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From fidgeter to entrepreneur?

A cross-sectional study examining the relationship between Attention Deficit Hyperactivity Disorder, Entrepreneurial Orientation, Entrepreneurial Social Identity, Entrepreneurial Passion and Entrepreneurial Performance

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Abstract

With seven to eight percent prevalence, the Attention Deficit Hyperactivity Disorder (ADHD) is a common disorder observed in children (Okie, 2006). ADHD symptoms even remain until adulthood and include problems in maintaining attention and sitting still (Okie, 2006). Interestingly, recent research found that these typical symptoms are related to increased entrepreneurial intentions and behavior (Thurik, Khedhaouria, Torrès & Verheul, 2016; Verheul et al., 2015). These findings have led to the assumption that due to a good person-job fit, entrepreneurial performance increases. Nevertheless, no study assessed the impact of ADHD on entrepreneurial performance yet. Thus, this study examines the relationship between the mental health variable ADHD and entrepreneurial performance. Hereby, the individual-level variables entrepreneurial social identity (ESI) and entrepreneurial passion (EP) and the firm-level variable entrepreneurial orientation (EO) are taken into account. By providing insights into the interplay of ADHD, entrepreneurial performance, individual- and firm-level variables, this study promotes a better understanding of ADHD in entrepreneurship.

Data has been collected using a survey that measured ADHD, ESI, EO, EP and entrepreneurial performance based on self-reports. 103 founders of micro-, small- and middle-sized businesses answered the questions online. The results have been analysed using multiple regression analysis. ADHD turned out to be of low value in predicting entrepreneurial performance. Instead, the individual-level variables ESI Darwinian and EP had a significant predictive value on performance ($p<.05$). High scores on EP turned out to positively moderate the ADHD-performance relationship. Interestingly, reporting the Darwinian identity was weakening performance in ADD-affected entrepreneurs. These results plead for different motivational processes in ADHD-affected entrepreneurs. To handle the problems in sustaining attention, ADHD-affected individuals need intense short-term, emotional motivation like entrepreneurial passion. Contrarily, long-term, commercial motivation in ADHD-affected individuals, like having the ESI Darwinian identity, leads to decreased entrepreneurial performance. These insights are of theoretical and practical values as they emphasize the deviating needs of ADHD-affected entrepreneurs. However, future longitudinal research that utilizes both, subjective and objective measurement tools, is needed to assess these assumptions further.

1. Introduction

"Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid."

Albert Einstein

Nowadays, with a prevalence rate of seven to eight percent in children, ADHD is one of the most common mental health disorders (Okie, 2006; Valero et al., 2011). During the last decade, several scholars assessed in how far an ADHD diagnosis influences the individual and its environment (e.g. Okie, 2006; Weyandt & DuPaul, 2013). In particular, studies sought to get a better understanding about ADHD and choice of proficiency. As it turned out, people who are behaviorally disinhibited are more inclined to choose a career path that offers them a high degree of creativity and flexibility (Lerner, 2016). In line with these findings, a relation between ADHD and entrepreneurship seems to exist, as ADHD-affected individuals are more inclined to found their own venture (Verheul et al., 2015). A possible explanation for this pattern is the good fit between the ADHD-affected individual's needs and the requirements of the entrepreneurial market (Thurik, Khedhaouria, Torrès & Verheul, 2016). As ADHD-affected people tend to have problems in sustaining attention or sitting still for a longer period of time, the independency offered by entrepreneurial engagement becomes promising (Thurik et al., 2016). The compliance of individual characteristics with contextual factors may foster the ADHD-affected entrepreneur's survival in terms of entrepreneurial performance. Accordingly, Rauch and Frese (2007) reported increased business success rates, when a fit between personality traits and environment existed.

Recent research presented ambiguous relations between ADHD and the entrepreneurial context. At the one hand, attention is drawn to the flaws in the inhibition of the individual's behavioral inhibitory system (BIS). This inhibition is expected to decrease the individual's ability to focus on business matters, which leads to overall decreased performance (Okie, 2006; Hmieleski & Lerner, 2016). On the other hand, studies recently started to assess whether conventionally assumed ADHD-weaknesses could have an advantageous impact, like increased entrepreneurial intentions (Verheul et al., 2015; Lerner, 2016; Wiklund, Patzelt & Dimov, 2016). In doing so, this line of research generated first results to support the de-stigmatization of former 'underdog'-characteristics (Gorgievski & Stephan, 2016).

Until now, it is not clear if and how ADHD and entrepreneurial performance are related. Getting insights into this relationship is of scientific and practical interest as it clarifies whether individuals benefit or suffer from ADHD symptoms in entrepreneurship. To provide nuanced findings, three variables are considered that affect entrepreneurial performance directly (Lumpkin & Dess, 1996; Fauchart & Gruber, 2011; Cardon et al., 2009b): entrepreneurial orientation (EO),

entrepreneurial social identity (ESI) and entrepreneurial passion (EP). Therefore, the following question will guide the research:

What is the relationship between entrepreneurs experienced amount of ADHD-symptoms and their perceived firm performance, taking account of entrepreneurial orientation, entrepreneurial social identity and entrepreneurial passion?

In answering this research question, the research is the first to give rise to the relationship between ADHD and entrepreneurial performance. The results indicate that there is no direct relation between both variables. However, individual characteristics, like entrepreneurial passion and entrepreneurial social identity turned out to influence the relation between ADHD and entrepreneurial performance. In reporting these findings, this research contributes value in multiple terms.

First, as the sample group of entrepreneurs is 'relatively under researched' (Gorgievski & Stephan, 2016; p.19), the present study adds value to the whole entrepreneurial research field. In specific, assessing the impact of both, the firm- and the individual-level, increases the knowledge about their relation to entrepreneurial success. Interestingly, individual-level variables turned out to be significantly related to entrepreneurial performance, whereas firm-level variables lacked predictive value.

Second, the results emphasize the role of entrepreneurial cognitions and emotions in entrepreneurial research. Until now, a tremendous amount of research assessed the influences of firm characteristics and strategy on entrepreneurial performance (e.g. Lechner & Gudmundsson, 2014; Wiklund & Shepherd, 2003; Lumpkin & Dess, 1996). Contrarily, the current research creates awareness for the need of considering 'soft'-factors in the assessment of entrepreneurial success. Reporting intrinsic motivation, here entrepreneurial passion, proved to impact entrepreneurial performance positively. Hence, future research should increase the focus on variables like intrinsic motivation.

Third, the current research contributes to the clinical research field in showing that ADHD-affected entrepreneurs benefit from emotional variables. Being aware that ADHD-affected entrepreneurs have special needs, enables increased support for those individuals. In this way the well-being of entrepreneurs will increase in the long run.

2. Theoretical framework

Before starting the development of the hypotheses, this section commences with creating a common understanding about the reasons why individual characteristics are expected to influence entrepreneurial performance. For this, the model of work engagement of Bakker and Demerouti (2008) is applied. The gist of this model relies upon the assumption that *personal resources*, like optimism and self-efficacy as well *as job resources*, like the amount of autonomy or social support, enable a buffering effect against increasing job demands. When sufficient resources exist, work engagement is created. This increases performance outcomes. Besides increased engagement, employees can experience 'job crafting'. 'Job crafting' describes the process of developing meaningfulness and identification towards work (Bakker, 2011). Applying the assumptions of this model to this research's context, ADHD, along with EP, ESI and EO will be considered as potential personal resources. These resources have the potential to protect the individual against arising entrepreneurial demands. In how far these theorized factors will have an either motivational or straining effect on outcome needs to be assessed. To enable a thorough research, each of the four announced concepts, ADHD, EO, ESI and EP, are defined first. Afterwards, research hypotheses are formulated that are based on existing theoretical assumptions and research results. The final research model is presented in Figure 1.

The Attention Deficit/Hyperactivity Disorder (ADHD) consists out of three core symptoms: hyperactivity, impulsiveness and inattention. The Diagnostic Statistical Manual of Mental Health Disorders IV (DSM-IV) classified these symptoms into two categories: hyperactivity-impulsivity and inattention (APA, 2013). *Hyperactivity-impulsivity* (in the following ADHD-hyperactive) symptoms relate to behavioral and observable symptoms. Examples for these symptoms are talking excessively, having difficulties with awaiting their turn and often interrupting or intruding on others (APA, 2013). *Inattention* (in the following ADD) symptoms are increasingly concerned with the process of maintaining attention. They often fail to give close attention to details, seem to be distracted without any external reason and refuse to fulfill tasks that require sustaining attention for a longer period of time (APA, 2013). To be finally diagnosed with ADHD, the individual needs to meet more than six out of the nine core symptoms. These must be present over a time period of six month (APA, 2013). In case of fulfilling more than six symptoms in only one out of the two categories, the individual will receive an ADD or ADHD-hyperactive diagnosis (APA, 2013).

