

# **Affect and firm performance: The mediating role of entrepreneurial skills**

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Erasmus School of Economics

**Constantin Johnen**

453813

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Supervisor: Indy Bernoster

## Contents

1 Introduction.....	1
2 Theoretical Background and Hypotheses.....	3
2.1 Terms and Definitions .....	3
2.1.1 Affect .....	3
2.1.2 Mediation .....	3
2.2 Affect – Firm Performance Relationship .....	4
2.3 Mediation of the Affect- Firm Performance Relationship.....	5
2.3.1 Mechanisms underlying the relationship between affect and firm performance .....	5
2.3.2 The mediating role of Entrepreneurial skills .....	6
3. Data & Methods .....	10
3.1 Data collection.....	10
3.2 Measures .....	10
3.2.1 Dependent Variable.....	10
3.2.2 Independent Variable.....	11
3.2.3 Mediator .....	11
3.2.4 Control Variables .....	11
3.3 Analysis.....	12
3.3.1 Data structure.....	12
3.3.2 Statistical tests.....	12
4. Results .....	13
4.1 Descriptives and correlation analysis.....	13
4.2 Hypothesis testing .....	13
4.3 Additional Analyses .....	17
5 Discussion & Contribution .....	18
6 Limitations and future research .....	19
References.....	22

**Abstract** Affect has been described to predict a variety of firm performance indicators but at present, little is known which mechanism(s) underlie this relation. Studies have shown that affect influences entrepreneurial skills, which were also shown to influence some firm performance measures (e.g. Baron, 2008; Sharon, 2003). Yet, it was never empirically tested whether entrepreneurial skills mediate the affect-firm performance relationship. I hypothesize that affect predicts entrepreneurial skills, which in turn predict firm performance and that entrepreneurial skills significantly mediate the relationship between affect and firm performance. In the present study, firm performance is measured through two different indicators, *current performance and growth performance*. Using a sample of 228 Dutch sole-proprietors, I find support for the mediating role of entrepreneurial skills. However, in contrast to previous studies, I do not find a significant influence of affect on firm performance, indicating that the influence is rather indirect than direct. Results add to our understanding of how individual traits influence firm performance and imply economic benefits of promoting positive and reducing negative affect.

*Keywords: positive affect, negative affect, firm performance, entrepreneurial skills, mediation*

## 1 Introduction

There is growing interest in how specific characteristics of entrepreneurs influence firm performance (e.g. Baron & Tang, 2011). One individual level variable that found increasing attention in this context, is the experienced affect of an entrepreneur (e.g. Baron, Tang, & Hmieleski, 2011; Gorgievski, Moriano, & Bakker, 2014). Affect exists along two dimensions, positive affect (PA) and negative affect (NA), and refers to both relatively stable tendencies to experience specific subjective feelings, called trait affect, and temporary shifts in such feelings generated by specific events, called state affect (Baron & Tang, 2011).

Affect has been found to influence a variety of performance measures on both the individual and firm level. On the individual level, behaviors such as organizational citizenship behaviors and task performance have been found to be influenced by affect, with PA being positively and NA negatively related to these performance measures (e.g. Johnson, Tolentino, Rodopman, & Cho, 2010; Kaplan, Bradley, Luchman, & Haynes, 2009).

On a firm level, affect has been found to influence business growth, innovation, and the satisfaction with firm performance in such way that PA was found to be positively related to innovation (Baron & Tang, 2011), satisfaction with business performance (Delgado-Garcia, Rodriguez-Escudero, & Martin-Cruz, 2012), and business growth, whereas, NA was associated with reduced business growth (Gorgievski et al., 2014) and a reduced satisfaction with firm performance (Delgado-Garcia et al., 2012).

Despite the growing awareness that affect influences firm performance, little research has been devoted to investigating the underlying mechanism(s) of this relation (Baron et al., 2011; Delgado-García, Quevedo Puente, & Blanco Mazagatos, 2015). One potential mechanism explaining the relation between PA (NA) and enhanced (reduced) firm performance was hypothesized to be found in the influence of affect on various cognitive processes (e.g. Baron, 2008; Judge, Thoresen, Pucik, & Welbourne, 1999). Baron (2008) conjectures that affect influences cognitive processes, including creativity and cognitive strategies for coping with stress, and that these cognitive processes, in turn, potentially influence performance (e.g. Baron, 2008; Baron & Tang, 2011). Baron (2008) suggested further, based on previous studies relating cognitive and entrepreneurial processes (Bhave, 1994; Herron & Sapienza, 1992), that cognitive processes might predict entrepreneurial processes (hereafter referred to as entrepreneurial skills). Baron (2008) also hypothesized that entrepreneurial skills, in turn, could influence firm performance (Baron, 2008). Given that affect might predict entrepreneurial skills, which in turn might predict firm performance, entrepreneurial skills appear to be a potential mediator of the affect-firm performance relationship. To my best knowledge this role of entrepreneurial skills has never been empirically tested.

