

Which Big-Five personality traits drive entrepreneurial failure in highly innovative industries?

Uwe Cantner^{*§}, Rainer K. Silbereisen[§] and Sebastian Wilfling^{*†}



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Abstract:

The relation between the comprehensive personality of highly innovative entrepreneurs and their disposition to fail is still strongly underinvestigated. Thus in this paper we examine a dataset consisting of 423 entrepreneurs from the German federal state of Thuringia is employed in order to examine the relationship between the Big-Five personality traits (conscientiousness, extraversion, agreeableness, openness, neuroticism) and entrepreneurial failure in highly innovative industries. Correspondingly, we identify seemingly successful discontinuances as far as possible with the help of a firm credit rating. As a framework for the relationship between personality traits and entrepreneurial failure the five-factor personality system theory of McCrae and Costa (1996, 1999) is operated. We find evidence that agreeable entrepreneurs have a lower probability to fail at all times from the start up of their firms. In contrast, conscientiousness increases the failure hazard rate at the time launching a firm, even if this effect diminishes over time. Neuroticism, openness, and extraversion are seemingly not related to the hazard of entrepreneurial failure in highly innovative industries. We conclude that this personality profile rather refers to effectuators in Sarasvathy's (2001) terminology than to entrepreneurs who build up their firms on causation principles.

Keywords: Entrepreneurial failure, innovative industries, The Big Five, personality of entrepreneurs

^{*}Friedrich Schiller University Jena, Department of Economics; [§]Friedrich Schiller University Jena, Institute of Psychology; [§]University of Southern Denmark, Odense, Department of Marketing and Management, I²M Group; [†]Corresponding author: e-mail: sebastian.wilfling@uni-jena.de

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1. Introduction

The trial of linking personality traits to entrepreneurial success and failure was already declared to be failed more than 20 years ago (Gartner 1988). However, this result might be driven by the fact that entrepreneurship research mainly focuses on narrow traits, like achievement motivation. The call for operating more reliable, valid and comprehensive measures of personality in order to explain success and failure in entrepreneurship research (Johnson 1990) has not yet been answered broadly. To our best knowledge, there exists only one study that investigates the relation between the Big-Five personality traits on entrepreneurial *survival*. In particular, the seminal work of Ciavarella et al. (2004) evaluates the relation between all of the Big-Five personality traits and venture survival till the eight year and survival time up to a maximum of 23 years. They find that openness is negative and conscientiousness is positive related to this measure. The other Big-Five personality traits agreeableness, extraversion and neuroticism do not have a significant link to venture survival in this study.

In the work of Ciavarella et al. (2004) it is yet not taken into consideration whether entrepreneurs ceased their activity either failed or successfully. But disregarding heterogeneity among entrepreneurial exits may entail a wrong understanding of the impacts that affect entrepreneurial exit and survival (Kato and Honjo 2010). And, conversely, it impedes the economic interpretation of entrepreneurial longevity as well. As a result, a generally striking shortcoming in investigating entrepreneurial failure is the neglect of reasons beyond failure that lead to stopping entrepreneurial activities (Wennberg et al. 2010, Amaral et al. 2007, Headd 2003). For instance, it is not only insolvency that drives quitting a business but also a successful sale of the venture in question.

In addition, Ciavarella et al. (2004) focus on various industries, but there might be dissimilarities between innovative and non-innovative entrepreneurs. However, innovative entrepreneurship is supposed to be a main driver of economic growth (Acs et al. 2009) and structural change (Schumpeter 1911). Hence, it might be fruitful to investigate a sample of highly innovative entrepreneurs, too. The extent of uncertainty is a further important issue that borders innovative and non-innovative entrepreneurship. Innovative industries display usually a higher degree of uncertainty than non-innovative ones. Thus, even the personality of entrepreneurs might be related differently to failure in highly innovative than in various industries.

In conclusion, there exists lack of evidence that clearly unsnarls the relationship between the comprehensive Big-Five personality profile and entrepreneurial failure in highly

innovative industries. We therefore attempt to shed some light on the question: “Which Big-Five personality traits may have a relation to entrepreneurial failure in highly innovative industries?” and follow the call of Sarasvathy (2004b) to link specific performance measures to the characteristics of specific subgroups of entrepreneurs. For answering this question, we account as far as possible for those observations that indicate a successful withdrawal with the help of a firm credit rating. Besides, in direction to recognize the peculiarities of highly innovative markets, we exploit a dataset consisting of more than 400 highly innovative entrepreneurs. Innovativeness in our case refers to the industry level in which the observed entrepreneurial firms are active. Thereafter, we only investigate entrepreneurs that operate with their firms in industries, in which companies on average spend more than 3.5% of their turnover for R&D (see Grupp and Legler 2000).

Ciavarella et al. (2004) do not draw on a general framework in order to explain the relation between the personality of the entrepreneur and venture survival. In contrast, we provide a theoretical framework how personality is related to entrepreneurial failure. As a workhorse for linking the Big-Five personality traits to entrepreneurial failure, we employ the five-factor personality system theory (McCrae and Costa 1996, 1999). In this framework, characteristic adaptations mediate between the personality and entrepreneurial failure. We argue moreover that effectuation (Sarasvathy 2001) outperforms causation as a decision process in innovative entrepreneurial activities, as innovative environments are supposed to be highly uncertain. Correspondingly, personalities that fit more to effectuation instead of causation processes may have advantages to avoid young firm failure in innovative industries. A further advance of our paper is the consideration of spell-dependent changes in the hazard rate as being determined by different degrees of the respective Big-Five personality trait.

In the next section we outline the term of entrepreneurial failure that we will employ. This is necessary in order to assess a clear-cut outcome variable within our analytical framework. Furthermore, the main reasons for young firm failure in Germany are marked out. The third section theoretically treats the relation between the Big-Five personality traits and entrepreneurial failure in highly innovative environments. The Big-Five personality traits consisting of conscientiousness, extraversion, openness, neuroticism and agreeableness will be introduced and 5 hypotheses on their correlation to entrepreneurial failure are derived. In the fourth section, we present our dataset consisting of more than 400 highly innovative Thuringian start-up entrepreneurs. Subsequently, our estimation strategy will be disclosed, which is based on survival analysis. The fifth section treats the results of our analysis and the sixth section discusses our findings. The paper concludes with the seventh section.

2. Entrepreneurial failure in highly innovative markets

2.1. Definition of entrepreneurial failure

We are interested in the link between personality and entrepreneurial failure in highly innovative firms. But is entrepreneurial exit¹ a well indicator for entrepreneurial failure? One problem in this regard is the issue whether entrepreneurs fail personally or their firms fall short (Davidsson and Wiklund 2001, Battisti and Okamuro 2010). But even if businesses are considered as financially successful they are ceased (Headd 2003). Thus, entrepreneurial exit in general is apparently not a proper indicator for entrepreneurial failure, even in highly innovative environments. For example, innovative entrepreneurs also may decide to withdrawal if they have a preference for more leisure time (Shane and Venkataraman 2000), problems with their health, have to take care of their children, have earned enough money or sold their firm. Correspondingly, Bates (2005) argues that an entrepreneurial exit is probably driven by higher opportunity costs for other activities or projects as well.

Zacharakis et al (1999, see also Sheperd 2003) simply define bankruptcy of an owner-manager's firm as entrepreneurial failure. In this spirit, Kato and Honjo (2010) differentiate in their study on firm survival between bankruptcy, voluntary liquidation and merger. But still, even among these exit categories there may occur a mixing up of failures with successful withdrawals within the respective categories. For instance, mergers might be driven by poor business expectations or a meagre performance of one of the merged firms. On the other hand, a voluntary firm liquidation must not necessarily be a successful one, while bankruptcy is most often the worst case (Wennberg et al. 2010). Furthermore, since we don't have data on liquidation and bankruptcy in our dataset we will not draw on this demarcation.

For all of these reasons, we will rather stick to the definition by Ricketts Gaskill et al. (1993) to test the influence of the Big-Five on entrepreneurial failure in highly innovative industries. They see business failure as "...wanting or needing to sell or liquidate to avoid losses or to pay off creditors or general inability to make a profitable go of the business." As innovative entrepreneurs are the architects of their businesses (Sarasvathy 2004a), it is analogously assumed by us that they mainly drive failure and success. To meet the requirement counting only exits driven by a low economic performance of the owned firm, we test which discontinuances are possibly not forced by mismanagement and recode them as not failed.

¹ In our study, we consider entrepreneurial exit due to DeTienne (2010) as "...the process by which the founders of privately held firms leave the firm they helped to create; thereby removing themselves...from the primary ownership and decision-making structure of the firm."

The next subsection treats the peculiarity of highly innovative environments and the impact of different management processes on failure.

2.2. The specific features of highly innovative industries and failure

In the following, we will focus on highly innovative entrepreneurs, because innovations are theoretically ennobled to foster economic growth (Grossman and Helpman 1994). The peculiarity of highly innovative environments is characterized by the entrepreneur's uncertainty about her customers, competitors and the innovative artefact itself (Ripsas 1998, Koellinger 2008). An approach that records for the uncertainty that entrepreneurs face in highly innovative environments is given by Sarasvathy's (2001) effectuation theory.

In her framework, effectuation renders a certain kind of decision processes that contrast causal decision making. Effectuation processes are moreover based on a given set of causes and the entrepreneurs' imagination. For instance, the personality of an innovative firm founder and the given conditions are such an unchangeable basis. Based on these causes, effects are *created* through chosen means in effectuation, instead of maximizing expected returns through reaching *given* effects mostly efficient. The advantage of this view is the redundancy of goals. Innovative entrepreneurs act in rather uncertain but not in risky environments. In this sense, risky means that one can assess exact numerical probabilities to certain outcomes. Uncertainty, on the contrary, represents a concept in which even the outcomes are unknown, not to mention that outcome probabilities are indeterminable. As in highly innovative industries the outcome or goal is uncertain, effectuation processes are possibly more efficient than causation to avoid failure in highly innovative markets.

Basic principles of effectuation comprise affordable loss rather than expected profits, strategic alliances rather than competitive analysis, exploitation of potentials rather than exploitation of pre-existing knowledge, and controlling an uncertain future instead of predicting it. It is proposed that entrepreneurs who employ effectuation principles in young firms in rather new industries are less likely to fail. A cornerstone of effectuation that prevents young firm failure is the forming of alliances to reduce uncertainty. As a consequence, entrepreneurs who are able to form sustainable alliances and partnerships might be less likely to fail. Otherwise, it is predicted that effectuators rather create participatory than hierarchical and procedure-based cultures. Furthermore, effectuative marketing activities and alliances are created on a gut level instead of proper long-range planning. Similarly, financial resources are gained on an informal way by effectuators.

In conclusion, the traits of the entrepreneur, the resources of their firms and the networks in which they act become important to avoid highly innovative firm failure. Hence, we infer that highly innovative entrepreneurs maybe demand other qualities than rather imitative entrepreneurs in direction to avoid failure. Namely, the founder personality traits might advance either effectuation or causation processes in running an innovative start-up. As a consequence, personality constellations that favour effectuation instead of causation processes might be more helpful to avoid innovative firm failure.