To explain the cognitive processes that occur in ADHD-affected individuals, Barkley (1997) introduced the 'Behavioral Inhibition' (BI)-model. This model has a promising value in explaining ADHD and is hence used as the basic model of this research. According to Barkley's BI-model, ADHD is caused by a restriction of behavioral inhibition. This means that the inhibition, anticipation and maintenance of behavioral responses are limited. Based on these behavioral inhibition problems,

the process of impeding executive functions is initiated. It is important to note that behavioral inhibition is not causing these executive problems directly. These executive functions rather take place between BI and motor control, fluency and syntax (Barkley, 1997). Thus, working memory, internalization of speech, self-regulation of affect and reconstruction are added to explain the model's problem of motor control, fluency and syntax. The problems in motor control, fluency and syntax become increasingly obvious when affected individuals need to fulfill tasks that include time-delay, generation of novel responses or resistance to distraction (Barkley, 1997). These impairments turned out to cause major problems even until adulthood. Affected individuals report problems in finding and keeping a job, achieving satisfying job and school performances and concentrating themselves (Wolf & Wasserstein, 2001; APA, 2013).

As soon as it comes to the physical origins of ADHD, research gives manifold explanations. Here, two main anatomic deviations are promising in explaining the observed inattention and hyperactivity-impulsivity problems (Berquin, 1998). Firstly, scholars identified distortions of the prefrontal cortex as being related to ADHD (Diamond, 2000; Hynd et al., 1993). Secondly, a lower sized cerebellum has been found in ADHD-affected individuals (Berquin, 1998).

ADD turned out to cause mainly problems in fulfilling personal or professional tasks that required a certain amount of attention (Wolf & Wasserstein, 2001). The deficiency of holding on to fulfilling tasks decreases the ability to act goal-directed (Barkley, 1997). This lack of holding attention collides with the former described demands of today's markets, namely reacting and adapting fast to occurring changes (Almeida, Ahmetoglu & Chamorro-Premuzic, 2014). Frese (2009) developed an action theory perspective on entrepreneurship. With this, he emphasizes the need for conscious actions to enable favorable performance. Hereby, entrepreneurial routines are launched that are easing the entrepreneurial action in the long run (Frese, 2009). As ADHD-affected individuals show an impaired ability to hold attention for a longer period of time, conscious performance and the establishment of routines are impeded. On top of that, potential investors turned out to be more inclined to refuse investing into projects of ADHD-affected entrepreneurs as soon as they recognized the inattentive and fast-changing behavior of those entrepreneurs (Lerner, 2016). This lack of trust is accompanied by insufficient connections, resources and experiences of ADHD-affected entrepreneurs, which is caused by their restlessness (Hmieleski & Lerner, 2016). Frese (2009) stated that entrepreneurs need to have good working memory capacities to become successful. As ADHD-affected individuals have major restrictions in working memory processing, a negative influence of ADHD on entrepreneurial actions is expected (Sagvolden, Johansen, Aase & Russell, 2005). Based on these scientific insights, it is assumed that ADHD-symptoms affect the individual, as well as the impression of the external environment, in a mainly negative way. Individual actions affect entrepreneurial performance and are of special importance in the entrepreneurial context accordingly (Lumpkin & Dess, 1996). Unlike big

companies, the actions of entrepreneurs have an immediate effect on their venture's performance (Lumpkin & Dess, 1996). This implies that in case of insufficient networks, attention, resources and working memory of ADHD-affected entrepreneurs, the performance of the whole venture will be affected negatively (Lumpkin & Dess, 1996). The following hypothesis merges these assumptions:

Hypothesis 1: The experienced amount of Attention Deficit Hyperactivity Disorder-symptoms is negatively related to the entrepreneur's perception of the own entrepreneurial performance.

The negative relation between the individual-level variable ADHD and entrepreneurial performance is proposed. Still, former research emphasized the necessity to pay special attention to both, individual-level and firm-level factors in entrepreneurial research (Bruyat & Julien, 2001). Hence, this section introduces and clarifies the firm-level variable entrepreneurial orientation (EO). This construct has been found to be of major importance in the entrepreneurial firm context (e.g. Rauch et al., 2009; Wiklund & Shepherd, 2011). It originated from the strategy-making process research and describes the whole process of market entrance at the firm-level (Miller & Friesen, 1978; Lumpkin & Dess, 1996). With that, it is obviously deviating from the individual-level at which ADHD is operating. As the target group of this research are owners of small and medium-sized enterprises (SME), which hold less than 250 employees (European Commission, 2003), the border between entrepreneur and firm vanishes. Therefore, EO is highly intertwined with the individual entrepreneur and can be assessed subjectively (Thurik et al., 2016). However, EO is a firm strategy-making variable that is expected to influence firm success directly (Rauch et al., 2009). This success is related to the existence of the three EO dimensions: innovativeness, risk taking and pro-activity (Miller, 1983; Rauch et al., 2009). *Innovativeness* incorporates the idea of creating a product or service that did not exist before. The degree to which the firm is able to take actions in even uncertain contexts is summarized in the *risk-taking* factor. *Pro-active* behavior is performed in acting target-oriented to reach the intended goal. This will finally lead to a competitive market-advantage (Rauch et al., 2009).

Unlike entrepreneurial performance, several studies have already assessed the relation between ADHD and entrepreneurial orientation. Thurik et al. (2016) surveyed the linkage between ADHD tendencies and EO in French small business owners and found a positive relation, meaning that entrepreneurs who reported ADHD symptoms tended to show higher entrepreneurial orientation This implies that the underlying entrepreneurial behavior (here: EO) fits to the needs of ADHD-affected individuals. In line with this assumption, Verheul et al. (2015) argued that due to having had problems in school and social relations, ADHD-affected entrepreneurs are better prepared for the adverse and challenging entrepreneurial market. Based on several experiences of underperformance

along with being an 'underdog', ADHD-affected entrepreneurs are hypothesized to be increasingly motivated and striven to achieve their goals (Wiklund, Patzelt & Dimov, 2016; Miller & Breton-Miller, 2016). These experiences are expected to lead to increased *pro-active* behavior. Next to that, one attribute of ADHD-affected individuals turned out to be a comparatively increased risk-seeking behavior (Hmieleski & Lerner, 2016). To prevent themselves from being bored, these entrepreneurs are inclined to engage themselves in risky actions, which fits to the second EO-dimension of *risk-taking* (Hmieleski & Lerner, 2016). Finally, the fast-changing lifestyle and the surplus of energy supports the amount of entrepreneurial *innovativeness*, as the fast-life approach offers the opportunity to be up-to-date and with that, react to current trends (Hmieleski & Lerner, 2016). Based on this, ADHD-affected entrepreneurs are expected to benefit from the three EO-factors. Taking this one step further, EO has the potential to impact entrepreneurial performance positively (Rauch et al., 2009). Accordingly, an ADHD-affected entrepreneur who reports high levels of EO will be more likely to report high entrepreneurial performance. EO operates as a moderator of the former negative ADHD-entrepreneurial performance relation. Based on this assumption, the following hypothesis is formulated:

Hypothesis 2: The negative relation between the experienced amount of ADHD-symptoms and entrepreneurial performance in entrepreneurs becomes weaker through reporting high levels of entrepreneurial orientation.

The existence of entrepreneurial orientated strategies is hypothesized to influence the ADHD-entrepreneurial performance relation. As stated above, entrepreneurial action is also highly related to individual intentions and behavior (Bruyat & Julien, 2001).Therefore, a closer look on the individual-level is taken. The entrepreneurial social identity (ESI)-theory seizes the individual motivation to perform entrepreneurial action (Fauchart & Gruber, 2011). In doing so, it differs from ADHD, as it is not an individual attribute but a cognitive variable. Hence, entrepreneurial social identity plays a crucial role in a '… person's feelings, values, beliefs and actions' (Fauchart & Gruber, 2015; p. 544). It consists of three different entrepreneurial identity categories: Darwinians, Communitarians and Missionarians (Fauchart & Gruber, 2011). Entrepreneurs who hold the *Darwinian identity* are mainly motivated by making profit and building a solid business to ensure their survival within the market (Fauchart & Gruber, 2011). Contrarily, people who take a *Communitarian identity* are motivated by creating value for their own social group (community). These entrepreneurs seek to get recognition of this group for their performed actions (Fauchart & Gruber, 2011). The individuals taking the *Missionarian identity* bring this one step further in aiming to improve the society through their own entrepreneurial actions. In doing so, this type of identity seeks to make the world a better place (Fauchart & Gruber, 2011).