The present study aims to shed more light on the relation between affect and firm performance and the underlying mechanisms of this relationship, by answering the question: Do entrepreneurial skills mediate the relationship between affect and firm performance? To investigate the relationship between affect and firm performance and its underlying mechanism(s), a sample of 228 Dutch entrepreneurs, defined as sole-proprietors, from different industries was investigated. The entrepreneurial context was chosen for two reasons. First, the firm performance of entrepreneurs has major implications for the growth of an economy and second, affect might exert especially strong effects on entrepreneurs. Two performance measures, *current performance* and *growth performance*, were used to estimate firm performance. As firm performance is an ongoing process, it was assumed to be more likely influenced by the rather stable trait affect compared to the event generated state affect. The present study, therefore, employs a trait affect measure. The mediating role of entrepreneurial skills was tested through a Sobel Goodman test. The statistical test provides strong indication that the relationship between both PA and NA and both firm performance measures is significantly mediated by entrepreneurial skills. The robustness of these results was supported through bootstrapping. The study did not find a significant total effect of affect on firm performance. The latter finding indicates that the effect of affect on firm performance is rather indirect than direct.

The findings contribute to our understanding of the influence of affect on firm performance. The present study strongly suggests that entrepreneurial skills constitute at least one mechanism underlying the focal relationship. It thereby sheds light on how personal traits of entrepreneurs could determine financial success. As entrepreneurship is recognized as an important driver of economic growth, the study suggests, in a wider context, how personal characteristics might predict economic growth. The study also provides practical implications. It shows that entrepreneurs high on PA have better chances to be financially successful, however, the study also shows that a one-sided approach to increase PA may be unfruitful if it is accompanied by a simultaneous increase in NA. Therefore, the present study underlines the importance of taking both dimensions of affect into account.

In Section 2, the theoretical background will be presented, and the hypotheses derived. In Section 3, the analysis of the present study will be presented. In Section 4, the results will be presented and in Section 5 discussed. Section 6 discusses important limitations of the present study and gives implications for future research.

## **2 Theoretical Background and Hypotheses**

In Section 2.1, relevant terms and definitions will be presented. Followed, in Section 2.2, by a presentation of previous literature regarding the relation between affect and performance. In Section 2.3, literature regarding underlying mechanisms of the focal relation will be reviewed.

### **2.1 Terms and Definitions**

#### *2.1.1 Affect*

Two forms of affect, state affect and trait affect, can be distinguished, where the former includes moods and emotions, which are due to reactions to specific events and the latter could be considered being a more stable personality characteristic (Baron et al., 2011; Watson & Clark, 1984). The present study focuses, in line with previous research which investigated the influence of affect on performance (e.g. Baron et al., 2011), on trait affect. Affect exists along two dimensions, namely PA and NA. These dimensions seem to be largely independent of one another and not opposite end-points of a continuum (e.g. Burke, Brief, & George, 1993; Emmons & Diener, 1985; Watson & Clark, 1984; Weiss, 2002). As the dimensions would be unipolar, individuals could be high on both, low on both, or high on one and low on the other (George, 1991; Watson, Clark, & Tellegen, 1988; Watson & Tellegen, 1985). Those individuals scoring high on PA can be described by experiencing joy, excitement, enthusiasm and exhilaration. Individuals scoring low on PA might experience listlessness, lethargy, or apathy. High NA was often related to the feelings of being anxious, afraid or angry, while those who are low on NA might feel placid, calm, serene, and content (Emmons & Diner, 1985; Watson et al. 1988; Watson & Clark, 1984). Those individuals that are high on NA and PA simultaneously seem to respond with fluctuating moods to changes in the environment. In other words, these people could be described as emotional. Others, who are low on NA and PA simultaneously, are rather unemotional or unresponsive (Emmons & Diener, 1985).