The next section deals with main reasons that lead to entrepreneurial failure.

2.3. Main reasons for failure in young entrepreneurial firms

Despite entrepreneurial failure is triggered by economic problems of the concerned business in our framework, it might be caused by different non-exclusive factors. In a recent representative study on failure of young German firms, three² main causes for young-firm failure are made out (Egeln et al. 2010): (1) Poor performance in managerial decision-making/competence, (2) problems with the demand, and (3) problems of the founder manager with interpersonal relations.

Managerial performance is a key factor for entrepreneurial success and a lack of managerial abilities contributes strongly to business failure. The performance of managers is constituted by their abilities in strategic decision-making, their skills and expertise or their talent to implement decisions. From these abilities, a poor strategic decision-making is the major driver of young firm failure in Germany. In particular, main reasons why young German firms fail are disregarding new customers, mistaken investment, failure in obtaining funds, and a lack of proper long-term planning (Egeln et al. 2010), which indicates a poor performance in strategic management decisions. Quite similar results are valid for a sample of small businesses from the US (Carter and Van Auken 2006). In contrast, Hall (1990) finds that entrepreneurial firms in Great Britain mainly went bankrupt due to a poor operational management. However, the second most cited reason for failure in this study is a wrong strategic decision making. In brief, all these results indicate the importance of a poor managerial performance on entrepreneurial failure.

Demand problems of a firm may occur if the entrepreneur in charge performs poor in sales activities. Besides, problems in sales are triggered by environmental factors. Especially

² Actually there are two more announced reasons for entrepreneurial *exit*, namely liquidity problems and personal reasons. But while liquidity problems mostly result from the other three failure-causes, personal problems are probably rather related to entrepreneurial exit because of non economic reasons or are attached to a poor economic business performance as well (Egeln et al. 2010).

to have problems in marketing, however, is probably the most prominent reason for young firm failure. Egelin et al. (2010) investigate a sample of 3007 young German firms, which exited between 2006 and 2008. They find that more than fifty percent of those firms failed because of severe demand problems. A quite similar pattern holds true for small firms in Japan. Approximately seventy percent out of a sample of 701 failed Japanese businesses closed down due to a decline in sales or orders (Harada 2007). In general, anticipating customer needs, which might be more difficult in highly innovative industries, is a very important necessity to circumvent demand problems. Especially the fact that highly innovative entrepreneurs struggle comparably more with marketing activities (Hisrich 1992), underlines the importance of successful sales activities in counteracting failure. Thus, demand problems are probably a strong predictor of entrepreneurial failure.

Interpersonal problems of the entrepreneur refer to tensions with other founder-team members, employees, other management team members or other stakeholders. For instance, as in team-based ventures there has to be made a commitment about strategic firm decisions, disagreement among the founder team-members may counteract efficient decision making and in turn leads to business failure. In case that the firms were managed by entrepreneurial teams, around a half of the German insolvent small firms studied by Egelin et al. (2010) suffered from disagreements in the founder team. Accordingly, as approximately two third of our sample consists ventures managed by teams, this reason for failure is possibly not to undervalue. However, interpersonal problems may be not only a reason for failure in team-ventures, but as well if entrepreneurs have to deal with other stakeholders.

In the next section we aim to provide a theoretical framework that knots entrepreneurial failure in highly innovative industries to a personality system theory.

3. The Big-Five personality traits and entrepreneurial failure within a personality system theory

The link between narrow personality characteristics and entrepreneurial success was foremost drawn by McClelland (1961), who attributed a person's need for achievement³ as an important ingredient of entrepreneurial success⁴. Other specific traits that were frequently

³ Need for achievement describes the degree of satisfaction that a person receives when she achieves something because of own efforts.

⁴ This view was also confirmed by many empirical studies (such as Wainer and Rubin 1969, Miner et al. 1994, Durand and Shea 1974, Rauch and Frese 2007), although it is not indisputable (see eg Javillonar and Peters 1973, Caliendo and Kritikos 2008).

connected to successful entrepreneurial activities are locus of control and risk taking propensity⁵ (Schmitt-Rodermund 2004).

However, the so called Big-Five model (see Digman 1990, Costa and McCrae 1995) is for several reasons a more compelling approach to assess the relation of personality with entrepreneurial success in highly innovative firms. First of all, the Big-Five personality factors are widely accepted in order to grasp the comprehensive personality of a subject (Digman 1990, Barrick and Mount 1991, Barrick et al. 2003), which curtails the threat to investigate unreasoned or invalid personality traits of entrepreneurs (Chandler and Lyon 2001). Moreover, those dimensions are comparably independent of cognitive dispositions (McCrae and Costa 1987), robust across different cultures (McCrae and Costa 1997, John and Srivastava 1999) and possibly stable over time⁶ (Costa and McCrae 1992a, Roberts and DelVecchio 2000, Hampson and Goldberg 2006). The Big-Five personality traits are therefore a quite stable construct, which is supposed to be unaffected by specific events. It is broadly suggested that the Big-Five personality traits predict essential differences in observed actions and reactions (McCrae and Costa 1999). Otherwise, trait scores may not predict a person's doing in a particular situation, but are quite reliable in marking behavioural trends across different situations and over time (McAdams and Pals 2006). Notwithstanding, a main shortcoming of the Big-Five construct is its rather descriptive than explanatory nature, and that it's not reflecting dynamic and developmental processes of a personality (John and Srivastava 1999). The Big-Five measure comprises five broad personality factors, namely extraversion, agreeableness, conscientiousness, neuroticism and openness (Digman 1990, Barrick and Mount 1991) and will be defined in the respective subsections below.

The only study that investigates the relation between the Big-Five personality traits and venture survival is given by Ciavarella et al. (2004). The authors argue that maintaining entrepreneurial activities is a strong indicator of entrepreneurial abilities. In turn, it is presupposed that entrepreneurial abilities are linked to the Big-Five, even though the link is not described in a theoretical framework and rather ad-hoc in the hypotheses. Overall, they examine 111 persons that graduated from the same university and who acted in their work history between 1972 till 1995 as entrepreneurs. From these 111 entrepreneurs, 54 ceased

⁵ Locus of control renders an individuals propensity to takeover responsibility and thus might be seen as an important trait for becoming entrepreneurial active (Cromie 2000). While locus of control and entrepreneurial success are suggested to be reinforcing factors (Anderson 1977), it is not clear whether this trait is generally important for business success (Brockhaus 1980, Göbel and Frese 1999) or not (Caliendo and Kritikos 2008). Likewise, risk taking propensity seems to be uncorrelated to entrepreneurial success (Brockhaus 1980, Göbel and Frese 1999) or impedimental for business survival, if entrepreneurs possess it on a very high or a very low level (Caliendo et al. 2010).

⁶ Empirical evidence suggests that the Big-Five are at least partly genetically determined (Jang et al. 1997). Hampson and Goldberg (2006) find a significant stability over forty years for all traits excepting neuroticism.

their activity previous to the eight year of business operation. Probit regression and survival analysis is utilized in order to answer the research question. They find that two out of the Big-Five are correlated to venture survival after eight years and up to 23 years. In particular, conscientiousness contributed to venture survival, whereas openness to experience hampered it. Although the results of Ciavarella et al. (2004) refer to various industries and the recognition of any kind of entrepreneurial exit, they might be a well indication for entrepreneurial failure in highly innovative industries as well. We will compare our results with this seminal work in our discussion.

In order to employ a proper framework to link the Big-Five personality traits to entrepreneurial failure, we draw on the five-factor theory personality system (McCrae and Costa 1996, 1999). In this framework, the Big-Five personality traits are determined by biological factors that constitute the individual. The mediators between the personality traits and concrete events in the objective biography of people, like entrepreneurial failure, are defined as characteristic adaptations. These characteristic adaptations are gained skills, routines, mind-sets, self-concepts and relationships, which are a consequence of the interaction between person and environment, or, put it differently, actual day-to-day manifestations of the underlying personality traits (McCrae and Costa 1996).

We hence assume that certain specifications of the Big-Five personality traits associate through characteristic adaptations to the above introduced typical reasons for failure, namely (1) a poor managerial performance, (2) problems with the demand, or (3) interpersonal problems. Correspondingly, the Big-Five personality traits shape respective characteristic adaptations, which are a result of dynamic entrepreneur-environment interactions. These adaptations in turn affect a poor managerial performance, a poor performance in sales, and interpersonal problems or a combination of these issues. As a consequence, all of these firm-leading problems might end up in entrepreneurial failure.

In other words, for example, as a result of an interaction of the personality with her firm-environment, the Big-Five determine whether an innovative entrepreneur has the tendency to negotiate tough with her customers, which is a characteristic adaptation. In turn, a rather tough negotiation-style possibly hinders well long term relationships between firm and customers, which possibly boosts firm failure. In a similar vein, for instance, an entrepreneur may have developed routines that let her act careless with regard to the implementation of business plans. As a result, her managerial performance suffers, because necessary changes in her firms' liquidity planning are not implemented and thus the firm goes bankrupt. Likewise, characteristic adaptations based on a low agreeable personality that end up in lasting

arguments with other founder team members possibly hinder proper decision making in a team venture. Hence, firm failure because necessary but postponed decisions, like changing the product design, may follow as an outcome.

Correspondingly, we will build up our hypotheses on the relationship between the Big-Five and the proposed reasons for entrepreneurial failure under consideration of mediating characteristic adaptations. In the following subsections, we will derive five hypotheses with the aim to test the average or proportional relation of the Big-Five with entrepreneurial failure in highly innovative environments. The link between personality, characteristic adaptations, and respective reason for failure will be knotted theoretically and motivated by the related literature.

Conscientiousness

Conscientiousness is attributed to a socially assessed impulse control that facilitates goal- and task-oriented behaviour. Typical traits of this factor are thinking before acting, delaying gratification, following norms and rules, and planning, organizing, and prioritizing tasks (John and Srivastava 1999). The trait of conscientiousness might be essential for task- and goal oriented adaptations (Gellately 1996), which are strongly important in managing new ventures too. Analogously, entrepreneurial failure might be inversely related to the level of conscientiousness, because of a poor managerial performance. Empirical evidence attributes a low managerial performance to a low level of conscientiousness (Barrick and Mount 1993, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001), and therefore confirms this logic.

On the other hand, as especially innovative entrepreneurs face uncertainty (Ripsas 1998, Koellinger 2008) when their firms are rather young, their ability to adjust to changing managerial demands might be much more important than in established firms or environments. Managerial performance thus might suffer if characteristic adaptations are shaped by a relatively high conscientiousness, which may impede necessary adjustments in product, process or organizational strategy (Tett 1998). In this regard, conscientiousness was significantly shown to be obstructively for decision-performance, after changing task contexts (LePine et al. 2000). The creation of an organizational setting is another main part of managing the set up of highly innovative firms. In this regard, the contextual performance of managers affects the psychological, organizational and social environment in which the work is fulfilled. However, contextual performance is negatively related to the conscientiousness of managers (Gellately and Irving 2001). This evidence might be a hint for lower contextual

performance of conscientious entrepreneurs in young innovative firms. In turn, especially at very young firm ages characteristic adaptations that influence the contextual performance of entrepreneurs in a negative manner perhaps enhance entrepreneurial failure. Another imperative for preventing innovative young firms from failure is the creativity of its entrepreneurs (Heunks 1998). Since conscientiousness is linked to adaptations that seem to counteract creativity (Feist 1998, George and Zhou 2001), conscientious founder managers may lack in creative thinking that prevent their firms from failure.