Until now, no research has been conducted that directly assessed the relation between entrepreneurial social identity and mental disorders like ADHD. Nevertheless, it is generally understood that identity shapes individual behavior (Burke & Reitzes, 1981). This implies that the individual identity has the potential to influence entrepreneurial behavior and affect the former proposed ADHD-entrepreneurial performance relation accordingly. As the definition of the construct emphasizes, this behavioral impact is routed in motivational processes (Fauchart & Gruber, 2011). Within the research area concerning the impacts of motivation on entrepreneurial outcome, Sideridis (2005) was able to report an interesting finding. He found that compared to their non-learning disabled counterparts, the amount of motivation to perform increased in pupils with learning disabilities, like ADHD. Applied to this research, an increased amount of motivation would outbalance possible negative effects of ADHD on entrepreneurial performance. Intense positive feelings towards entrepreneurial actions have been related to the level in which entrepreneurs identified themselves with their entrepreneurial tasks (Murnieks et al., 2014). To propose a possible effect on the distinct entrepreneurial social identities, the insights of Alsos, Clausen, Hytti and Solvoll (2016) are considered. In this research, a different behavior in adopting different entrepreneurial social identities has been proven. Darwinian and Missionarian identities turned out to perform more causal behavior. They acted highly goal-directed and used occurring means to achieve previous defined goals. In contrast to that, Communitarians were more tempted to behave in an effectuation manner, meaning that they remained flexible and used means to define the goal *during* the goal achieving process. These findings give rise to possible effects of entrepreneurial social identity in the ADHD-entrepreneurial performance relation. ADHD-affected individuals are known to have problems with maintaining attention (APA, 2003). Holding a Communitarian identity is expected to have the potential to even reinforce this problem, as this identity style relies on flexible, less goal-directed actions. This poses the risk that problems in keeping attention and acting goal–directed become visible. In contrast to that, the Darwinian and Missionarian identity could counteract these problems in facilitating goal-directed behavior. Acting goal-directed turned out to have positive impacts on entrepreneurial performance (Baum & Locke, 2004) Being intrinsically motivated increased the willingness to act and led to increased entrepreneurial performance (Murnieks et al., 2014). Due to an increased ability to act goal-oriented, the ADHD-affected entrepreneur is expected to benefit from reporting high scores on either the Darwinian or Missionarian identity. This long-term motivation is expected to increase entrepreneurial performance. Summarizing, the Darwinian and Missionarian identity are expected to moderate the negative ADHD-entrepreneurial performance relation. The following hypothesis captures these assumptions:

Hypothesis 3: The negative relation between the experienced amount of ADHD-symptoms and entrepreneurial performance in entrepreneurs becomes weaker through reporting high scores on a) Darwinian entrepreneurial identity b) Missionarian entrepreneurial identity.

The individual motives underlying entrepreneurship and firm performance are presented. Still, one influential variable is lacking as once a business has been started, personal engagement is required (Bakker & Demerouti, 2008). Here, the concept of entrepreneurial passion (EP) comes into play. This concept has been identified as key driver for entrepreneurial engagement (Cardon, 2005). Deviating from 'common' passion, EP is related to the intense positive emotion that is consciously experienced while seeking for or engaging in entrepreneurial opportunities, tasks or activities (Cardon, Wincent, Singh & Drnovsek, 2009b). Cardon, Gregoire, Stevens and Patel (2013) operationalized EP as consisting out of the following three different self-identities: inventor, founder and developer identity. While passion drives forward activities related to inventing and exploiting opportunities in the *inventor identity*, the *founder identity* is mainly active during establishing the venture. The *developer identity* experiences EP mostly during nurturing and growing the business. Even if EP is divided into three distinct identities, individuals can show EP in multiple identities, meaning for example during both, inventing and founding activities (Cardon et al., 2005). Having those identities is affecting the individual in two ways: affectional and personal (Cardon et al., 2012). Accordingly, the passionate individual is experiencing intense positive feelings towards the action (Cardon et al., 2012). Furthermore, passionate action is central to the identity of the actor (Cardon et al., 2009a).

In the forgone paragraphs, the motivational power of the ESI variable has been set out. Increased motivation through having the Darwinian or Missionarian identity was hypothesized to increase entrepreneurial performance. Adding EP to these variables adds another layer to the individual-level. Like ESI, EP consists out of three different identity-types. But unlike ESI, the identities of EP are concerned with distinct entrepreneurial stages. Therefore, the ESI identities can adopt the EP identities of the inventor, founder and/or developer. What makes EP interesting in this research's context is its assumption of adding the emotions related to the entrepreneurial identity-stages. Cardon (2005) already found that positive-loaded emotions, like passion, empower entrepreneurial behavior. Entrepreneurs, who experience meaningfulness during activities, show more devotion and are positively evaluated by others (Cardon, Sudek & Mitteness, 2009a). Experiencing EP turned out to have long-term effects on entrepreneurial behavior. Collewaert et al. (2016) found that the identity factors remained stable, whereas the intense positive feelings tended to decrease over time. Even though the affective component changes, once EP is experienced, it supports entrepreneurial action and enables a cognitive immersion into the chosen topic (Cardon & Kirk, 2013; Collewaert et al., 2016). In line with this, Cardon and Kirk (2013) found proof for a mediation-effect of EP on self-efficacy and persistence. In fact, the identities of founding and inventing increase entrepreneurial

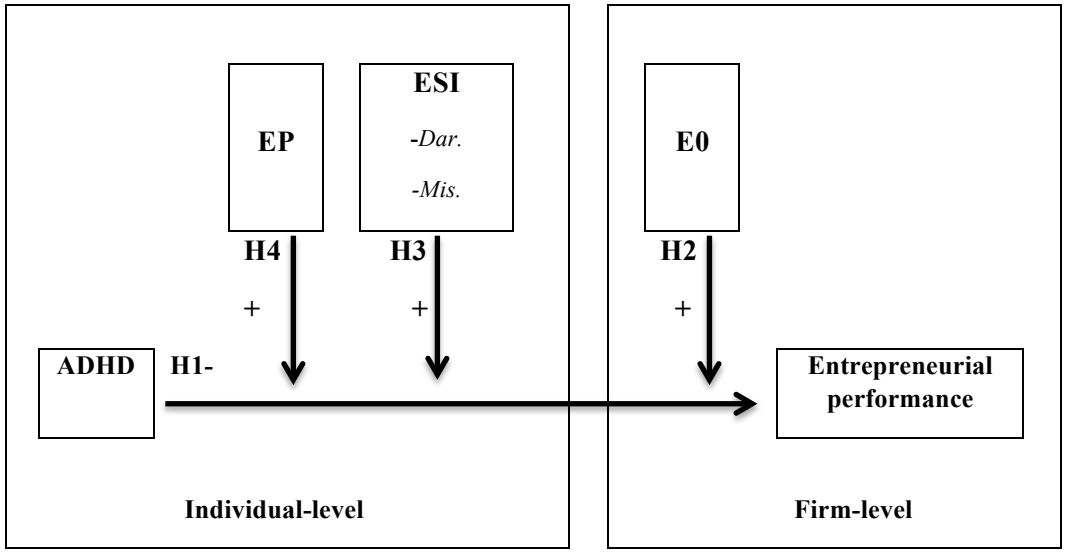
persistence and drive entrepreneurial action (Cardon, Wincent, Singh & Drnovsek, 2005). Next to that, passion is closely related to tenacity, which helps people to overcome obstacles and to sustain energy in achieving their goal (Murnieks et al., 2015; Baum & Locke, 2004). Summarizing, these findings lead to the assumption that the experience of EP supports continuation based on intrinsically felt devotion to the entrepreneurial action. Hence, it is hypothesized that experiencing EP enhances goal-orientation and enables a moderation of the former negative ADHD-entrepreneurial performance relation. This assumption is converted into the following hypothesis:

Hypothesis 4: The negative relation between the experienced amount of ADHD-symptoms and entrepreneurial performance in entrepreneurs becomes weaker through reporting high levels of entrepreneurial passion.

2.1 Theoretical model

Figure 1 presents the graphical representation of the above-formulated hypotheses. It consists out of two levels: the individual- and the firm-level. ADHD, EP and ESI operate at the individual-level, whereas EO and entrepreneurial performance take place at the firm-level. The three constructs of EP, ESI and EO are expected to work as moderators and weaken the former negative relationship between ADHD and entrepreneurial performance.

Figure 1. Theoretical model



3. Method

3.1 Data collection and sample

Data has been collected using three different distribution channels. First, potential entrepreneurs have been approached via social media and e-mail. For this reason, the link to the online survey was exclusively shared in groups on 'LinkedIn' and 'Facebook', which gave reason to expect that entrepreneurs would be members of the group (e.g. 'Amsterdam Startups' or 'Millennial Entrepreneur Community'). The online survey has been created with the help of the survey-creation program 'limesurvey'. As a second approach, companies have been called. In sorting the ORBIS database by size (<20 employees) and region (Amsterdam, Enschede, Hanover and Berlin) suitable companies have been identified. During the phone call, entrepreneurs indicated their e-mail addresses and received the survey via mail thereafter. As a last channel, paper and pencil versions of the survey have been directly distributed to entrepreneurs during entrepreneurial events, like meet-ups or funding events.

Using verified sampling methods increased the scope of potential participants. Still, the sampling method remains a convenience sampling, as entrepreneurs participated who were relatively easy to approach. The major drawback of convenience sampling is its bias producing effect (Bryman & Bell, 2011). As the researcher influences the selection of participants, the sample becomes non-random, which impedes the validity of the results later on. However, using a convenience sample has been a conscious decision in this research. First, the literature review unveiled that a convenience sampling approach is a common sampling method in entrepreneurial research (Lerner, 2016; Thurik et al., 2016). This is not surprising, considering the limited accessibility of entrepreneurs. Incubators and accelerators exist in high amounts, but partnerships and agreements of sharing surveys with clients are limited. Second, this master thesis project had a restricted time frame. Even though it was possible to increase the scope of participants from a local to a national scale, global, random sampling would have impeded the time schedule of this project.

In total 210 people started to fill in the online survey. Several participants did not fulfill the inclusion-criteria, as they did not start their own business or did not fill in the survey completely. Therefore, the final sample size consists out of 103 entrepreneurs (drop-off-rate=51%).