#### *2.1.2 Mediation*

Baron and Kenny (1986) define a variable as mediator "(...) to the extent that it accounts for the relation between the predictor and the criterion" (Baron & Kenny, 1986, p.1176). In other words, the mediator represents the mechanism by which the independent variable influences the dependent variable (Kenny & Judd, 2014). Another term which is sometimes used synonymously to express mediation is indirect effect (Kenny & Judd, 2014). Some researchers disagree on this interchangeable use of the terms indirect effect and mediation (e.g. Holmbeck, 1997), as mediation would require the existence

of a total effect that can be mediated, however, no such requirements would exist to find significant indirect effects (e.g. Mathieu & Taylor, 2006; Preacher & Hayes, 2004). To my best knowledge, no consent has been found to date whether the existence of a significant total effect is required to label some variable a mediator. In fact, many researchers state that a total effect should not be overemphasized when analyzing mediation (e.g. Rucker et al., 2011). Kenny and Judd (2014) express this apparent paradox, saying that “one might find significant mediation even when there is no overall effect to be mediated” (Kenny & Judd, 2014, p.336). In line with the latter statement, the present study uses the termini indirect effect and mediation interchangeably.

## 2.2 Affect – Firm Performance Relationship

A considerable amount of literature has been devoted to investigating the relation between affect and performance (e.g. Delgado-Garcia et al., 2015; Kaplan et al., 2009). While studies within this field were, at first, mainly conducted amongst employees and students (e.g. Kaplan et al., 2009), a more recent stream focused on the influence of affect on entrepreneurial- and subsequently firm performance (e.g. Baron et al., 2011).

Affect has been shown to influence the performance of individuals (Kaplan et al., 2009), in such a way that PA was generally related to an increase and NA to a decrease among various performance outcomes (Lyubomirsky, King, & Diener, 2005), including organizational citizenship behavior and task performance (e.g. Carver & Scheier, 1998; Johnson et al., 2010; Judge et al., 1999; Kaplan et al., 2009). Notably, some studies have not found a significant relation between affect and the performance of an individual (Judge & Ilies, 2004; Melton, 1995).

A more recent stream has focused on the effects of affect on entrepreneurial performance (Delgado-Garcia et al., 2015). There are two reasons why affect might exert especially strong effects among entrepreneurs (Baron, 2008; Mitchel et al., 2004). First, environments in which entrepreneurs act would often be highly unpredictable (Lichtenstein, Dooley, & Lumpkin, 2006) and affect would exert especially strong effects in such environments (Forgas, 2000). Second, entrepreneurs would execute a variety of different activities (Shane, 2003) of which many were shown to be influenced by affect, including decision making and judgment, forming productive working relationships with others, and persuasion (e.g. Diener & Seligman, 2002; Forgas, 2000; Lyubormirsky et al., 2005).

The performance of an entrepreneur was often closely linked to the performance of his/her business, congruently, in a more recent stream, affect has been shown to influence firm performance (e.g. Gorgievski et al., 2014). For instance, PA was positively related to different innovation measures, including innovative firm performance (e.g. Gorgievski et al., 2014) and total number of innovations

(Baron & Tang, 2011; Baron et al., 2011). A direct relation between NA and innovation was, to my best knowledge, only investigated in one study and no significant results were found (Gorgievski et al., 2014). It was also found that if PA increased beyond a certain point, a further increase in PA would be detrimental for the innovative performance of a firm (Baron et al., 2011).

Another performance measure which was investigated is the satisfaction with business performance. PA was found to be significantly positively related to satisfaction with business performance, while NA was found to be negatively related to this performance measure (Delgado-Garcia et al., 2012; Gorgievski et al., 2014).

Moreover, Baron et al. (2011), report that PA would be positively related to a firm's sales growth rate. However, the authors have found that if PA increased beyond a certain point, a further increase in PA would be detrimental for a firm's sales growth (Baron et al., 2011). Gorgievski et al. (2014) report that PA positively predicts business growth, whereas NA would be negatively related to this measure, which included the growth in employees, profit, and turnover.

The majority of the aforementioned studies found a positive (negative) relation between PA (NA) and firm performance (Delgado-Garcia et al., 2015). Therefore, I also expect a similar relationship between the two dimensions of affect and the presently employed firm performance measures. More precisely, in line with Gorgievski et al. (2014), I expect PA (NA) to be positively (negatively) related to the profit and revenue of a firm, subsumed under *current performance*.