The second dimension that affects entrepreneurial failure remarkably is a poor performance in sales activities. A very striking argument for a meagre sales performance of conscientious entrepreneurs is their concern for task accomplishment instead of gaining economic rewards (Costa and McCrae 1992b, Stewart 1996), which indeed may boost failure. Therefore, conscientiousness perhaps corresponds to individual adjustments, which let entrepreneurs concentrate on task performances that not necessarily bear profitable fruits. On the other hand, a fast time to market is crucial to avoid failure in highly innovative markets. As a consequence, conscientious entrepreneurs in highly innovative markets may struggle with innovating quickly (Tett 1998). This argument may hold true, even Barrick et al. (1993, see also Salgado 1997, Hurtz and Donovan 2000) find a higher performance of conscientious salespeople.

Interpersonal problems of entrepreneurs were above suggested to be a driver of firm failure. In particular, entrepreneurial failure ought to be affected by an inefficient coordination within the firm management⁷ and weak ties to other stakeholders of the firm. Conscientiousness shapes characteristic adaptations in interpersonal relations that let people act dependable, detailed, persistent and hard working (Barrick et al. 2001). In a professional environment, conscientious people thus may have advantages to build up beneficial and sustainable relationships with other people. Failure because of interpersonal problems is hence certainly not a frequent outcome for conscientious entrepreneurs. Empirical evidence on the relation between conscientiousness and performance in teamwork or dyadic job-settings confirms this rationale (Barrick et al. 1998, 2001).

We plead that the hazard to fail is increased if innovative entrepreneurs are highly rated in conscientiousness, even if Ciavarella et al. (2004) find the opposite result for entrepreneurial exit. Conscientious entrepreneurs are perhaps less likely to adapt their young innovative firms to a strongly uncertain demand and prevalent organizational challenges in a proper way, which is probably flanked by a lack of creativity. Moreover, the presumption that

⁷ In case that there is a management team involved.

conscientious entrepreneurs focus too strong on task accomplishment instead of profits may become more noticeable in innovative environments than in established markets. The propensity of conscientious individuals to goal-oriented behaviour and job performance that is expressed in goal achievement (Barrick et al. 1993) refers rather to causation than to effectuation and might be harming for a young innovative firm. In conclusion, these disadvantageous connotations of conscientiousness are perhaps not outweighed by a lower propensity to interpersonal problems.

Hypothesis 1: A higher degree of conscientiousness increases the hazard rate of entrepreneurial failure.

Extraversion

Extraversion may be defined as a propensity to act energetically within the social and material environment and comprises characteristics like sociability, activity, assertiveness and positive emotionality (John and Srivastava 1999). Still, a poor management performance certainly increases the hazard of entrepreneurial failure. As we investigate entrepreneurs who manage their own firms, they certainly possess a high level of occupational autonomy. Thus, extraversion perhaps fosters characteristic adaptations, like developing leadership qualities (Judge et al. 2002a), that enable entrepreneurs to perform better in management tasks in innovative firms (see Barrick and Mount 1991). Consequently, a better management performance linked to extraversion maybe circumvents entrepreneurial failure. Empirical evidence suggests that extraversion is correlated to the performance of managers in general (Barrick and Mount 1991, Barrick and Mount 1993, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). Furthermore, in case that a high occupational autonomy is given, extraverted managers on average perform better (Gellately and Irving 2001).

But is extraversion linked to sales performance as well? Extraverted individuals are motivated, gregarious, forceful, and sociable, and thus this trait possibly encourages sales-promotional characteristic adaptations (Barrick and Mount, 1991, Barrick et al. 2001). Furthermore, extraversion is suggested to be a quality that raises the sensitivity for rewards (Gray 1973). In doing so, a higher sellers' autonomy possibly increases her sales success (Steward 1996). As sales activities are essential in innovative entrepreneurship, extraverted entrepreneurs that sell innovative products have possibly a lower hazard to fail. Because evidence on the Big-Five and the success of salespeople is ambiguous (Barrick and Mount 1991, Barrick et al. 1993, Salgado 1997), it should be noted that extraversion relates to a

higher sales performance, if sales are connected to rewards (Stewart 1996). These results might be a clue that innovative entrepreneurs higher in extraversion are less likely to fail, as they tend to strive after sales profits.

A higher extraversion perhaps contributes to processing characteristic adaptations that are helpful in team and dyadic interactions (Mount et al. 1998). Hence, extraverted entrepreneurs that manage innovative firms are possibly less prone to fail because of interpersonal problems. Again, entrepreneurs often belong to founder teams, lead teams and fulfil dyadic interactions. In this regard, effective team work is assumed to be increased by extraverted team members (Barrick et al. 1998, 2001). Moreover, Barry and Stewart (1997) find that extraversion increases socioemotional and task related inputs into group work, which may lead to positive reciprocity of other team members. But admittedly, for jobs that involve team and dyadic interactions, extraversion had just a low effect on performance (Barrick et al. 2001).

Summarized, from the above discussion we conclude that extraversion is negatively related to entrepreneurial failure. This choice is reasoned by the imperative for young firms to gain profits, which is perhaps easier if sales are conducted by extraverted entrepreneurs. The tendency for extraverts to perform better in managerial tasks is certainly helpful as well to avoid entrepreneurial failure. Moreover, it is possibly in the extraverts' nature to operate effectuation, as her sociability allows for building up helpful alliances with key partners, which reduces uncertainty and thus the hazard to fail.

Hypothesis 2: A higher degree of extraversion decreases the hazard rate of entrepreneurial failure.

Agreeableness

The Big-Five factor agreeableness pictures a prosocial and communal tendency in direction of other people and contains qualities like altruism, tender-mindedness, trust and modesty (John and Srivastava 1999). These qualities may have different ascendancies on managerial performance in highly innovative markets. Empathy as a main feature of agreeable people (Ashton and Lee 2001) apparently shapes managerial performance in entrepreneurial firms. A high empathy regarding customer wants is perhaps even more required if entrepreneurs target highly innovative markets. Accordingly, poor strategic product decisions perhaps result from adaptations that are related to a low agreeableness. On the other hand, agreeableness may help to gain personal adjustments that in part arrange transformational

leadership (Bono and Judge 2004), which possibly enhances work motivation, job satisfaction and the fulfilment of staff member needs (Judge and Bono 2000). As a result, employees certainly work more effectively and prevent their firm from failure, especially in a highly uncertain environment. In other words, even if empirical evidence suggests no remarkable relation between managerial performance and agreeableness (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001), we presuppose that agreeableness is linked to a higher managerial performance in highly innovative markets.

At the same time, operative sales activities might be more easily conducted by highly agreeable entrepreneurs. The performance in sales job tasks was suggested to be associated with agreeableness (Barrick and Mount 1991). Moreover, beyond strategic product decisions, it might be crucial for innovators to adjust their sales promotion to the needs of their customers. This presupposes that entrepreneurs act emphatic and prosocial towards other people. As agreeable individuals render prosocial behaviour (Graziano et al. 2007), they are more likely to meet the requirements of their customers, which in turn lead to a better economic performance of their firms. Likewise, agreeableness is based on a motivation to maintain relationships with other people (Graziano and Eisenberg 1997). For this reason, entrepreneurs scaled higher in agreeableness possibly have a higher intention to maintain relationships with their customers. Nonetheless, literature on sales performance and agreeableness support no relation (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). But we think that innovative sellers need to be more empathetic with their customers, which is mirrored by a positive relation between customer service performance and agreeableness (Hurtz and Donovan 2000).

Agreeableness certainly relates negatively to innovative firm failure caused by interpersonal problems. The propensity of agreeable entrepreneurs to be impartial (see Ekehammar and Akrami 2007), e. g. with management team-members, customers, employees or financiers, perhaps alleviates endeavours to raise funds, making efficient decisions, or execute profitable deals and thus decrease firm failure prospects. With regard to innovative firms that were set up by founder teams, disagreements in the founder team are less likely if it consists of agreeable entrepreneurs (see Barrick and Mount 1991, Barrick et al. 2001), which in turn prevents from decision-making problems and entrepreneurial failure. Cooperation and thus agreeableness is similarly important if new-venture entrepreneurs have to raise additional funds from external financiers (Cable and Shane 1997). And, otherwise, gaining external resources from other organizations, like financiers or suppliers, with the help of maintained relationships (Street and Cameron, 2007) reduces uncertainty and the hazard to fail. Still,

communication and cooperation habits possibly mediate between personality and entrepreneurial failure through interpersonal problems. Therefore, even in dyadic interactions like negotiations with new financiers, agreeable entrepreneurs certainly perform better (see Mount et al. 1998) through typical adjustments. This point of view is supported by the result that a low agreeableness relates to a low performance in team-jobs (Mount et al. 1998, Barrick et al 2001).

In the beginning we figured out that effectuation possibly prevents from entrepreneurial failure in highly innovative industries. As one of the main cornerstones in effectuation is the reduction of uncertainty through the building of sustainable alliances, we strongly suggest that agreeableness is negatively linked to entrepreneurial failure in innovative environments.

Hypothesis 3: A higher degree of agreeableness decreases the hazard rate of entrepreneurial failure.

Openness

A person's openness covers the broadness, deepness, genuineness, and complexity of her mental and experiential life (John and Srivastava 1999). Managerial performance in innovative environments might be positively related to openness, as open personalities reveal a strong tolerance for ambiguity. In other words, open entrepreneurs may develop adaptations that are beneficial in fast changing or uncertain environments (Burke and Witt 2002), which perhaps contributes to their managerial performance in an innovative firm. Likewise, open people are comparatively better in performing decisions after the task environment changed (LePine et al. 2000). In this respect, openness could be strongly beneficial, if the entrepreneur is obliged to adjust the firm strategy to a changing environment. As highly innovative environments regularly provide disruptive changes in the market environment (Malerba and Orsenigo 1997), this facet of openness might be essential in avoiding entrepreneurial failure. Furthermore, if a venture faces situations like liquidity problems, the strategy might have to be changed. If then the entrepreneur renders certain behavioural patterns, which are shaped by a relatively low openness, she might not be able to adapt properly to the problematic situation. Although empirical studies have ambiguous suggestions on the relation between openness and managerial performance in general (Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001), we suppose that openness relates to an increased managerial performance in innovative environments.

Successful sales activities in highly innovative industries prevent from entrepreneurial failure. One important step to do so in uncertain environments is an international market orientation (Zahra et al. 2000). However, in order to realize sales in foreign markets, an interest and understanding of other cultures is needed. Openness may help to shape characteristic adaptations that empower innovative entrepreneurs to gain a better understanding of foreign markets. In this respect, openness is supposed to be related to the work adjustment, contextual performance and task performance of expatriates (Shaffer et al. 2006). Furthermore, evidence on customer service employees shows a higher performance if they possess a higher openness (Hurtz and Donovan 2000). Therefore, open entrepreneurs may have a higher interest for their customers' care. As a consequence, a better sales performance might be created on the base of loyal customers. However, there exists broad evidence that openness is unrelated to the professional success of salespeople (Barrick and Mount 1991, Barrick et al. 1993, Hurtz and Donovan 2000).