3.2 Measures

Dependent variable entrepreneurial performance: To measure entrepreneurial performance, the measure of Wiklund and Shepherd (2003) has been used, which captures performance two-dimensionally. As in Wiklund and Shepherd (2003), four items measure the importance of and satisfaction with *financial performance.* Entrepreneurs were asked (1) how important it is for them to reach goals like for example 'sales growth' and 'revenue growth' in running their firm and (2) how satisfied they are in achieving this goal. In indicating the degree of importance of and satisfaction with reaching goals like 'process innovation' and 'adoption of new technology', *operational performance* was measured (6 items). All of the ten subjective estimates were indicated on a 5-point-Likert-Scale (ranging from '*strongly disagree'* to '*strongly agree'*). This research's sample had an average scale score of 36.58, a standard deviation of 4.92 and sufficient reliability scores for both, the financial (Cronbach's α= 0.55) and the operational performance scale (Cronbach's α=0.63).

Independent variable ADHD. To measure the degree of existing ADHD symptoms, the *ADHD-Self-Report-Screener* (ASRS-6) has been used. The ASRS-6, developed by the World Health Organization (WHO), is a short version of the original, 18-item-containing, '*Adult ADHD Self Report Scale v1.1'* (ASRS). The original version of the ASRS assesses the eighteen criteria of ADHD that have been formulated by the American Psychiatric Association in their diagnostic manual DSM-IV (APA, 2013). The short form of the self-assessment survey screens the presence of ADHD symptoms in adults. Respondents receive six questions, which are related to one of the following two factors: attention deficit or hyperactivity-impulsivity (Hesse, 2013). The answers are given on a 5-point Likert-Scale, ranging from 'never' to 'very often'. Kessler et al. (2007) evaluated the ASRS-6 as having an 'adequate sensitivity (68.7%), excellent specificity (99.5%), excellent total classification accuracy (97.9%)…' (p.53). In achieving these high evaluations, the short-form has outperformed the original 18-item ASRS (Kessler et al., 2007). The sample group had mean scale scores of 16.51 and a standard deviation of 4.08. The reliability turned out to be satisfying (Cronbach's α=0.74).

Moderators

Entrepreneurial Orientation. The '*Miller/Covin and Slevin EO Scale'* measured the degree of entrepreneurial orientation in respondents (Covin & Slevin, 1989). This survey consists out of nine items that are scored on a 5-point Likert-Scale to indicate the individual level of agreement with each statement (ranging from *'strongly disagree*' to *'strongly agree'*). Each of the three EO dimensions proposed by Miller (1989), risk-taking, innovativeness and pro-activeness, are measured by three items. The survey is frequently used and achieved a good reliability (Cronbach's $\alpha>0.7$) and a sufficient construct validity ($X>0.60$; Thurik et al., 2016). In this research's sample the mean scale score was 27.54 (SD=4.08). A Cronbach's α score of 0.71 indicated a sufficient reliability.

Entrepreneurial Social Identity. For measuring entrepreneurs social identity, the '*Entrepreneurial Social Identity-Scale*' has been used (Sieger et al., 2016). This scale consists out of 15 items. A set of five statements measures the distinct identities of Darwinians, Communitarians and Missionaries respectively. The strength of agreement concerning the statements is indicated on a 5-point Likert-Scale ('*strongly disagree'* to '*strongly agree'*). During its development, the scale received a sound convergent validity ($p<0.001$) and a confirmation of the nine factor constructs structure (Sieger et al., 2016). The scale has been validated in 12 different countries and achieved satisfying factor loadings (Cronbach's $\alpha>0.5$) and internal fit ($CFI>0.95$) (Sieger et al., 2016). This corresponds to the findings of the current study, which had a Cronbach's α of 0.82. The mean scale scores of the Darwinian and Missionarian scale have been 17.8 (SD=3.67) and 17.5 (SD=4.9) respectively.

Entrepreneurial passion. To control for effects of entrepreneurial passion, the scale of Cardon, Gregoire, Stevens and Patel (2013) has been utilized. The scale consists out of 13 questions, which are divided into the two different EP-components: 'intense positive feelings' and 'identity centrality'. Both components are split up into three different identity domains: inventing, founding and developing. The intense positive feeling scale contains 4 items for each category, whereas intense positive feelings of the three identity domains are each measured with one item. The scale item score was 53.16 (SD=7.49). The scale achieved a satisfying reliability (Cronbach's $\alpha=0.85$).

Controls

Entrepreneurial check. Before measuring EO, one question validated whether the respondents have founded their own business. These respondents were identified as entrepreneurs. The following question formulated by Delmar & Davidsson (2000) was posed at the beginning of the survey: 'In your working life, have you started a new business?'. Answering 'yes' was an inclusion criterion. A negative answer was causing the survey to stop. Handling this inclusion/exclusion criterion, defines entrepreneurship as an "occupational category' (Gorgievski & Stephan, 2016). This approach assumes that an entrepreneur needs to have *founded* a business rather than performing actual entrepreneurial processes and actions (Gorgievski & Stephan, 2016).

Job satisfaction. Former research found an effect of the amount of job satisfaction on entrepreneurial performance (Judge, Thoresen, Bono & Patton, 2001). To assess this potential effect of job satisfaction on entrepreneurial performance, four items were taken from the 'Nature of work'-subscale of the '*Job Satisfaction Survey'* (Spector, 1985). They measured the participants' amount of job satisfaction. Respondents indicated the strength of their agreement with each statement on a 5-point Likert-Scale (*'strongly disagree'* to *'strongly agree'*). In this sample, participants achieved mean scores of 17.71 and a standard deviation of 2.47. Moreover, the results reveal a satisfying reliability (Cronbach's α=0.82).

Upward generalization. To control for possible exaggerated answers, the 'Upward Generalization'-Subscale has been added to the test battery. The set of five statements is part of the '*Positive Overgeneralization Scale*' (POG) (Eisner, Johnson & Carver, 2008). Respondents indicate their degree of agreement with the statements on a 5-point-Likert-Scale ('*I disagree a lot'* to *'I agree a lot'*). The scale received a sufficient internal consistency score (Cronbach's α=0.74). This sample had a mean score of 11.68 and a standard deviation of 4.26.

Demographics and company specification. To control for several demographic variables, the individual characteristics 'gender' and 'age', have been assessed. Next to these personal attributes, possible influencing firm factors have been measured, too. Thus, questions concerning 'firm size' (micro/small/middle) and 'industry' (high-tech/non-high-tech) have been posed at the end of the survey.

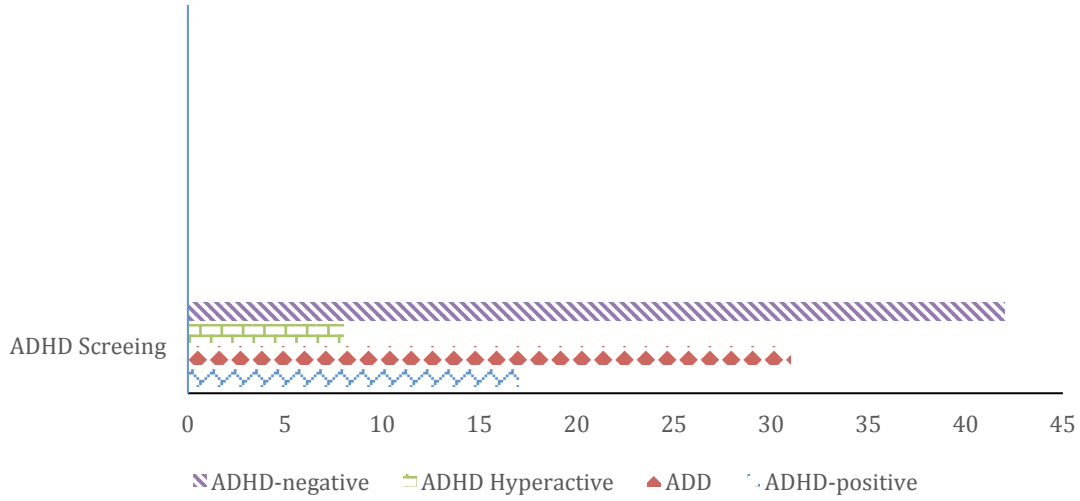
3.3 Statistical analysis

The analysis of the data has been conducted with the help of the statistical program SPSS-24. In a first step, the sample means, reliabilities and factor distributions have been identified. In a second step, correlations between scales and subscales have been calculated. This unveils first trends of relationships between the distinct variables. Finally, a multiple regression analysis has been performed. For this, the approach of Aiken & West (1991) was applied. To increase the meaningfulness of the achieved results, total scale and sub-scale scores were mean-centered (Paccagnella, 2006). In a first step the control variables job satisfaction, upward generalization, gender, age, firm size and industry have been entered in the regression model. Their relationship to entrepreneurial performance was indicated in the SPSS-output and is reported in the result-section below. In a next step, the independent variable ADHD and the expected moderator variables have been added the basic regression model. The amount of change in the model's predictive value (FChange), indicated in how far adding the variables increased the predictive value of the whole model. In a third step, the moderation hypotheses have been tested. For this purpose, mean-centered interaction terms of ADHD and the moderating variables have been calculated and included in the second regression model (Jaccard, Turrisi & Wan, 1990). A significant effect of the interaction term indicated the presence of a moderation effect. This procedure enabled testing the four proposed hypotheses. Subsequently, a post-hoc analysis has been conducted. This enabled a deeper understanding of the obtained results. Hence, the regression analysis has been repeated for each of the two ADHD dimensions ADD and ADHD-hyperactive.