**H1** PA is positively related to current performance.

**H2** NA is negatively related to current performance.

I further expect, in line with Gorgievski et al. (2014), PA (NA) to be positively (negatively) related to the *growth performance*.

**H3** PA is positively related to growth performance.

**H4** NA is negatively related to growth performance.

## 2.3 Mediation of the Affect- Firm Performance Relationship

### 2.3.1 Mechanisms underlying the relationship between affect and firm performance

One mechanism that might explain the relationship between affect and performance are cognitive processes (e.g. Baron, 2008). Especially two cognitive processes, creativity and stress coping strategies, found a considerable amount of attention in their relation to affect and performance (e.g. Baron &

Tang, 2011). For instance, the positive relation between PA and task performance would be due to the positive relation of PA and creativity. PA would enhance creative problem solving (Isen, Daubman, & Nowicki, 1987), and creativity in general (Ashby & Isen, 1999; Bass et al., 2008; Lyubormirsky et al. 2005) and consequently task performance (Baron, 2008). These findings also seem to apply in the field of entrepreneurship in which PA was found to be significantly related to creativity, which, in turn, would be positively related to firm-level innovation (Baron & Tang, 2011). Baron and Tang (2011) explicitly tested whether creativity mediates the relationship between PA and firm innovation and found significant indirect effects. Notably, it was also found that when perceived recognition and rewards for creativity were high, PA would be negatively and NA positively related to creative performance (e.g. George & Zhou, 2002). Moreover, studies have found that the relationship between affect and performance could be explained by different cognitive strategies to cope with stress triggered by NA and PA respectively (e.g. Bowman & Stern, 1995). Individuals high on PA would employ more efficacious coping strategies, such as direct efforts to solve problems, leading to a better performance (e.g. Baron, 2008; Judge et al., 1999). Individuals high on NA would be less efficient in their coping strategies, as those individuals might rather try avoiding than coping with stress, potentially leading to a decrease in performance (Baron, 2008; Spector & Jex, 1998).

Another potential mediator of the focal relationship are goals. Some studies found that affect would influence goals (e.g. George & Brief, 1996), which in turn would influence performance (Baum & Locke, 2004). More precisely, individuals high on PA have been found to select more demanding (George & Brief, 1996) and approach oriented goals, which would enhance task performance (Carver & Scheier, 1998). Similarly, Delgado-Garcia et al. (2012) have found that PA would influence an entrepreneur to have more ambitious and broad goals, in contrast to NA, which would affect an entrepreneur to have narrower goals. The authors further found that goals influence the satisfaction with firm performance and concluded that goals partially mediate the relation between affect and satisfaction with firm performance. It was also suggested that affect influences entrepreneurial skills (Baron, 2008), which in turn might influence goals, which then would influence firm performance (Baum & Locke, 2004). In the next section, the potentially mediating role of entrepreneurial skills will be discussed.

### *2.3.2 The mediating role of Entrepreneurial skills*

Baron (2008) suggests that affect would influence entrepreneurial skills, which, in turn, might affect firm performance (e.g. Shane, 2003). Therefore, entrepreneurial skills might mediate the relationship between affect and firm performance. The present section reviews literature on both the relation between affect and entrepreneurial skills and entrepreneurial skills and firm performance.

Entrepreneurial skills will be defined in line with Baron's (2008) conceptualization of entrepreneurial skills including the following five skills: The skill to develop broad social networks, recognize opportunities, acquire financial and human resources, respond effectively to highly dynamic environments, and tolerate intense levels of stress.

PA has been shown to be positively linked to skill to develop broad social networks (Baron, 2008; Ireland, Hitt, & Sirmon, 2003; Nahapiet & Ghoshal, 1998; Staw, Sutton, & Pelled, 1994), whereas NA would reduce tendencies to develop broad social networks (Baron, 2008).