Openness perhaps helps to develop personal adjustments that curtail interpersonal problems. An interest for other people may increase the understanding of other management team members, employees, customers and financiers in a more proper way. This view is supported by the fact that openness is related to occupational success in dyadic job-settings (Barrick et al. 1998) and in team jobs (Barrick et al. 2001).

All in all, we assume from the above discussion that open entrepreneurs are less likely to fail. Especially the ability of open people to adjust quickly to new requirements might be essential to cope with uncertainty in innovative markets. In addition, although Ciavarella et al. (2004) find that openness impedes venture survival in various industries, open entrepreneurs maybe better able to conduct effectuation principles in innovative firms, because they are more open for exploitable potentials.

Hypothesis 4: A higher degree of openness decreases the hazard rate of entrepreneurial failure.

Neuroticism

Neuroticism renders the inclination to have negative emotions and to feel anxious, nervous, sad and tense (John and Srivastava 1999). In addition, neuroticism is connected to weaker psychological and physiological health (Lahey 2009). This facet of neuroticism perhaps develops personal adjustments that hamper management performance within an innovative firm, while the probability to fail is increased. Especially if a high autonomy level

is given, like in new ventures, anxious behaviour shaped by a neurotic personality may decrease managerial performance. The link between neuroticism and a poor managerial performance is supported empirically (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). Furthermore, managers scoring high in autonomy perform worse if they possess higher values of neuroticism (Gellately and Irving 2001).

Neurotic people usually have a low self esteem and a low self-efficacy (Judge et al. 2002b). The sales performance of innovative entrepreneurs ought to be negatively affected by a self-doubting seller. Customers probably tend to attribute the low self-confidence of neurotic innovators to the performance of their innovative products. If the product then becomes a slow seller, the existence of the providing firm is threatened. In this relation, the performance of people employed in sales is negatively related to higher levels of neuroticism (Barrick and Mount 1991, Hurtz and Donovan 2000, Barrick et al. 2001), which is, though, not valid for Europe (Salgado 1997).

The habit of neurotic people to have negative emotions and to be angry (Lahey 2009) is perhaps not beneficial with respect to relations or communications with other stakeholders (see Barrick et al. 2001). Hence neuroticism is likely to cultivate interpersonal problems. Efficient team decisions might be thus hampered by neurotic entrepreneurial team members, resulting in failure. With respect to teamwork related jobs, the performance of neurotic workers is shown to be lower (Mount et al. 1998, Barrick et al. 2001). The same holds true for jobs that deal with dyadic interactions (Mount et al. 1998).

We infer that the factor neuroticism is positively associated to entrepreneurial failure in highly innovative environments. The fundamental tendency to have negative emotions is however apparently detrimental in all aspects of managing an innovative entrepreneurial firm. Furthermore, a pessimistic tenor certainly counteracts the identification of potentials, which is a pillar of the effectuation principle.

Hypothesis 5: A higher degree of neuroticism is positively related to entrepreneurial failure.

In the previous subsections we derived hypotheses that propose average or proportional links of the Big-Five to entrepreneurial failure. However, for curiosity we will test as well for time changing links of the founders' personality with her propensity to fail. There might be different phases in the entrepreneurial process in which personality traits are connected differently to entrepreneurial failure (see DeTienne 2010). If we find respective results, further research avenues might be paved.

4. Data and empirical methods

4.1. Sample and data selection

Data of this study stems from the Thuringian Founder Survey, which is an interdisciplinary project on the success and failure of solo- or team-entrepreneurs in the East German state of Thuringia. The focus in this study was on innovative industries according to Centre for European Research (ZEW) classification “advanced technology” and “technology-oriented services” (Grupp and Legler 2000). Hence, all entrepreneurs in our dataset acting in industries in which on average more than 3.5% of the turnover of all firms is spend in R&D. The study draws from a population of 4,215 founders who registered a new entry in the commercial registry in Thuringia between 1994 and 2006. From this whole population, there were realized 639 face-to-face interviews, which were conducted between January and August 2008. The data contains more than 200 socio-economic and psychological variables of the founders and their (team-)ventures, like age, education, vocational experience, gender, industry classification of the firm, their Big-Five personality scale etc.

Altogether, we dropped 216 observations because of missing values, formations that were not original start ups, lack of interview quality and if they were launched earlier than 1994⁸. The remaining sample size then comprised 423 observations from which 97 (co-) founders ceased their entrepreneurial activity till 2008.

In the next subsection we introduce the empirical methods that we employ to test our hypotheses.

4.2. Dependent variable: Hazard Rate of entrepreneurial failure

With regard to our data-set, the most appropriate empirical method to link entrepreneurial failure with the Big-Five personality traits is duration-analysis. Because we only possess incompletely firm specific financial data for the third, the fourth, and the fifth year, the spell of entrepreneurial activity is the most precise indicator to measure entrepreneurial failure in our sample. We quantify the duration of entrepreneurial activity from the time when the observed entrepreneur started her business till she withdraws from managing her own firm. The duration is measured in years. And furthermore, it is assumed that entrepreneurial exit is no failure, if the owned firm that is left may be classified as economically successful.

⁸ The intention behind this measure was to minimize effects of the German reunification.

With the purpose in mind that we mainly want to investigate failed discontinuances, entrepreneurs that resign from an apparently economic healthy venture will be coded as not failed but censored. In particular, the Creditreform-Rating⁹ of the firms, which are associated with the entrepreneurs, is used as a workhorse. The rating index ranges from 100 (best) to 600 (worst). From our perspective, a relatively poor Creditreform-Rating suggests at least a relatively weak financial performance of the respective managed firm. Discontinuances because of an insufficient profitability may be correspondingly anticipated by a poor Creditreform-Rating. At the same time, we only have available Creditreform data for the third, the fourth, and the fifth year of firm existence. The reference whether an entrepreneur depart from a poor performing firm is thus set by the last observed Creditreform-Rating of her firm.

Because of missing data¹⁰, we only take into consideration 373 (82 discontinuances) instead of 423 observations. A one-sided t-test based on 2000 bootstrap replications¹¹ (see Efron and Tibshirani 1994) reveals that the Creditreform-Rating of firms that were left by their entrepreneurs is significantly higher ($p \leq 0.001$) compared to those firms of continuing entrepreneurs. This result supposes strongly that discontinuance is possibly a quite well proxy for failure. While this may be true, we finally recode those 22 entrepreneurial discontinuances, which firms observably lay above the average Creditreform-Rating of not abandoned firms. To this end, we face exactly 75 discontinuances that are from now on classified as entrepreneurial failures.

Parametric and semi parametric hazard rate models

We apply the Cox approach (Cox 1972) and an augmentation of it to estimate respective (semi)-parametric hazard rate-models.¹² In our context, the hazard rate simply renders the probability to fail instantly, given that an entrepreneur has maintained her activities until the current period. This method to employ spell-data has different advantages compared to other methods like logit- or linear regression. On the one hand, we estimate observations that are right-censored which is not recognized by conventional methods. Duration data is moreover nonnegative which also might bias results when applying linear regressions. The base Cox-model for observation j then becomes to

⁹ Creditreform is the leading rating agency in Germany and employs several informations in order to set up its rating, such as industry, number of employees, payment history, productivity, quantity of orders, firm development and management quality (see Czarnitzki and Kraft 2007).

¹⁰ Firms are only recognized within the rating if there was made a request by other firms and if they have existed at least for three years. We further had problems to obtain Creditreform data in the time span between 1994 till 1997.

¹¹ As the Creditreform-Rating among the firms is obviously not normally distributed, this seems to us the most appropriate approach.

¹² Kiefer (1988, see also Helsén and Schmittlein 1993) provides an interesting discussion on hazard rate models.

$$h(t) = \lambda_0(t) \exp(\beta' x_j), \quad (1)$$

where $h(t)$ represents the time t conditioned hazard rate. Furthermore, since the Cox-model is a semi-parametric hazard function, $\lambda_0(t)$ mirrors an unspecified baseline hazard function, whereas β is a vector of coefficients and x_j indicates a vector of covariates.

If, in the second place, the baseline hazard function is written as

$$\lambda_0(t) = \exp(\beta_0 + (\gamma_0 + \gamma x_j)t), \quad (2)$$

then (1) renders a Gompertz-model (see Jenkins 2004), which displays the spell-effect t of a vector of subject-specific covariates γ . This model-specification allows to control for time-varying effects of the link between the Big-Five and entrepreneurial failure. The coefficient β_0 hence indicates the baseline hazard function, if all other covariates equal zero, while γ_0 reflects the change of the baseline hazard rate with increasing time t . We will employ this augmentation to test for spell dependence of the Big-Five personality traits. All standard-errors of the respective Cox-model will be computed with robust covariance matrix estimators (see Lin and Wei 1989). Estimations of the Cox- as well as the Gompertz-regressions are operated with Stata.

4.3. Explanatory variables: The Big-Five personality traits

The Big-Five personality traits were quantified in a standardized way with the help of 45 items (Ostendorf 1990). Each of the Big-Five personality factors was measured by 9 German bipolar adjective pairs on a six-point Likert scale (0-5). For all of the Big-Five, a score closer to 5 represented a higher value in the concerning trait. According to the definitions above, we include variables of conscientiousness, extraversion, agreeableness, openness and neuroticism. A principal component factor analysis with promax rotation indicates that the items for the respective Big-Five factor which we utilize actually form five independent personality factors in our sample (see table 5 Appendix A). Thus, the validity of our items seems to be given.

4.4. Control Variables

Beside personality characteristics of the founder manager there were supposed other factors that may directly influence entrepreneurial failure. With regard to firm survival in general, empirical evidence suggests that a lack of industry related experience might increase the hazard rate of firms (Klepper 2002, Buenstorf and Klepper 2010, Buenstorf et al. 2010). Human capital is not only theoretically knotted to a higher economic growth, but also empirically to a prolonged longevity of firms (Bates 1990), which is in our framework the years enrolled into a college. There are nevertheless also firm-external aspects that might drive entrepreneurial success in new ventures, like environmental factors (Baum et al. 2001) or the industry structure (Chrisman et al. 1998).

Correspondingly, we control for the age of the entrepreneur at the time of starting entrepreneurial activities in the corresponding business, number of years in studying, experience in self-employment, industry, industry related experience, time of entry, percentage of equity, and finally for founder teams.

Table 1 renders the independent variables, the explanation of them and the direction of the hypotheses on the link between the Big-Five and entrepreneurial failure. Moreover, table 2 shows summary statistics of our variables and table 3 indicates the respective correlations. The variable FAIL in our correlation table indicates all observations that failed in our sample. On the contrary, observations that withdraw from successful firms are indicated as DISSUC in the correlation table. Needless to say that both subsamples don't include observations, which are censored and possibly will exit later failed or successfully.