4. Results

First, the existence of ADHD patterns have been assessed (see Figure 3). Based on the scores on the ASRS-6, respondents were divided into one of the four screening groups: ADHD-negative, ADD, ADHD-hyperactive and ADHD positive. The grouping rested upon the follwing cut-off scores: individuals attaining a score of 7 and above on the two hyperactive items screened positive for the ADHD-hyperactive group (WHO, 2003; Hesse, 2013). Participants with a score higher than 9 on the remaining 4 inattentive items were classified as ADD-affected. Being identified as as positive ADHD-hyperactive and ADD screener, led to an ADHD positive categorization. Individuals who met non of the ADHD positive, ADD or ADHD-hyperactive criteria were categorized as ADHD-negative screeners. Figure 2 presents the graphical representation of the results. Half of the sample (42%) achieved a ADHD-negative screening result. The remaining 58 percent screened positive, with a majority of ADD screeners (32%). 17 percent were ADHD-positive screeners. Concluding, the sample consisted out of a balanced distribution of negative and positive ADHD screeners.

Figure 2. Distribution of ADHD Screening Scores



Second, a general and an ADHD-split descriptive analysis has been performed. Table 1 presents the descriptive values for the four distinct groups. Interestingly, more women than men screened positive for ADHD (9:8; $p<.1$). In the remaining categories, respondents scored quite similar. The average entrepreneur is 37 years old, graduated from university, unmarried and childless. Their businesses are in average 5 years old, operate in the high-tech industry and employ 11 employees. Table 2 presents the overall mean-scores and standarddeviations of the applied scales.

4.1 Reliability and validity check

Calculating the reliability of the scales and subscales revealed that the entrepreneurial-innovationeness-scale reliability suffers from decreased reliability due to its first item: 'In general, my firm puts a strong emphasis on the marketing of tried-and-true products or services.'. The confirmatory factor analysis supporrted this deviation from the remaining items. These patterns led to the deletion of this item and with that to a satisfying Cronbach's alpha ($\alpha>.6$). To ensure scale reliability, the following items 'How important is it to you to reach growth in the number of employees?' (Financial performance) and 'Inventing new solutions to problems is an important part of who I am.' (Entrepreneurial passion-Identity centrality) are excluded from the analysis. In doing so, satisfying reliability and factor loadings of the constructs are ensured.

4.2 Correlational analysis

To reveal first tendencies for possible relationships between scales, a correlational analysis between constructs has been conducted (see Table 4). Entrepreneurial performance scores are significantly and positivly related to job satisfaction, ESI Darwinian, Missionarian and EP. ADHD scores show a positive relation with the upward generalization scale ($r=.22$, $p<.05$) and no relation to the expected moderators and the dependent variable entrepreneurial performance ($p>.1$). However, the subscale ADHD-hyperactive displays signifcant relations to ESI Darwinian/Missionarian and EP ($p<.05$). EP turned out to be highly related to entrepreneurial performance, job satisfaction, ADHD-hyperactive, ESI Darwinian and Missionarian ($p<.05$). EO is not linked to any of the other scales ($p>.1$).

Table 1. Sample characteristics

	Age	Year of foundation	Married	No children	Co-founders	High-tech Industry	University degree	Employees	Females	Males
ADHD positive	36	2011	7	7	2.27	7	8	13	9	8
ADD	35	2013	11	19	1.33	15	19	17	6	25
ADHD-hyper.	35	2007	3	6	1.88	2	5	9	2	6
ADHD negative	38	2011	15	24	1.7	29	24	10	9	33
Total	37	2011	36	56	1.72	53	59	11	26†	77†

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Table 2. Scale descriptives

	Entr. performance	JS	UG	ADD	ADHDHyper	ADHD	EO	ESIDar	ESI Com	ESI Mis	EP
Mean	36.58	17.71	11.68	10.12	6.41	16.51	27.54	17.8	17.54.	17.5	53.16
SD	4.92	2.47	4.26	2.97	1.8	4.08	3.67	3.67	4.81	4.9	7.49

Table 3. Reliability-analysis

Scale	Cronbach's α
EO	.71
EO Inno	*.63*
EO Pro	.53
EO Risk	.68
ESI	.82
ESI Darwinian	.65
ESI Missionarian	.85
ESI Communitarian	.85
EP	.85
EP Inventing	.77
EP Founding	.79
EP Developing	.74
EP Identity Centrality	*.61*
UG	.74
JS	.82
Performance	.59
Performance Financial	*.55*
Performance Operational	.63
ADHD	.74

Table 4. Correlation analysis

	Performance	JS	UG	ADD	ADHD-H.	ADHD	EO	ESI-Dar.	ESI-Com.	ESI-Mis.	EP
Performance	1	.2*	.14	.13	.12	.14	-.09	.24*	0.18	.22*	.42**
JS	.2*	1	-.15	-.27	.12	-.15	.17	.12	.3**	.21*	.27**
UG	.14	-.15	1.00	.19	.2*	.22*	.07	.13	-0.13	.08	.15
ADD	.13	-.27	.19	1	.41**	.91**	.04	-.01	.05	.09	-.05
ADHD-H.	.12	.12	.2*	.41**	1	.75**	.07	.21*	.12	.2*	.33**
ADHD Total	.14	-.15	.22*	.91**	.75**	1	.05	.08	.10	.16	.11
EO	-.09	.17	.07	.04	.07	.05	1	0.00	-.01	.03	0.00
ESI Darwinian	.24*	.12	.13	-.01	.21*	.08	0.00	1	.10	.06	.33**
ESI Communit.	.18	.3**	-.13	.05	.12	.10	-.01	.10	1	.52**	.10
ESI Missionarian	.22*	.21*	.08	.09	.2*	.16	.03	.06	.52**	1	.21*
EP	.42**	.27**	.15	-.05	.33**	.11	0.00	.33**	.10	.21*	1

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

4.3 Regression analysis

First, the control variables job satisfaction, upward generalization, age, gender, firm size and industry are entered in the regression model. This basic model turned out to be of no significant value in predicting entrepreneurial performance (F=1.39; p>.1). Adding ADHD as predictor does not result in a significant increase of predictive value of the model (FChange=.131; p>.1). Hypothesis 1 is therefore rejected.

Table 5.1. Regression analysis (H1)

	Model 1	Model 2
Job satisfaction	.43	.45
Upward generalization	.23	.22
Age	-.08	-.08
Gender (male)	-1.99	-1.85
Firm size	.53	.58
Industry	-1.02	-1.13*
ADHD		.06
R	.35	.35
R Squared	.12	.12
Adjusted R Squared	.04	.02
F	1.39	1.2
F Change	1.39	.131

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

To test the hypothesized positive impact of EO on the negative ADHD-entrepreneurial performance relation, ADHD and EO are included to the model. This inclusion adds moderate predictive value (FChange=3.2: p<.1). However, the overall predictive value of the model is not significant (F=1.92; p>.1). To test the moderating effect of EO on the ADHD-entrepreneurial performance relation, the interaction term ADHD*EO has been added. This did not increase the predictive value of the model (FChange=.06; p>.1). Based on these results, hypothesis 2 is rejected.

Table 5.2. Moderation analysis ADHD*EO (H2)

	Model 1	Model 2	Model 3
Job satisfaction	.43	.58	.58*
Upward generalization	.23	.23	.23
Age	-.08	-.08	-.08
Gender (male)	-1.99	.-1.66	-1.58
Firm size	.53	.96	.94
Industry	-1.02	-1.01	-1.08
ADHD		.09	.09
EO		-.42*	-.44*
ADHD*EO			-.01
R	.35	.46	.46
R Squared	.12	.21	.21
Adjusted R Squared	.04	.1	.09
F	1.39	1.92	1.69
F Model Change	1.39	3.2†	.06

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

The expected moderation-effect of the Darwinian identity on the ADHD-entrepreneurial performance relation, is assessed in adding ESIDarwinian and ADHD to the basic regression model. ESIDarwinian turns out to be of significant value in predicting entrepreneurial performance (B=.46, p<.05). The inclusion of ESIDarwinian and ADHD resulted in a significant predictive value increase of the model (FChange=3.2; p<.05). Despite the positive ESIDarwinian-entrepreneurial performance relation, the moderation effect of ESIDarwinian cannot be confirmed. The inclusion of the interaction term ADHD*ESIDarwinian turned out to be non-significant (B=.59; p=.15). Therefore hypothesis 3a needs to be rejected.