Baron (2008) argues further that affect would be related to the ability to recognize opportunities, such that PA would enhance and NA decrease this ability. The idea that opportunity recognition can be influenced, is in line with previous studies which argue that opportunity recognition is not a matter of pure luck but also due to active and conscious search for opportunities (Patel & Fiet, 2009). This active and conscious search may be facilitated by PA, because PA would have an energizing and activating effect and it may be reduced by NA, as NA would have an opposite effect (Forgas, 2000). Another factor that seems to increase the chance to recognize opportunities is creativity (Hills, Shrader, & Lumpkin, 1999). Previous research has indicated that PA is positively and NA negatively linked to creativity (Baron, 2008, 2007; Isen, 2000), giving further indication to a positive (negative) relation between PA (NA) and opportunity recognition skills. Moreover, PA was also positively related to increased social networks (Baron, 2008). Social networks, in turn, could facilitate the recognition of opportunities (Aldrich, Rosen & Woodward, 1987; Lee & Tsang, 2001; Ostgaard & Birley, 1996; Sullivan and Marvel, 2011).

In addition, Baron (2008) reasons that PA is positively and NA negatively related to the skill to acquire human and financial resources. One argument supporting this hypothesis is that individuals high on PA would be more enthusiastic, which in turn would be related to persuasiveness (Terry & Hogg, 2000). Persuasiveness in turn could help to obtain financial resources (Baron, 2008). Moreover, since emotions would be contagious (Hatfield, Cacioppo, & Rapson, 1994) the enthusiasm, for instance about a business idea, could spread from entrepreneur to an investor (Baron, 2008). In line with these arguments, it was further claimed that the positive (negative) relation between PA (NA) with building social networks might not only positively (negatively) affect the acquisition of financial but also the acquisition of human resources (Ireland et al., 2003; Adler & Kwon, 2002).

A fourth entrepreneurial skill mentioned by Baron (2008) is the capacity of an entrepreneur to respond effectively to changes in the environment. Again, it was argued that PA relates positively and NA negatively to that skill due to different decision-making strategies that seem to be triggered by PA and NA respectively. While PA would encourage a satisficing strategy, in which the first acceptable strategy is chosen, NA would encourage a maximizing strategy (Forgas & George, 2001). Even though the maximizing strategy would often lead to superior choices (Iyengar, Wells, & Schwartz, 2006), Baron

(2008) conjectures that a satisficing strategy may be the better alternative to choose for entrepreneurs, since entrepreneurs would have to respond quickly to environmental changes and this rather heuristic information processing would allow an entrepreneur to make not only fast, but also appropriate decisions (Baron, 2008). Additional support for a positive relation between PA and the effectivity of responses to changes in the environment was given by Lyubomirsky et al. (2005), who state that PA would encourage the flexibility to solve various problems. Moreover, PA was positively and NA negatively related to the development of broad social networks (Baron, 2008; Ireland et al., 2003; Nahapiet & Ghoshal, 1998; Staw et al., 1994), which in turn could enhance the capacity to respond more effectively to changes in the environment (Baron, 2008).

Lastly, PA was positively related to the tolerance for intense levels of stress (Baron, 2008). The positive relation would be due to effective techniques for coping with stress, such as addressing problems directly instead of avoiding them (Fredrickson & Joiner, 2002). In contrast, individuals high on NA would be less efficient in coping with stress (Spector & Jex, 1998), which could lead to a lower tolerance for stress (Baron, 2008).

In line with the discussed literature, I expect a positive relation between PA and entrepreneurial skills and a negative relation between NA and entrepreneurial skills.

**H5:** *PA is positively related to entrepreneurial skills.*

**H6:** *NA is negatively related to entrepreneurial skills.*

Baron (2008) further mentioned that increased entrepreneurial skills might positively affect firm performance. In line with this suggestion, Singh (2000) found that the ability to develop a broad social network is positively correlated with the firm performance of an entrepreneur, which could be due to the correlation of a network with the access to important resources, such as financial, human or informational resources (Adler & Kwon, 2002; Ozgen & Baron, 2007). In addition, Baron and Markman (2003) have found that social skills are positively linked to financial firm performance measures including revenue and income.

Shane (2003) has further argued that the ability to recognize opportunities would strongly increase firm performance. In line with Shane's (2003) proposition, it was argued that even though opportunities always involved uncertainties, an entrepreneur that made a better judgment than others about new market opportunities would make a profit (Wu, 1989).

Moreover, Shane (2003) claimed that the ability to acquire resources, including financial and human resources, would increase firm performance. This argumentation is in accord with Cooper, Gimenco-Gascon, and Woo (1994), who argue that financial capital positively affects firm performance, for example because capital would enhance the ability to meet financing demands

imposed by growth. Similar, Baum and Locke (2004) find that the greater the skill of an entrepreneur to find financial capital and human resources, the greater the venture growth, with venture growth being measured through both employee- and sales growth.