Conscientiousness (+)	This variable shows subject's level of <i>conscientiousness</i> . The construct is the mean of values on a six-point Likert-scale (0-5), where at most 9 different items are acknowledged.
Extraversion (-)	The measured intensity of <i>extraversion</i> is represented by this variable. The construct is the mean of values on a six-point Likert-scale (0-5), where at most 9 different items are acknowledged.
Agreeableness (-)	A subjects level of <i>agreeableness</i> is given by this variable. The construct is the mean of values on a six-point Likert-scale (0-5), where at most 9 different items are acknowledged.
Openness (-)	<i>Openness</i> of the entrepreneur is given by this variable. The construct is the mean of values on a six-point Likert-scale (0-5), where at most 9 different items are acknowledged.
Neuroticism (+)	The propensity of an entrepreneur to <i>neuroticism</i> is coded in this variable. The construct is the mean of values on a six-point Likert-scale (0-5), where at most 9 different items are acknowledged.
AGE	This variable represents the <i>age</i> during starting in the respective business.
STUY	Are the <i>number of years the subject went to a college</i> before launching the business.
SELFEMP	Represents the <i>number of years in self-employment</i> before launching the business.
NACE2	Industry dummy (NACE, 1 digit), chemical industry, 1=YES, 0=NO.
NACE3	Industry dummy (NACE, 1 digit), electrical engineering, fine mechanics, optics, 1=YES, 0=NO.
NACE7	Industry dummy (NACE, 1 digit), information and communication technology, 1=YES, 0=NO.
EXP_IND	Is the control for <i>industry related experience</i> , 1=YES, 0=NO.
PEQU	Renders the absolute <i>percentage of equity</i> of the corresponding firm at the time of market entry.
2002	Dummy for two <i>entry-cohorts</i> , namely entry before year 2001 and from year 2002, 0=entry from 2002 till 2008, 1=entry from 1994 till 2001.
TEAM	This dummy shows whether the venture was set up by a team of entrepreneurs from which all members at least were supposed to become owner of the firm, 1=YES, 0=NO.

Table 1: Explanation (hypothesized direction) of independent variables

	Mean*	Mean+	Mean#	SD*	SD+	SD#	Max*	Max+	Max#	Min*	Min+	Min#
Conscientiousness	3.63	3.71	3.75	0.602	0.561	0.618	4.89	4.78	4.67	0	2.44	2.33
Extraversion	3.2	3.19	3.11	0.632	0.554	0.669	4.78	4.44	4.22	1.44	1.67	1.67
Agreeableness	3.11	3	3.17	0.563	0.603	0.654	5	4.44	4.33	0.889	1.22	1.44
Openness	3.18	3.17	3.36	0.544	0.546	0.634	4.89	4.38	4.56	1.56	2.11	2.22
Neuroticism	1.36	1.37	1.4	0.496	0.553	0.415	3.11	2.5	2.56	0	0.222	0.778
AGE	39.1	42.7	42.9	9.27	10.2	8.6	63	67	58	18	25	28
STUY	4.56	4.62	6.27	2.65	3.22	2.62	13	14	13	0	0	0
SELFEMP	2.1	4.03	1.36	4.04	5.13	1.92	34	26	5	0	0	0
NACE2	0.223	0.263	0.273	0.417	0.443	0.456	1	1	1	0	0	0
NACE3	0.235	0.276	0.227	0.425	0.45	0.429	1	1	1	0	0	0
NACE7	0.37	0.289	0.318	0.483	0.457	0.477	1	1	1	0	0	0
EXP_IND	0.837	0.75	0.773	0.37	0.436	0.429	1	1	1	0	0	0
PEQU	74.4	79.2	65.8	36.8	32.3	36.2	100	100	100	0	0	0
2002	0.731	0.895	0.955	0.444	0.309	0.213	1	1	1	0	0	0
TEAM	0.662	0.763	0.818	0.474	0.428	0.395	1	1	1	0	0	0

*indicates observations that survived

+indicates observations that failed

#indicates observations that exit successfully

Table 2: Summary statistics

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Conscientiousness	1																
2. Extraversion	0.19***	1															
3. Agreeableness	0.1**	0.05	1														
4. Openness	0.11**	0.27***	0.02	1													
5. Neuroticism	-0.27***	-0.34***	-0.18***	-0.24***	1												
6. AGE	0.14***	0.05	0.14***	-0.06	-0.02	1											
7. STUY	-0.04	-0.1**	0.05	0.03	0.06	0.25***	1										
8. SELFEMP	0.02	0.05	0.05	0.04	-0.04	0.17***	-0.14***	1									
9. NACE2	0.09*	0.05	0.06	-0.12***	0.01	0.15***	-0.06	0.03	1								
10. NACE3	0.03	-0.07	-0.08*	0.02	0.05	0.15***	0.01	0.04	-0.31***	1							
11. NACE7	-0.15***	-0.01	0.01	0.12***	-0.01	-0.19***	0.13***	-0.03	-0.41***	-0.42***	1						
12. EXP_IND	-0.01	-0.05	-0.06	0.03	-0.01	0.04	0.01	-0.05	0.02	-0.11**	0.04	1					
13. PEQU	0.05	0.01	0.11**	0.12***	-0.09**	-0.03	0.13***	0.05	-0.19***	-0.05	0.21***	-0.13***	1				
14. 2002	-0.06	-0.03	-0.05	-0.13***	0.02	-0.03	0.09*	-0.12**	0.02	0.05	-0.07	0.01	-0.11**	1			
15. TEAM	-0.04	-0.03	0.04	0	0.06	-0.02	0.11**	0.04	-0.04	0.07	0	-0.03	-0.04	-0.04	1		
16. FAIL	0.05	-0.01	-0.07	-0.01	0	0.14***	0.01	0.17***	0.04	0.04	-0.06	-0.09*	0.05	0.15***	0.08*	1	
17. DISUCC	0.04	-0.03	0.03	0.08*	0.02	0.08	0.14***	-0.06	0.02	-0.01	-0.02	-0.03	-0.06	0.11**	0.07	-0.11**	1

*p<.1 **p<.05 ***p<.01

Table 3: Correlation coefficients

5. Results

We employed 6 regressions based on the Cox-model, which are listed in table 4. And, as already mentioned above, model 1-3 are specifications in which “fails” are counted as events. In order to recall it, we classified those entrepreneurial exits in our sample as successful that were conducted from firms identified as financially successful either after three, four or five years in the market. With this procedure we find 22 successful exits and 75 entrepreneurial fails. In short, we analysed 423 entrepreneurs of which 75 quitted their business failed. All of the “successful” exits are recoded as censored.

The first model is a base Cox-regression with robust standard errors. All of the control variables¹³ in this model, namely any further year of experience in self-employment ($p \leq 0.01$), entry before year 2002 ($p \leq 0.1$), an additional percent of equity ($p \leq 0.1$), age at the time of launching the venture ($p \leq 0.01$), and team venture formation ($p \leq 0.05$) had a significant impact on the hazard rate. Interestingly, two out of the Big-Five personality traits seem to have a relation on the propensity to fail in model 1. A relatively higher degree in conscientiousness ($p \leq 0.1$) is supposed to increase proportional hazard rate of failure, whereas agreeableness ($p \leq 0.01$) tends to decrease it. Thus, this specification confirms hypothesis 1 (conscientiousness is positively related to failure) and hypothesis 3 (agreeableness is negatively related to failure). Hypotheses 2 (extraversion is negatively related to failure), hypothesis 4 (openness is negatively related to failure) and hypothesis 5 (neuroticism is positively related to failure) have to be rejected. In the base Cox framework it is assumed that the hazard rate does not change over time and thus that the hazard rate of failure for every observation is equal in every period or, in other words, proportionally. Nonetheless, we also wonder whether the impact of the Big-Five personality traits on failure change over time. A test statistic on proportional hazards proposed by Grambsch and Therneau (1994) indicates that the whole model seems to be not proportional ($p \leq 0.01$) and that at least the influence of conscientiousness may vary over time ($p \leq 0.01$). Graphs plotting smoothed Martingale-residuals (Therneau et al. 1990) furthermore suggest that the assumption of a linear influence of the Big-Five on the hazard rate is quite robust in model 1 (Figure 3a in Appendix A). Plotting the Cox-Snell residuals against the Nelson-Ahlen estimator of the residuals draws a quite good approximation of a 45° line (see Figure 2a in

¹³ We even set up models with gender and the number of firm-employees as controls, but these were strongly insignificant and thus excluded. Although the first result is in line with existing empirical evidence (Kalleberg and Leicht 1991), the size of firms is suggested to be positively related at least to the survival of firms (Audretsch and Mahmood 1993, 1994, 1995).

Appendix A) which speaks though in favour of a quite good model fit (Klein and Moeschberger 2003).

In comparison to model 1, model 2 in table 4 fits a Cox-regression in which it is as well controlled for 3 different NACE industry classifications. However, the coefficients and the corresponding significance-levels just change marginally, which is in line with the fact that the industry-dummies are insignificant.¹⁴ Again, this model supports hypotheses 1 and 3, while hypotheses 2, 3 and 4 are rejected. Even in this model, the proportional hazard assumption seems not to hold ($p \leq 0.01$), although from the Big-Five variables only for the coefficient of conscientiousness the proportionality assumption is supposed to be violated ($p \leq 0.01$). The Big-Five coefficients are, similarly to model 1, correctly specified as linear (Figures 3b in Appendix A). As Figure 2b in Appendix A indicates, model 2 is quite well fitted and does not remarkably differ from Model 1. We thus conclude that in our sample the industry does not have a severe effect on entrepreneurial failure.

In the section on the hypotheses, we mentioned the possibility that the relation between the Big-Five traits and the hazard to fail might change over time. We test for time-varying effects of the Big-Five on entrepreneurial failure with the help of model 3 in table 4. Moreover, because there are convincing clues that hazard rates in our sample changing over time, we employ a Cox-model with a Gompertz-specification in order to control for time varying effects of the Big-Five factors. These time varying effects may relate to different requirements of entrepreneurs in different stages of firm development. Another positive side-effect of this specification is the estimation of the baseline hazard. Yet, a disadvantage of this specification is the fact that it is parametric and thus the data is assumed to be Gompertz-distributed.

The coefficients of the control variables and significance-levels in model 3 do not change noteworthy compared to the former models. On the other hand, the Big-Five coefficient conscientiousness, which contributes positively to the hazard rate, notably increases and becomes strongly significant ($p \leq 0.01$) at the time of starting the firm. Similarly, the negative influence of agreeableness noteworthy increases at the time of entry and remains highly significant ($p \leq 0.01$). The time-varying coefficients suggest that from the Big-Five only the effect of conscientiousness on exit hazard changes over time. In other words, the failure hazard rate at the time of starting the firm reduces every period by the

¹⁴ A Cox-frailty regression (Clayton and Cuzick 1985) with a random effect for 28 industries, which was strongly insignificant, showed no remarkable changes in the coefficients and their significance levels. In other words, the branches in which the related firms are active have possibly no impact on the propensity of entrepreneurs to fail.

amount of the time varying coefficient. This result is in line with the above findings that the effect of conscientiousness might be non-proportional, at least in our framework. Specifically, the positive effect of conscientiousness on the hazard rate shrinks over time significantly ($p \leq 0.05$) and becomes negative after 9 years in entrepreneurial charge.¹⁵ As figure 2c in Appendix A indicate, model 3 exhibits a better fit compared to model 1 and model 2.¹⁶ The inclusion of time changing effects of the Big-Five on failure show that confirming hypothesis 3 and rejecting hypotheses 2 as well as hypotheses 4-5 is supported by quite robust evidence, as the effects seem to be stable over time. In contrast, we face well weak support in validating hypotheses 1 that predicts an increasing effect of conscientiousness on failure, as the effect, which appears at the time when the firm is launched, vanishes over time.