Table 5.3. Moderation analysis ADHD*ESIDarwinian (H3a)

	Model 1	Model 2	Model 3
Job satisfaction	.43	.31	.31
Upward generalization	.23	.15	.15
Age	-.08	-.06	-.06
Gender (male)	-1.99	-2.3	-1.96
Firm size	.53	-1.9	-.27
Industry	-1.02	-.78	-.85
ADHD		.08	.05
ESI(Dar)		.46*	.43
ADHD*ESIDar			-.07
R	.35	.46	.49
R Squared	.12	.21	.24
Adjusted R Squared	.04	.1	.12**
F	1.39	1.92†	2.01*
F-Change	1.39	3.2*	2.37

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Unlike ESIDarwinian, ESIMissionarian had no significant value in prediciting entrepreneurial performance (B=.42:p>.1). There are no significant increases after adding ADHD, ESIMissionarian or the interaction term ADHD*ESIMissionarian to the model (p>.1). Hence, hypothesis 3b gets rejected.

Table 5.4. Moderation analysis ADHD*ESIMissionarian (H3b)

	Model 1	Model 2	Model 3
Job satisfaction	.43	.42	.45
Upward generalization	.23	.22	.22
Age	-.08	-.08	-.08
Gender (male)	-1.99	-1.86	-1.83
Firm size	.53	.62	.7
Industry	-1.02	-1.05	-1.1
ADHD		.05	.05
ESI(Missionarian)		.42	.03
ADHD*ESIMis			-.01
R	.35	.35	.36
R Squared	.12	.13	.13
Adjusted R Squared	.04	.05	-.01
F	1.39	1.92†	.92
F-Change	1.39	.108	.08

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Table 5.5 reports the significant increase in prediciting entrepreneurial performance when EP and ADHD are added to the model (FChange=5.59; p<.01). The interaction term in model 3 is significant (B=.05; p<.05). In case of high entrepreneurial passion, the relationship between ADHD and entrepreneurial performance gets enhanced. Thus, EP moderates the relationship of ADHD and entrepreneurial performance. Hypothesis 4 is confirmed.

Table 5.5. Moderation analysis ADHD*EP (H4)

	Model 1	Model 2	Model 3
Job satisfaction	.43	-.06	-.02
Upward generalization	.23	.06	.12
Age	-.08	-.04	-.04
Gender (male)	-1.99	-1.73	-1.3
Firm size	.53	-.25	-.09
Industry	-1.02	-.86	-.82
ADHD		-.1	-.01
EP		.29**	.32*
ADHD*EP			.05*
R	.35	.51	.56
R Squared	.12	.26	.31
Adjusted R Squared	.04	.16	.2
F	1.39	2.6†	2.84**
F Change	1.39	5.59**	3.78*

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Table 6 summarizes the results of the tested hypotheses. Except hypothesis 4, all hypotheses are rejected.

Table 6. Overview hypotheses assessment

Hypothesis	Content	Rejected	Confirmed
1	*Negative relation ADHD and entrepreneurial performance*	X	
2	*Moderation EO*	X	
3	*Moderation ESI a) Darwinian and b) Missionarian*	X	
4	*Moderation EP*		X

4.4 Post-hoc analysis

To assess possible different relationships in ADD and ADHD-hyperactive entrepreneurs, the analysis is repeated with a split of the independent variable ADHD. Below, the reults of the analysis with (1) ADD and (2) ADHD-hyperactive are presented.

Including ADD to the control model does not cause any significant changes in the model's predictive value ($F=1.38$; $p>.1$).

Table 7. Regression analysis ADD

	Model 1	Model 2
Job satisfaction	.43	.54†
Upward generalization	.23	.23†
Age	-.08	-.09
Gender (male)	-1.99	-1.33
Firm size	.53	.64
Industry	-1.02	-1.33
ADD		.244
R	.35	.37
R Squared	.12	.14
Adjusted R Squared	.04	.04
F	1.39	1.38
F Change	1.39	1.1

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

In the ADD model, the control variable upward generalization is moderately predicting entrepreneurial performance. The model is of moderate predictive value (F=2.21, p<.1).

Table 7.1. Moderation analysis ADD*EO

	Model 1	Model 2	Model 3
Job satisfaction	.43	.69	.6*
Upward generalization	.23	.24†	.26†
Age	-.08	-.09	-.09†
Gender (male)	-1.99	-1.53	-1.94
Firm size	.53	1.05	1.05
Industry	-1.02	-1.24	-1
ADD		.31	.3
EO		-.44	-.37
ADD*EO			-.23
R	.35	.48	.5
R Squared	.12	.23	.25
Adjusted R Squared	.04	.13	.13
F	1.39	2.21†	2.12**
F Change	1.39	4.14*	1.33

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Including ADD and ESIDarwinian to the control-model resulted in a significant increase of predictive value (FChange=4.36; p<.05). ESIDarwinian is positively related to entrepreneurial performance. Adding the interaction term ADD*ESIDarwinian leads to a sufficient predictive value of the model (FChange=2.4; p<.05). The coefficient of the interaction term ADD*ESIDarwinian is negative and does predict entrepreneurial performance significantly (B=-1.3; p<.05). Thus, obtaining high scores on the ESI Darwinian identity weakens the ADD-entrepreneurial performance relation. In case of ADD, ESIDarwininan is moderating the ADD-entrepreneurial performance relation negatively.

Table 7.2. Moderation analysis ADD*ESI Darwinian

	Model 1	Model 2	Model 3
Job satisfaction	.43	.42	.44
Upward generalization	.23	.15	.14
Age	-.08	-.06	-.07
Gender (male)	-1.99	-2.14	-1.67
Firm size	.53	-.16	-.32
Industry	-1.02	-1.1	-1.21
ADD		.33	1.88*
ESIDar		.49**	.52**
ADD*ESIDar			-1.3*
R	.35	.49	.52
R Squared	.12	.27	.27
Adjusted R Squared	.04	.13	.16
F	1.39	2.27*	2.4*
F Change	1.39	4.36*	2.85*

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

Unlike the ESIDarwinian-entrepreneurial performance relation, no significant relations have been found in the moderation-analysis of ADD and the Missionarian identity (see table 7.3).

Table 7.3. Moderation analysis ADD*ESI Missionarian

	Model 1	Model 2	Model 3
Job satisfaction	.43	.51	.53
Upward generalization	.23	.23	.23
Age	-.08	-.08	-.08
Gender (male)	-1.99	-1.72	-1.73
Firm size	.53	-.68	.73
Industry	-1.02	-1.72	-1.31
ADD		.24	.23
ESIMis		.03	.03
ADD*ESIMis			.02
R	.35	.37	.37
R Squared	.12	.14	.14
Adjusted R Squared	.04	.02	.01
F	1.39	1.19	1.05
F Change	1.39	.58	.03

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

The relation that was observed in the ADHD-EP analysis is found again in the ADD-EP regression analysis. ADD*EP is significantly and positively related to entrepreneurial performance ($p<.05$). High scores of EP increase the predictive value of ADD on entrepreneurial performance. Hence, a moderation-effect of EP on the ADD-entrepreneurial performance relation is at hand. The predictive value of the model ($F=2.84$; $p<.01$) and the change in predicative value are significant ($FChange=2.27$; $p<.1$).

Table 7.4. Moderation analysis ADD*EP

	Model 1	Model 2	Model 3
Job satisfaction	.43	.07	-.08
Upward generalization	.23	.07	.11
Age	-.08	-.05	-.05
Gender (male)	-1.99	-1.39	-1.01
Firm size	.53	-.06	-.08
Industry	-1.02	-1.21	-1.17
ADD		.14	.01
EP		.27**	.32*
ADD*EP			.05*
R	.35	.512	.54
R Squared	.12	.27	.29
Adjusted R Squared	.04	.16	.18
F	1.39	2.6†	2.84**
F Change	1.39	5.62**	2.27†

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.10

No increase in predictive value is observed when entering ADHD-hyperactive into the basic model.

Table 8. Regression analysis ADHD-hyperactive

	Model 1	Model 2
Job satisfaction	.43	.55
Upward generalization	.23	.22
Age	-.08	-.09
Gender (male)	-1.99	-2.14
Firm size	.53	.66
Industry	-1.02	-.78
ADHD Hyper		-.2
R	.35	.36
R Squared	.12	.13
Adjusted R Squared	.04	.04
F	1.39	1.38
F Change	1.39	.00

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

As in ADD, the moderate relation between upward generalization and entrepreneurial performance remains. Job satisfaction and entrepreneurial performance are significantly and positively related. The amount of change in the predictive value of the model is significant (FChange=2.56; p>.1).

Table 8.1. Moderation analysis ADHDHyperactive*EO

	Model 1	Model 2	Model 3
Job satisfaction	.43	.66*	.65*
Upward generalization	.23	.24†	.29*
Age	-.08	-.09	-.07
Gender (male)	-1.99	-1.99	-1.67
Firm size	.53	1.14	1.09
Industry	-1.02	-.55	-.89
ADHD Hyper		-.2	-.05
EO		-.41	-.43
ADHD Hyper*EO			.27
R	.35	.46	.5
R Squared	.12	.21	.25
Adjusted R Squared	.04	.11	.14
F	1.39	2.12†	2.21*
F Change	1.39	3.41*	2.56

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

As in the former analysis, a positive relation between ESIDarwinian and entrepreneurial performance has been found (P<.05). However, the strength of the ESI Darwinian-entrepreneurial performance relation was lowered to a moderate predictive value (F=1.77, p<.1).