Also, entrepreneurs would need to have the capacity to respond effectively to highly dynamic environments to be successful (Baron, 2008). This capacity would, for instance, be crucial to help an entrepreneur to respond to uncertainties inherent to all opportunities, which, in turn, would be pivotal to a successful firm performance (Shane, 2003).

Lastly, the tolerance for intense levels of stress was also positively related to firm performance. The logic behind this relation is that a higher tolerance for stress would be positively related to an increased health (Carver & Scheier, 2001) and an increased health, in turn, may be beneficial for firm performance (Baron 2008).

Overall, the reviewed studies linked each of the entrepreneurial skills positively to a large variety of firm performance measures (e.g. Baron, 2008; Shane, 2003). In line with these findings, I also expect entrepreneurial skills to be positively related to firm performance, which is measured in the present study through *current performance* and *growth performance*.

**H7:** *Entrepreneurial Skills are positively related to current performance.*

**H8:** *Entrepreneurial Skills are positively related growth performance.*

Given that PA is related to entrepreneurial skills, which in turn are argued to be related to both *current performance* and *growth performance*, I expect that entrepreneurial skills mediate the relation between PA and firm performance.

**H9:** *Entrepreneurial skills mediate the relation between PA and current performance.*

**H10:** *Entrepreneurial skills mediate the relation between PA and growth performance.*

Further, given that NA is related to entrepreneurial skills, which in turn are argued to be related to both *current performance* and *growth performance*, I expect that entrepreneurial skills mediate the relationship between NA and firm performance.

**H11:** *Entrepreneurial skills mediate the relation between NA and current performance.*

**H12:** *Entrepreneurial skills mediate the relation between NA and growth performance.*

### 3. Data & Methods

#### 3.1 Data collection

An online questionnaire was sent to 2158 Dutch sole proprietors between December 2014 and January 2015. The e-mail was sent three times as a reminder and answered by 736 individuals. Excluding those individuals that a) did not answer one or more questions, b) answered one or more questions with “I don’t know”, or c) answered one or more questions with “I don’t want to tell”, led to a sample of 228 individuals that were considered in the present study. Thus, the effective response rate is 10.56%, which is slightly lower than the response rate reported in previous studies with a similar sample size, which analyzed the influence of affect on firm performance (i.e. Delgado-Garcia et al., 2012).

#### 3.2 Measures

##### 3.2.1 Dependent Variable

In previous studies, which investigated the influence of affect on firm performance, revenue and profit measures of a company are amongst the most cited to estimate firm performance (e.g. Baron et al., 2011; Gorgievski et al., 2014). The present study employs five different firm performance measures, which are closely related to revenue and profit.

Firstly, individuals were asked to state what their average net monthly income is. Responses were anchored from 1 (“less than 1.250 euros per month”) to 6 (“more than 5.000 euros per month”). Secondly, the weekly income of an individual was estimated by a multiplication of the average hourly fee individual with an average of paid working hours of an individual. A third measure of the present study estimated the revenue of a firm. Individuals were asked to indicate in which revenue category their company falls, with answers ranging from 1 (“up to 10.000 Euros) to 7 (“more than 500.000 euros”). The three aforementioned measures were subsumed, via Principal Component Analysis (PCA, see section 3.3.1), to *current performance*.

Previous literature typically measured revenue and profit by accounting for their respective growth (e.g. Gorgievski et al., 2014). To capture the revenue growth of a firm, individuals were asked two questions to indicate the expected revenue for two consecutive years (2014 and 2015) in comparison to the respectively preceding years. First, individuals were asked “do you expect the revenue of 2014 to be higher compared to the revenue in 2013?”. Answers were ranged from 1 “lower than 2013”, “same”, to “higher than 2013”. Second, individuals were asked the same question for the

year 2015 compared to 2014. The two aforementioned measures were subsumed, via PCA (see section 3.3.1), to *growth performance*.

### *3.2.2 Independent Variable*

To measure affect, the conceptualization of Watson, Clark, and Tellegen (1988), seems to be most suitable as it constitutes the most common measure throughout different scientific fields. Affect was assessed with the Dutch version of the 20-item PANAS (Positive and Negative Affect Scale, Watson et al., 1988), with 10 items indicating positive (e.g. enthusiastic) and 10 items indicating negative (e.g. irritated) affect. For example, individuals were asked to answer, “do you generally feel irritated?”. Responses were given on a five-point agreement scale ranging from 1 (“a little bit or not”) to 5 (“extreme”). The PANAS has been validated in various studies (e.g. Watson et al. 1988). The responses on each of the 10 items were summarized by taking an average, leading to two variables, PA and NA. The alpha reliability coefficients for PA and NA were 0.82 and 0.8, respectively, which is consistent with the reliability reported in previous studies (e.g. Foo et al., 2009).