The models 4-6 have the same specification like the models 1-3, excepting that *all* entrepreneurial exits, failed and successful withdrawals according to our classification, are considered. We now code the 22 entrepreneurs that left apparently from economically successful firms, at least from the Creditreform-Rating, as exits instead of censored. With this procedure we aim to check whether there are differences regarding the Big-Five between entrepreneurial exit and entrepreneurial failure. Additionally, as we use a quite rough economic performance measure of the firms in our sample, a change in the effects of the Big-Five may serve as a robustness check that personality traits have a dissimilar relation to different exit routes and that our rough classification possibly works out. Another purpose of these specifications refers to the comparability of our study to that of Ciavarella et al. (2004), in which it is not differentiated between successful exits and failures.

With regard to the controls, the picture does not change perceivable in the models 4-6, even though, the negative impact of former industry experience now becomes slightly significant ($p \leq 0.1$) and a further percent of equity is not anymore significantly related to a higher hazard rate. Moreover, the coefficients of the industry classifications and the team-dummy increase, while the corresponding standard errors decrease. Considering the Big-Five coefficients, the effect of agreeableness decreases perceptibly. This result underlines the importance of agreeableness for avoiding failure in our sample and contributes to the other

¹⁵ $0 > 0.867 - 0.104 * t \rightarrow t > 8.34$

¹⁶ In direction to control for nonlinear time-varying behaviour of the underlying hazard function, we estimated an Accelerated Failure Time (AFT) model (Wei 1992) with a similar specification like in model 2 and a log-logistic hazard function. But still, agreeableness strongly significantly ($p < 0.01$) increases the *time to failure*, while conscientiousness decreases the time to failure with ($p < 0.14$). The other Big-Five personality traits have no significant impact on the time of failure and the impact direction on failure corresponds to model 2, as well. In our point of view, the Gompertz approach is much more precise to measure the time varying impact of the single Big-Five traits over time, as the AFT model only allows for a time-varying base hazard function.

evidence that hypothesis 3 has to be confirmed. Conversely, the influence of all the other factors increases (standard errors decrease), leading to significant results for extraversion and openness, in model 5 compared to model 2. Within the sixth model, which is the counterpart of the Gomertz-model 3, henceforth the negative relation of agreeableness with the hazard rate at the period of founding the firm shrinks over time. In short, now both effects, that of agreeableness and conscientiousness, seem to vanish with a longer length of stay of the entrepreneur with her firm. This finding is partly supported by the result that the proportionality-assumption does generally not hold in the models 4 as well as 5 ($p \leq 0.01$) and specifically not for openness (only in model 5, $p \leq 0.1$), agreeableness (model 4-5, $p \leq 0.05$) and conscientiousness (model 4-5, $p \leq 0.01$).

In like manner to the first three models, figures 2d-2e in Appendix A indicate a relatively well fit of the specifications. Furthermore, the graphs for the smoothed Martingale residuals in the figures 3c-3d confirming the choice of linear Big-Five coefficients, at least for the models 5-6. In the next section we will discuss our findings.

	(1)Cox	(2)Cox	(3)Gompertz	(4)Cox	(5)Cox	(6)Gompertz
Conscientiousness	0.418*	0.388*	0.867***	0.431**	0.401*	0.883***
	(0.229)	(0.232)	(0.288)	(0.206)	(0.207)	(0.299)
Extraversion	-0.161	-0.177	0.0841	-0.252	-0.274*	-0.00250
	(0.187)	(0.187)	(0.256)	(0.164)	(0.164)	(0.249)
Agreeableness	-0.547***	-0.563***	-0.802***	-0.400**	-0.422**	-0.822***
	(0.210)	(0.209)	(0.249)	(0.191)	(0.189)	(0.259)
Openness	0.0897	0.135	-0.102	0.312	0.373*	-0.152
	(0.239)	(0.244)	(0.340)	(0.194)	(0.205)	(0.349)
Neuroticism	0.140	0.154	-0.0274	0.149	0.169	0.0510
	(0.291)	(0.292)	(0.387)	(0.246)	(0.247)	(0.355)
Conscientiousness*t			-0.104**			-0.0982**
			(0.0474)			(0.0471)
Extraversion*t			-0.0571			-0.0534
			(0.0411)			(0.0372)
Agreeableness*t			0.0565			0.0846**
			(0.0405)			(0.0384)
Openness*t			0.0345			0.0873
			(0.0593)			(0.0561)
Neuroticism*t			0.0322			0.0114
			(0.0478)			(0.0422)
AGE	0.0329***	0.0332***	0.0328***	0.0344***	0.0352***	0.0353***
	(0.0118)	(0.0124)	(0.0122)	(0.0101)	(0.0106)	(0.0104)
STUY	-0.0340	-0.0311	-0.0198	0.00654	0.00904	0.0186
	(0.0540)	(0.0549)	(0.0554)	(0.0465)	(0.0472)	(0.0479)
SELFEMP	0.0821***	0.0840***	0.0869***	0.0682***	0.0701***	0.0742***
	(0.0211)	(0.0215)	(0.0209)	(0.0196)	(0.0198)	(0.0195)
NACE2		-0.0387			-0.0596	
		(0.355)			(0.306)	
NACE3		-0.316			-0.387	
		(0.369)			(0.323)	
NACE7		-0.274			-0.313	
		(0.370)			(0.320)	
EXP_IND	-0.392	-0.422	-0.356	-0.410*	-0.442*	-0.417*
	(0.262)	(0.264)	(0.276)	(0.230)	(0.230)	(0.245)
PEQU	0.00588*	0.00614*	0.00644*	0.00293	0.00321	0.00366
	(0.00356)	(0.00351)	(0.00362)	(0.00296)	(0.00294)	(0.00300)
2002	0.709*	0.700*	0.580	0.685*	0.676*	0.550
	(0.407)	(0.408)	(0.405)	(0.378)	(0.380)	(0.374)
TEAM	0.661**	0.667**	0.642**	0.709***	0.717***	0.701***
	(0.282)	(0.280)	(0.286)	(0.254)	(0.252)	(0.258)
_cons			-7.175***			-6.767***
			(2.030)			(2.165)
t			0.243			0.0240
			(0.298)			(0.305)
N	423	423	423	423	423	423
events	75	75	75	97	97	97
AIC	852.1	856.9	503.7	1086.3	1090.1	579.6
BIC	900.7	917.6	580.6	1134.9	1150.9	656.5
Standard errors in parentheses			* p<.1	** p<.05	*** p<.01	

Table 4: Models 1-6

6. Discussion

The most convincing result of our analysis is the link between agreeableness and a lower propensity to fail. Evidence for this suggestion comes upon across all of the six models. In those models that explicitly considering apparently failed exits, this result becomes more accentuate, which emphasizes the negative relation of agreeableness and failure. Indeed, even comparing the time varying relation of the Big-Five factors with the hazard rate stresses this finding. While highly innovative failed entrepreneurs have a systematically lower agreeableness at all times from start-up, the relation between discontinuance and agreeableness is supposed to shrink over time. Those results correspond to hypothesis 3 and confirm that a higher level of agreeableness seems to decrease the instantaneous probability to fail at all times from start-up in our sample.

Comparing our results with that of Ciavarella et al. (2004), reveals similarities and differences. In both studies, neuroticism had definitely no link to entrepreneurial exit in general, while in our study neuroticism has no relation to entrepreneurial failure, too. This finding contradicts the literature on job performance, which suggests a positive relation between a poor job performance and neuroticism (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). Hence, personal adjustments that are developed through neuroticism are possibly not relevant for entrepreneurial failure, exit or performance.

Openness, which impedes venture survival according to Ciavarella et al. (2004), has in one of our discontinuance models a positive and slightly significant relation to exit hazard in general, but no relation to failure in our sample. Hence we conclude that openness may have an association to successful entrepreneurial exit, but possibly not to failure. This is in line with literature on the link of openness and a poor job performance, which proposes at most a quite moderate negative relation (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). Since people who are more open tend to have preferences for changing the status quo (George and Zhou 2001), they perhaps may decide to withdraw even if their firm runs successfully with the aim to find a new challenge. Despite we not offer direct evidence for this suggestion, further research may provide an answer.

Likewise, we find in one model, which includes failed and not failed withdraws, that extraversion significantly decreases the hazard of entrepreneurial exit. A connection between entrepreneurial failure and extraversion was though not given, even if less extraverted workers reveal a worse job performance (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). Again, this result may be a hint that extraversion plays a

negative role for successful exits but not for entrepreneurial failure. Because Ciavarella et al. (2004) find no relation of extraversion and entrepreneurial exit, the difference in our findings might be explained by higher expected rewards from uncertain situations through extraverts (Petersen 2005). Therefore, managing a firm in highly innovative and simultaneously uncertain environments might enhance further reward expectations for extraverted entrepreneurs, which hinder them in exiting successfully. Even this indirect outcome urges for an investigation of successful entrepreneurial exits and personality.

A result that accords to our hypothesis is that conscientious entrepreneurs are more likely to fail in young innovative firms. Even if we expected this outcome, it contradicts the findings of Ciavarella et al. (2004), who declare that conscientiousness prevents from entrepreneurial exit. The literature on job performance broadly attributes a lower conscientiousness to a lower job performance, as well (Barrick and Mount 1991, Salgado 1997, Hurtz and Donovan 2000, Barrick et al. 2001). We explain this result by characteristic adjustments of conscientious entrepreneurs that counteract flexibility, adaptability and creativity. These qualities yet are an imperative for young firms in innovative environments (Heunks 1998) and thus our contradictory findings might be caused by our specific sample characteristic. Because our sample consists of entrepreneurs who act in highly innovative industries, the prevalent uncertainty in these industries may mainly explain the positive relation of conscientiousness to failure in our study. As a result, our work contributes to evidence that conscientiousness is not in any case a predictor of job performance, especially if the job outcome is uncertain or a creative artefact (Tett 1998, Feist 1998, George and Zhou 2001, Tett and Burnett 2003), like an innovation.