Table 8.2. Moderation analysis ADHDHyperactive*ESIDarwinian

	Model 1	Model 2	Model 3
Job satisfaction	.43	.44	.45†
Upward generalization	.23	.16	.13
Age	-.08	-.07	-.08
Gender (male)	-1.99	-2.66†	-2.58
Firm size	.53	-.02	.08
Industry	-1.02	-.38	-.39
ADHD Hyper		-.29	1.45
ESIDar		.41*	.39*
ADHD Hyper*ESIDar			-.89
R	.35	.44	.46
R Squared	.12	.2	.21
Adjusted R Squared	.04	.09	.09
F	1.39	1.89†	1.77†
F Change	1.39	2.62†	.81

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

No significant relation could be found in the ESIMissionarian-ADHD-hyperactive model (p>.1).

Table 8.3. Moderation analysis ADHDHyperactive*ESIMissionarian

	Model 1	Model 2	Model 3
Job satisfaction	.43	.52	.54
Upward generalization	.23	.22	.21
Age	-.08	-.09	-.09
Gender (male)	-1.99	-2.16	-2.07
Firm size	.53	.75	.74
Industry	-1.02	-.66	-.62
ADHD Hyper		-.25	.43
ESIMis		.07	.07
ADHD Hyper*ESIMIS			-.36
R	.35	.37	.37
R Squared	.12	.14	.14
Adjusted R Squared	.04	.02	.01
F	1.39	1.22	1.09
F Change	1.39	.27	.22

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

The moderation analysis of EP in the ADHD-hyperactive-entrepreneurial performance model turned out to result in a significant predictive value of the model (F=3.22, p<.01). EP is strongly positive related to entrepreneurial performance, whereas ADHD-hyperactive is negatively related to entrepreneurial performance. The interaction term ADHDHyperactive*EP is negative but not significantly related to entrepreneurial performance. Thus, a moderating effect of EP on the ADHD-entrepreneurial performance relationship is not found in ADHD-hyperactive entrepreneurs.

Table 8.4. Moderation analysis ADHDHyperactive*EP

	Model 1	Model 2	Model 3
Job satisfaction	.43	.1	.14
Upward generalization	.23	.08	.1
Age	-.08	-.06	-.05
Gender (male)	-1.99	-2.05	-1.64
Firm size	.53	-.14	.06
Industry	-1.02	-.65	-.68
ADHD Hyper		-.65†	-.64†
EP		.32***	.34***
ADHD Hyper*EP			-.14
R	.35	.54	.57
R Squared	.12	.29	.32
Adjusted R Squared	.04	.2	.22
F	1.39	3.17**	3.22**
F Change	1.39	7.07**	2.85†

Note: Coefficients (two-tailed p-values); ***p<.001, **p<.01, *p<.05, †p<.1

5. Discussion

This research has been conducted to understand the relationship between ADHD and entrepreneurial performance better. Different to the expected negative relationship, no direct relation between ADHD and entrepreneurial performance has been found. Nevertheless, this research identified the important role of the individual-level variable entrepreneurial passion in the ADHD-entrepreneurial performance relation. Experiencing high amounts of EP enhances the relationship between ADHD and entrepreneurial performance. Furthermore, the Darwinian identity was significantly positive related to entrepreneurial performance. However, the post-hoc analysis unveiled that having the Darwinian identity weakens the ADD- entrepreneurial performance relationship.

5.1 Contribution to theory

As the direct relation between ADHD and entrepreneurial performance has not been assessed yet, this research contributes to existing literature in manifold ways. First, ADHD symptoms and firm-level variables like EO turned out to affect entrepreneurial performance to a lower degree than did individual-level variables like entrepreneurial social identity and entrepreneurial passion. This finding emphasizes the importance of individual-level variables for entrepreneurial success. Second, a high degree of entrepreneurial passion was beneficial for the ADHD-entrepreneurial performance relation. This is of special interest for the entrepreneurial research field as it offers the opportunity to increase performance in entrepreneurs who are affected by mental disorders like ADHD. This knowledge promotes the de-stigmatization of mental illnesses in the business context. To encourage future research, the following section considers explanations of the findings and suggestions for upcoming research.

The literature review gave reason to expect a direct ADHD-entrepreneurial performance relation (e.g. Hmieleski & Lerner, 2016; Thurik et al., 2016: Rauch et al., 2009). However, neither a negative nor a positive relationship has been found. Interestingly, individual, motivational factors turned out to be of higher value in predicting entrepreneurial performance. Considering insights from the field of positive psychology constitutes a first step in explaining these findings. In their fundamental work, Seligman and Csikszentmihalyi (2000) emphasized the value of personal attributes for the individual. According to these authors, a focus on individual strengths instead of individual weaknesses will promote well-being in the future and will decrease the existence of mental disorders (Seligman & Csikszentmihalyi, 2000). Applying this line of reasoning to the current findings clarifies the lacking predictive value of ADHD. The weaknesses that are connected to ADHD get secondary when personal, motivational factors as entrepreneurial passion come into play. Appropriate to the core assumption of Seligman & Csikszentmihalyi (2000), emphasizing the impact of the weak attribute

'ADHD' on entrepreneurial performance is decreasing when personal, strong attributes are present. This intrinsic motivation encourages behavior that is benefitting performance (Bohlmeijer, Bolier, Westerhof & Walburg, 2015).

Related to this thought of the encouraging effect of motivational processes, the Darwinian entrepreneurial social identity is found to be related positively to entrepreneurial performance. Obtaining high scores on the ESI-scale is related to increased amounts of entrepreneurial motivation. This entrepreneurial motivation is high, due to intrinsic convictions (Fauchart & Gruber, 2011). As Murnieks et al. (2014) pointed out, pro-active-motivation is connected to carrying out intended actions. This means that if those convictions exist, the personal willingness to perform increases accordingly. In the current research entrepreneurs adopting the Darwinian identity were the only ones who were showing a significant relation to entrepreneurial performance. This suits the findings of Hoogendoorn, van der Zwan and Thurik (2011). These authors found that commercial entrepreneurship was positively related to venture survival. Commercially oriented entrepreneurs showed less fears regarding financial barriers and bankruptcy (Hoogendoorn et al., 2011). Contrarily, social entrepreneurs were less successful (Hoogendoorn et al., 2011). The Darwinian entrepreneur is per definition commercially orientated. This includes considering profitability and weighting risks and benefits on a rational basis (Hoogendoorn et al., 2011; Fauchart & Gruber, 2011). Having a clear achievement goal fosters goal-directed behavior and organizational action (Alsos et al., 2016). This in turn leads to increased success of Darwinian entrepreneurs compared to the socially motivated Communitarians and Missionarians in general.

However, entrepreneurs affected by ADD showed decreased performance scores when having high scores on the Darwinian identity. Hence, these entrepreneurs need to be rather demotivated than motivated by commercial goals. To explain this pattern, the difference in commercial and social entrepreneurs is reconsidered. Having Darwinian identity is related to long-term, commercial results (Fauchart & Gruber, 2011). ADD-affected entrepreneurs have difficulties in sustaining attention (Wiklund et al., 2016). As the commercial cognitions are related to a long-term focus, they are insufficient in motivating the ADD-affected entrepreneur ad hoc. However, those entrepreneurs are in special need of an immediate motivation boost. This boost withholds them from being distracted and from engaging themselves in too many projects (Wiklund et al., 2016). Wiklund et al. (2016) state that 'Entrepreneurs with ADHD are likely to engage in actions that are intuitive, proactive and risky' (p.18). This is opposing to the monetary motivation of the Darwinian identity, as it considers possible failure, too (Lumpkin & Dess, 1996). Thus, the Darwinian identity harms the advantageous characteristic of ADHD-affected entrepreneurs. Furthermore, ADHD-affected individuals are attracted by the freedom and independency that the entrepreneurial field offers (Verheul et al., 2016). Hence,

the monetary focus of the Darwinian identity is incompatible with these independency-intentions of the ADD-affected entrepreneurs.

The core of entrepreneurial social identity is connected to motivational, goal-directed behavior (Fauchart & Gruber, 2011). The same holds true for the second individual-level variable entrepreneurial passion. Despite the Darwinian identity, EP has a strengthening influence on the ADHD-entrepreneurial performance relationship. Both, entrepreneurial social identity and entrepreneurial passion are motivational variables. One possible explanation for the reported difference is the time aspect underlying both variables. Passion is an *emotion*, whereas perceived identity is a *cognition* (Cardon et al., 2005; Fauchart & Gruber, 2011). As emotions have a short time frame, the entrepreneur who is experiencing passion gets motivated immediately (Weiner, 1985). Contrarily, entrepreneurial social identity sets values related to the goal, implying a long-term orientation (Fauchart & Gruber, 2011). Individuals who are engaging themselves in entrepreneurial actions are operating in a fast-changing environment (Almeida et al., 2014). Here, short-term motivation works as the switch to boost motivation and enhances entrepreneurial performance. Taking this to the ADHD context, the short-term boost fosters automatic goal-directed behavior, also known as habits (Aarts & Dijksterhuis, 2000). Habits emerge when '…selecting and performing the same goal-directed behavior frequently and consistently [which] leads to associations between goal and instrumental actions' (Aarts & Dijksterhuis, 2000; p.54). Thus, to establish habits one needs to have a goal, which one desires to achieve on a frequent basis. Having problems in keeping attention (hyper-focus), works against this goal-action relationship (Sagvolden et al., 2005). However, hyperactivity can also enable simultaneous engagements into actions that lead to former set goals (Thurik et al., 2016). At this point the emotional component, entrepreneurial passion, starts to operate. As Cardon et al. (2009b) explored, EP launches a self-regulation process, which motivates the individual to manage problems and to continue working. Thus, the difficulties in organizing oneself are moderated by the self-regulation process initiated by experiencing entrepreneurial passion. In line with that, intense positive emotions were found to be related to entrepreneurial engagement (Cardon, 2005). Consequently, they lead to a greater perception of the significance to reach a goal (Carsrud & Brännback, 2011). Hence, passion sets the foundation for goal-directed behavioral mechanisms, which are the basis for developing habits in the long run. Summarizing, the boundless degrees of energy that ADHD-affected individuals experience, are channeled by feelings of passion towards achieving the goal (here: being an entrepreneur). This in turn leads to the reported increase of entrepreneurial performance scores.

