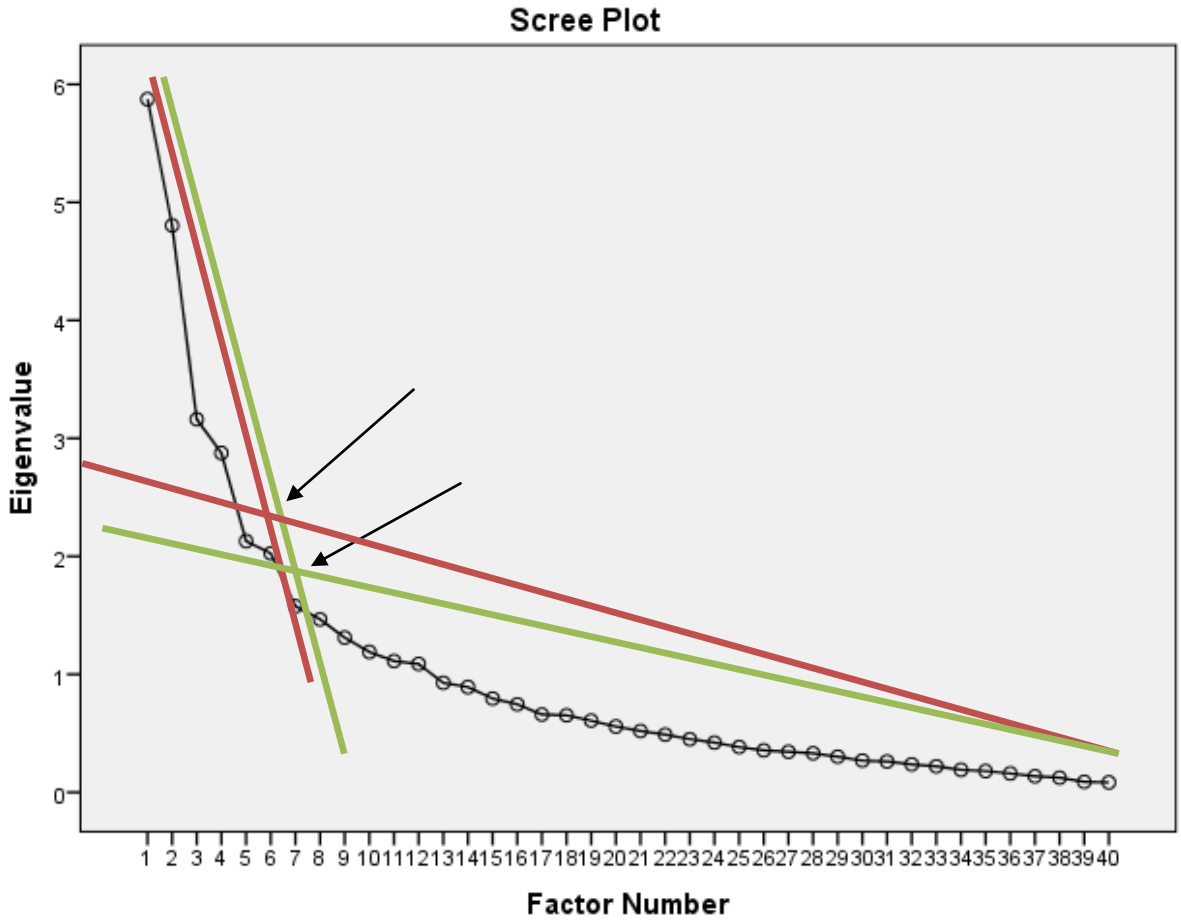

Figure 11: Scree plot

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