The broad confirmation that agreeableness shapes entrepreneurs that tend to fail less was predicted by our hypothesis. It is though not found in case of entrepreneurial exit by Ciavarella et al. (2004), who recover no relation. One reason of this dissimilarity is perhaps rooted in the personality of successful leaving entrepreneurs, who might reveal on average a higher degree agreeableness. This suggestion arises from the comparison of our models 3 and 6. In the first, in which only failed entrepreneurs are counted as exits, the negative effect of agreeableness on failure remains over time. Contrarily, in the second, which treated failed and successful withdraws as exits, the negative effect of agreeableness on failure diminishes over time. Thus the difference may partly stem from the fact that Ciavarella et al. (2004) included possibly successful exits in their study too. But still, this cannot be the only explanation and again, we refer to our specific sample properties. Especially in highly innovative environments, agreeable entrepreneurs may develop adaptations that allow them building up

important relationships to other founder team members, suppliers, financiers, customers and employees that decrease uncertainty. These informal relationships may substitute for formal institutions in already established markets. Conversely, formal institutions in established environments might supersede characteristic adaptations based on agreeableness as a protection against failure. On the other hand, agreeableness may have a crucial role for the empathy regarding customer needs, which facilitates a successful product launch.

Both findings, namely that agreeableness and low conscientiousness contribute to avoid entrepreneurial failure, verify that Sarasvathy's (2001) effectuation principles are better suited for innovative entrepreneurs than causation. Important pillars of entrepreneurial activity in the effectuation scheme are the creation of strategic alliances and precommitment from stakeholders to reduce uncertainty. A higher agreeability certainly facilitates the accomplishment of this general principle. Especially the uncertainty of the demand reaction for the product might make this necessary. The exploitation of contingencies, contrasted by the exploitation of existing knowledge is another component of effectuation theory. In case of conscientiousness, if entrepreneurs clutch too strong on precasted thoughts or goals, their survival in highly uncertain environments is impeded, because they are unable to adjust to contingencies that arose. This explanation pattern is consistent with recent empirical evidence that links venture performance to the maintenance of basic effectuation principles in new ventures (Read et al. 2009).

As already denoted, we conducted supplemental analyses on the time changing effects of the Big-Five on failure through different firm stages of the entrepreneurial process. We find in this respect that the effect of the Big-Five is seemingly stable over time, excepting for conscientiousness. This shows that certain behaviours connected to conscientiousness are apparently more helpful to avoid failure, if the firm is already established. And simultaneously, that different stages of the entrepreneurial process might demand different kinds of managers. Indeed, Sarasvathy (2001) proposed that in early and uncertain organizational stages effectuators are much more effective than in well established environments.

There are limitations in our study. First of all, because of a lack of data, we are not able control for the specific characteristic adaptations that mediate between the Big-Five factors and failure. Therefore, a promising research gap might be given in figuring out respective characteristic adaptations and model them as mediators between the entrepreneurial personality and failure. Secondly, our economic success measure for the firms which are related to the entrepreneurs is quite rough. More precise data on economic firm success would

hence certainly improve the accuracy of our results. Nevertheless, future research may help to solve this problem. The third difficulty accords to our measure of innovativeness which only refers to the industry level in which the firms are acting in. A more precise approach to gauge innovativeness, like the investigation of sector-specific entrepreneurs or R&D expenditures on the firm level, might be illuminating.

With regard to our controls, we find that firm external factors as industry belonging as not significantly important, which is in line with recent empirical evidence on new venture survival (Short et al. 2009). The outcome that no industry experience is supposed to increase the hazard of ceasing entrepreneurial activities accords to former findings in industrial dynamics (Klepper 2002, Buenstorf and Klepper 2010, Buenstorf et al. 2010). Notwithstanding, one of the results concerning the controls might be puzzling on a first glance. The variable years of experience in being self employed actually increased the hazard rate. This though just might indicate a faster learning about the own ability to run a firm in the respective market (Jovanovic 1982, Pakes and Ericson 1998), because of already available experiences. The management of the owned firm is hence given up relatively faster in case of a comparatively poor talent. On the other hand, additional years of experience in self employment may also indicate the existence of other owned firms which are managed contemporaneously and hence demand possibly necessary management resources.

7. Conclusion

In this paper we aimed to answer the question, which relation the Big-Five personality traits might have to entrepreneurial failure in highly innovative environments. We find evidence that a relatively higher degree of agreeableness possibly decreases the hazard rate for entrepreneurial failure. Moreover, conscientiousness is related to entrepreneurial failure positively at the time of starting entrepreneurial activities, while this effect decreases over time. Further research might mark out which characteristic adaptations mediate between the personality traits and entrepreneurial failure. Besides, there might be other motives beyond failure that drives decisions to quit linked to the Big-Five personality traits. These relationships ought to be investigated in future research. As one major problem of our study is given by the missing model-link between the Big-Five and failure, more data on characteristic adaptations may help to find more precise results.

Nonetheless, we serve quite robust evidence that the longevity and failure of highly innovative entrepreneurial activity seems to be related with the personality traits of its founder. This result implies at least that the personality might be linked to the performance of

new firms that innovate and further research ought to be done in this direction. Moreover, we showed that a single personality factor seems to have an impact on different adaptations, which on a first glance seem to be unrelated, but may prevent from or boost failure simultaneously.

APPENDIX A (Robustness Checks)