Finally, the firm-level variable entrepreneurial orientation proved to be not significantly related to entrepreneurial performance. This is surprising, considering the high amount of research confirming the importance of firm-level variables for entrepreneurial performance assessments (Rauch

et al., 2009). One possible explanation for this finding is the non-financial measurement of entrepreneurial performance. Rauch et al. (2009) reported that non-financial measurement was related to lower effects of EO on entrepreneurial performance. Additionally, an ongoing discussion about what defines and belongs to entrepreneurial action tackles the EO-concept. The original Covin and Slevin (1989) definition integrates venture creation as part of the concept (Frese, 2009), whereas later research pleaded for separating business venturing from EO (Lumpkin & Dess, 1996; Almeida et al., 2014). In doing so, entrepreneurial action starts already before launching the business. Utilizing this definition would make the inclusion of exclusively business founders too narrow. All of these conceptually open questions may weaken the assessment of firm-level entrepreneurial orientation. This disunity is also reflected in the level of analysis. As EO is originally related to the firm-level, one assesses the degree to what a business is entrepreneurial orientated based on 'managerial perceptions' (Lyon, Lumpkin & Dess, 2000; p.1057) instead of individual behavior and attitudes. This 'lack of consideration of the role attitudes and behaviors [are] play[ing] within the EO construct…' (Wales, Wiklund & McKelvie, 2015; p.355) has been just recently criticized and causes confusion about the construct's definition. Even though researchers like Khedhaouria et al. (2015) allowed for operationalizing EO in a small business environment as working on the individual-level, the answers are still addressing the rational view out of the entrepreneur's perspective. This is different in ESI and EP and pleads for an increased informative value of emotional, individual variables. Accordingly, Lumpkin (2011) did already call for an increased consideration of emotional variables in entrepreneurship. Taking this one step further, measuring individual variables like entrepreneurial social identity and entrepreneurial passion would replace future EO-assessments.

5.2 Limitations

First, although the sample size of 103 respondents has been sufficient to show first tendencies among entrepreneurs, the sample is still too small to make general statements about the model's validity and reliability (Moore, McCabe & Craig, 2006). Accordingly, splitting the ADHD group created relatively small groups of less than 50 members. The ADHD-hyperactive group for example consisted out of eight participants, which is too small to make reliable statements (Bartlett, Kotrlik & Higgins, 2001). This small group size may also be a reason for the non-significance of the ADHD-hyperactive regression models.

Second, the study is designed cross-sectional. This impedes the ability to generate causal inferences (Moore et al., 2006). Handling this design made it impossible to assess variables over time. However, measuring variables like firm failure longitudinally would be recommended, as it enables an objective measurement of entrepreneurial performance (Thurik et al., 2016). Therefore, executing a longitudinal research would improve future scientific outcomes.

Third, the measurement suffers from a common method bias, as exclusively subjective assessment tools have been used. This monotonous measurement approach could have caused the reported correlations between survey scales (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Next to that, entrepreneurs are expected to be more prone to perceive themselves in over-optimistic ways (Coelho, 2010; Stange et al., 2012). This in turn, causes a biased assessment and accordingly, a biased representation of results. In measuring entrepreneurial performance objectively, future research could overcome these measurement related issues.

Fourth, the ADHD screening tool ASRS-6 relies on self-report indicators. As Manor et al. (2012) state, self-reported ADHD-surveys lack reliability. Affected individuals are 'usually unaware or not aware enough' (p.319) of their ADHD-symptoms. These findings raise questions about the reliability of reported ADHD-screens. Respondents might have tended to underestimate the existence of their own ADHD-behavior. This would have led to less ADHD positive screens in total.

5.3 Contribution to practice

Even though ADHD had no influence on entrepreneurial performance, ADHD-affected entrepreneurs turned out to benefit from experiencing entrepreneurial passion. ADHD-affected entrepreneurs can take advantage of their energy surplus when feeling passionate about entrepreneurial activities. Still, identifying ADHD as an attribute that boosts entrepreneurial performance might be too optimistic. However, perceiving ADHD as what it is, a deviation from the common level of activity and attention, could balance its possible counteractive effects on working-life. This can be achieved through engaging in activities that one feels passionate about. Practitioners in the business- and the psychological-field could use this knowledge to treat affected individuals in a different way than they do now. Managers, as well as investors, should pay more attention to the degree of passion that entrepreneurs show. This would be a better indication of entrepreneurial performance outcomes than making decisions based on entrepreneur's level of attention or hyperactivity. In the psychological context, ADHD-affected individuals who experience passion towards their venture could be supported instead of withheld. Reviewing recent literature reveals that ADHD-affected individuals tend to engage in entrepreneurial actions more frequently than non-affected individuals (Verheul et al., 2015). Assuming that an ADHD affection goes along with a tendency to underperform urges early stage support for ADHD diagnosed entrepreneurs. This aid could be given by support-organizations. Hereby, possible negative effects of the ADHD disorder can be outbalanced and negative results, such as firm failure, can be decreased. A possible way to facilitate feelings of passion is to provide entrepreneurs with workshops that are presenting successful and passionate entrepreneurs.

5.4 Outlook

This research contributed to a better understanding of the relationship between mental health problems and entrepreneurial performance (e.g. Verheul et al., 2015; Thurik et al., 2016). Nevertheless, a lot of work in this research field needs to be done. Especially when considering the limitations of this research, future research should aim at getting more insights into the long-term influences of ADHD and firm- and individual-level variables. Here, an objective assessment of entrepreneurial performance is necessary. Such a research has not been conducted yet. Therefore, a longitudinal study design is highly recommended for future research.

Another interesting research-direction in this area is a stronger focus on diagnostic assessment. As mental health affections are involved, an extensive diagnostic assessment should be preferred to short screening tools. This will probably not only need more time but will complicate finding appropriate and sufficient respondents, too. Nevertheless, an idea for future business research would be an increased cooperation with diagnostic centers specialized on ADHD diagnoses. These centers have access to the focus group and conduct proper, extensive diagnostic interviews. In assessing diagnosed individuals who have founded their own business, a more valid and reliable research will be enabled.

Building upon Cardon et al.'s (2009) call for increased research about entrepreneurial emotion, the current research emphasizes the need for more research regarding the relationship between entrepreneurial emotions, cognitions and behavior. This is of special importance in stigmatized entrepreneurs, like ADHD-affected individuals. Even if a mental disorder affects entrepreneurial action negatively, as it '…deviates from fundamental standards of conduct.' (Bolton, 2008; p.xiiv), these deviations or disorders turn out to contain potential advantageous effects for those individuals. It is the task of future research to get more insights in what mediates or moderates these originally negative characteristics. In doing so, research can contribute to an in-depth understanding of the role of personal characteristics and entrepreneurial performance for business and for society. Next to that, it offers affected individuals the chance to regard their disorder as an opportunity to grow. An example for possible moderators is the effect of the entrepreneur's entrepreneurial focus (Hmieleski & Baron, 2008). It is likely that ADHD-affected individuals are more inclined to have a *promotion focus*, meaning that they seek new opportunities, instead of having the *preventing focus*, which aims at sustaining the business and at avoiding failure (Hmieleski & Baron, 2008).

Reporting entrepreneurial passion turned out to increase the ADHD-entrepreneurial performance relation. This led to the conclusion that the entrepreneurial passion construct would be a good success-indicator. Nevertheless, this conclusion might be too unrealistic and lead to an over-optimistic view of EP accordingly. As former research was able to show, the entrepreneur's perception

of passion deviates from the perception of investors (Cardon et al., 2009a). Hence, future research should examine which effect EP has on angel investors in ADHD-affected entrepreneurs. This could be done in setting up an experimental research (2-group-design), which assesses the perceptions of investors and ADHD-affected entrepreneurs regarding passion and entrepreneurial performance.

As the above-mentioned proposals for future research show, there are many future directions for this research field. They have the potential to generate interesting and important results for both, theory and practice. It is important to continue this line of research in order to increase the quality of knowledge regarding the relation of mental health disorders and entrepreneurial performance. In increasing knowledge about personal strengths in ADHD-affected entrepreneurs, fish will be finally judged by their ability to swim and not any longer by their ability to climb.

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