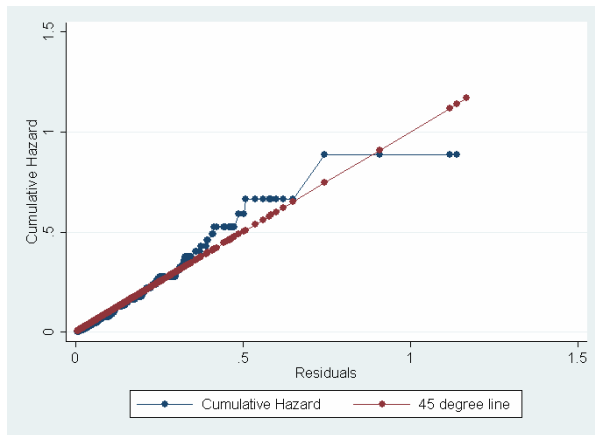


Figure 2a: Cox-Snell residual analysis:
Model 1

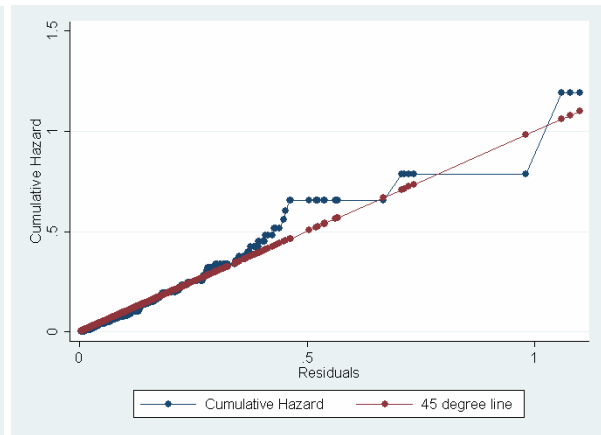


Figure 2b: Cox-Snell residual analysis:
Model 2

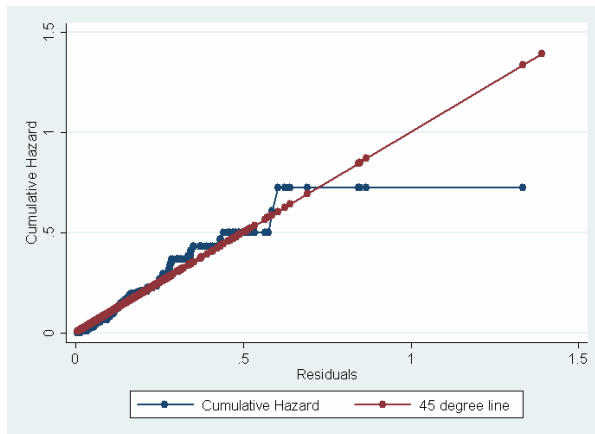


Figure 2c: Cox-Snell residual analysis:
Model 3

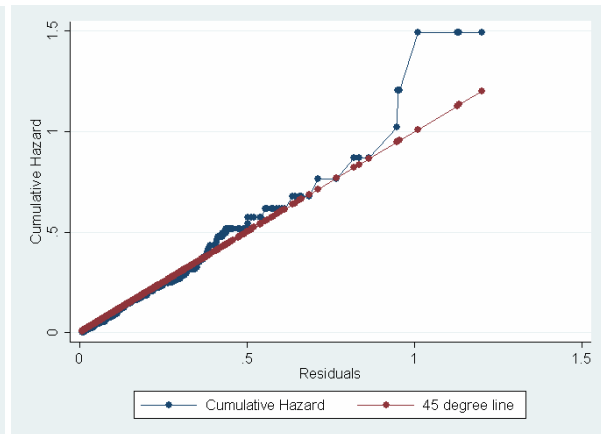


Figure 2d: Cox-Snell residual analysis:
Model 4

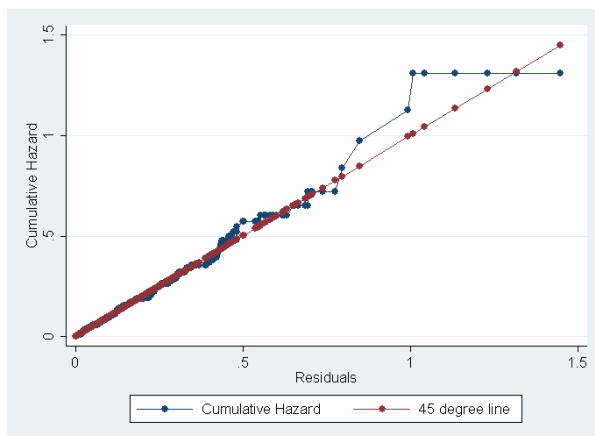


Figure 2e: Cox-Snell residual analysis:
Model 5

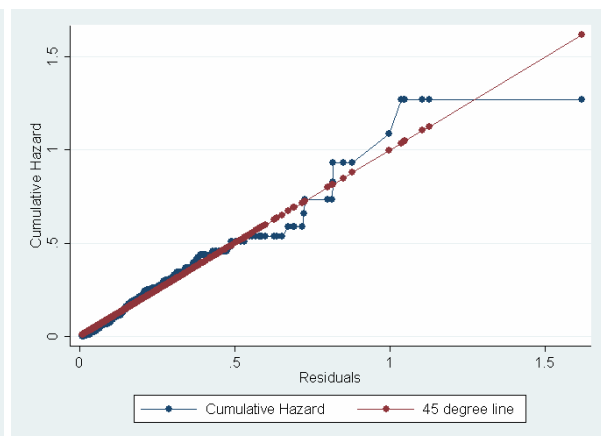


Figure 2e: Cox-Snell residual analysis:
Model 6

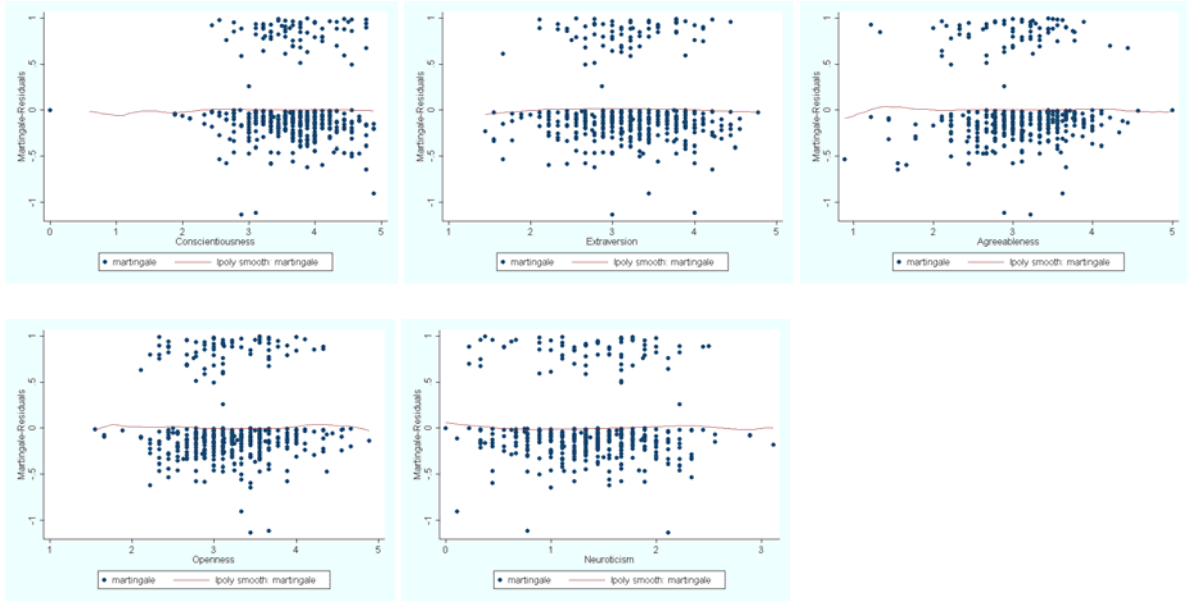


Figure 3a: Smoothed Martingale residuals in Model 1

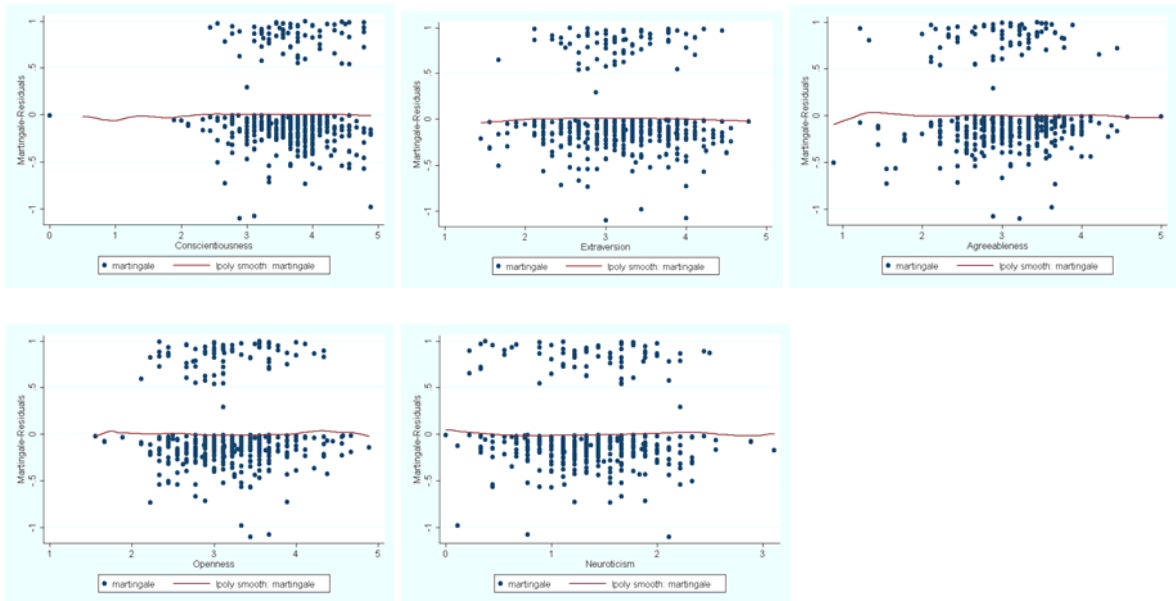
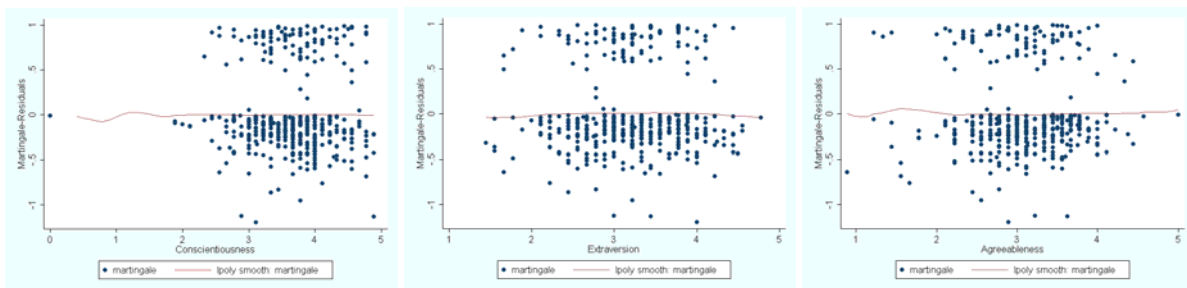


Figure 3b: Smoothed Martingale residuals in Model 2



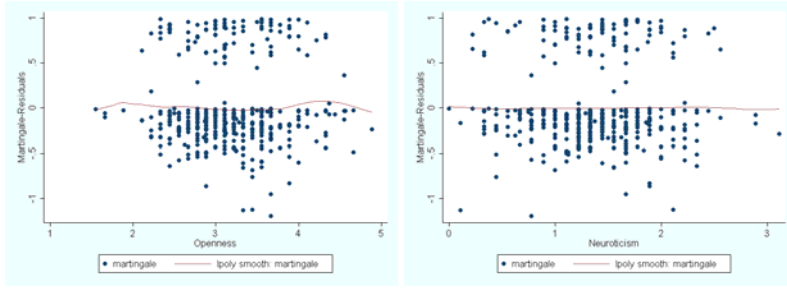


Figure 3c: Smoothed Martingale residuals in Model 4

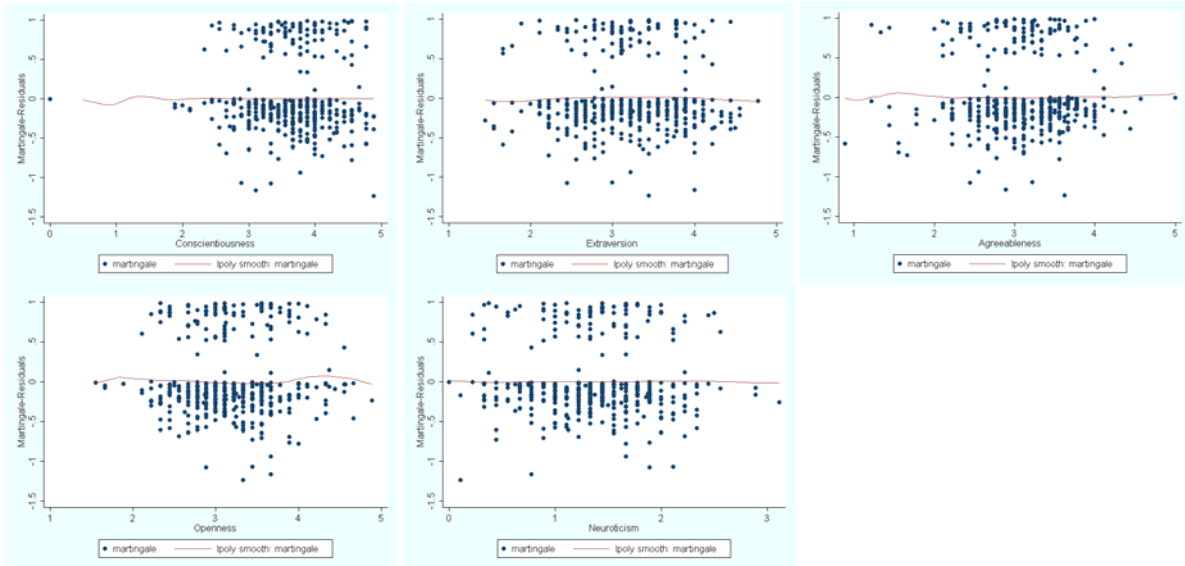


Figure 3d: Smoothed Martingale residuals in Model 5

Big-Five trait	Item	Factor1	Factor2	Factor3	Factor4	Factor5
Conscientiousness	sparsam - verschwenderisch	0.351			-0.4353	
	ordentlich - unachtsam	0.7344				
	übergenu - ungenau	0.7309				0.2312
	gründlich - unsorgfältig	0.8002				
	geschäftstüchtig - verspielt	0.2974	0.3351		-0.3822	
	strebsam - ziellos	0.4486				-0.3725
	geordnet - ungeordnet	0.6488				
	fleißig - faul	0.6538				
	gewissenhaft - nachlässig	0.8445				
Extraversion	gesprächig - schweigsam		0.6826			
	anschlußbedürftig - einzelgängerisch		0.4665	0.3118		0.3817
	direkt - taktierend		0.2479			
	offen - zugeknöpft		0.7381			
	impulsiv - selbstbeherrscht		0.3344	-0.4545		0.5764
	aktiv - passiv		0.3765			-0.3366
	kontaktfreudig - zurückhaltend		0.8165			
	freimütig - gehemmt		0.6752			
	gesellig - zurückgezogen		0.7461			
Agreeableness	nachsichtig - barsch			0.6515		
	friedfertig - streitsüchtig			0.719		
	leichtgläubig - zynisch			0.5577	-0.2175	0.3718
	gutmütig - reizbar			0.6732		-0.227
	weichherzig - rücksichtslos			0.5589		0.2324
	höflich - grob	0.2755		0.4483	0.3531	
	selbstlos - selbstsüchtig			0.3374		
	vertrauensvoll - misstrauisch		0.2385	0.4898		
	zustimmend - gegensätzlich	0.2238		0.4177		
Openness	künstlerisch - unkünstlerisch				0.3624	0.2068
	komplex - einfach			-0.2458	0.4849	
	phantasievoll - phantasielos		0.2117		0.3029	-0.2667
	originell - konventionell		0.347		0.3897	
	kreativ - unkreativ	0.2083			0.3987	
	modern - traditionell				0.4289	
	intelligent - unintelligent				0.3731	-0.3911
	gebildet - ungebildet				0.3632	-0.2279
	liberal - konservativ	-0.2769			0.55	
Neuroticism	überempfindlich - entspannt	0.2318		-0.3592		0.4672
	labil - gefühlsstabil					0.648
	selbstachtunglos - überzeugt		-0.2246			0.4042
	verletzlich - robust					0.597
	furchtsam - mutig		-0.4047			0.2833
	ängstlich - ruhig		0.223			0.6679
	hilflos - selbstvertrauend					0.4878
	selbstmitleidig - selbstzufrieden					0.3465
	unsicher - sicher	-0.2839	-0.3354			0.3813

Only |loads|>.2 are indicated; values in bold show the highest load per item

Table 5: Principal component factor analysis with promax rotation with the employed items

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