### *3.2.3 Mediator*

In line with Baron’s (2008) conceptualization of entrepreneurial skills, participants were asked to indicate their skills regarding each of the five above mentioned entrepreneurial skills, by responding to how well a statement fits to their skills. For instance, to measure the capacity to respond effectively to changes in the environment, the statement “I have the capacity to effectively react to fast changes in the environment” was employed. The responses were anchored from 1 (“completely agree”) to 5 (“don’t agree”). The five different measures of entrepreneurial skills are subsumed, by taking an average, under “entrepreneurial skills”.

### *3.2.4 Control Variables*

In line with previous studies, to parcel out any confounding effects, the present study included eight control variables: Entrepreneur’s age, gender, firm age, industry, education, working hours, liquidity and previous entrepreneurial experience. Previous research has shown that an entrepreneur’s age, gender, and education, as well as the firm’s age (Ho & Pollack, 2014; Zhang et al., 2009), industry type (Ho & Pollack, 2014; Sine, Mitsuhashi, and Kirsch, 2006), working hours (Gorgievski et al., 2014), and firm liquidity (Miller & Triana, 2009) can influence firm performance. Further, in line with Delgado-Garcia et al. (2012) I controlled for previous entrepreneurial experience.

### 3.3 Analysis

#### 3.3.1 Data structure

In the present study, the two firm performance measures, *current performance* and *growth performance*, emerge out of a principal component analysis (PCA). The PCA was conducted to reduce the number of variables for the regression analysis. The PCA is a form of factor analysis, with the first principal component (PC) explaining the highest fraction of the total variance. The next PC then explains the highest fraction of the variance which remained unexplained and so forth (Laursen & Foss, 2003).

Table 1  
*PCA Rotated components*

	PC1	PC2	Unexplained
Expected revenue 2014		.7368	.4158
Expected revenue 2015		.6697	.5091
Revenue	.5895		.2159
Weekly income	.5479		.3107
Monthly wage	.5925		.2144

Note. Blanks represent loadings < .3

Principal-components factor analysis with varimax rotation on the items extracted two factors. The two components and their respective loadings are presented in Table 1. As the first component loads mainly on revenue and two estimates of current income, it was labeled *current performance*. As PC2 loads mainly on the expected growth of revenue in two consecutive years, it was labeled *growth performance*.

#### 3.3.2 Statistical tests

To estimate the coefficients of hypotheses 1-8, the Ordinary Least Squares (OLS) method was employed. To test the statistical significance of the estimated coefficients, a t-test was conducted.

To test the significance of the indirect effects formally, the Sobel test was applied. The Sobel test was found to have the greatest statistical power compared to 14 other tests, including the commonly used method developed by Baron and Kenny, 1986 (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The Sobel test compares the magnitude of the indirect effect to the null hypothesis that it is zero. To conduct the test the unstandardized indirect effect is divided by its standard error. This ratio is compared to a standard normal distribution to determine the significance of the indirect effect (Hayes, 2009; Preacher & Hayes, 2004).

As a robustness check the sampling distribution of the indirect effect was bootstrapped. This nonparametric approach makes no assumption about the shape of the distributions of the variables (e.g. Efron & Tibshirani, 1993; Mooney & Duval, 1993). Bootstrapping resamples the data and computes the indirect effect in each of the samples (Hayes, 2009; Preacher & Hayes, 2004). It also computes a confidence interval, which, if not consisting zero, gives ci% confidence that the indirect effect is not zero (Hayes, 2009).

## 4. Results

### 4.1 Descriptives and correlation analysis

The sample contains 25% female sole-proprietors. The individuals are between 24 and 76 years old with an average age of 50.44 years. The majority of individuals obtained tertiary education (67.11%), followed by secondary education (32.89%). Similar to previous studies (e.g. Baron & Tang, 2011, Delgado-Garcia et al., 2012), entrepreneurs acting in a variety of different industries were considered. Industries represented were agriculture (1.75%), industrial (3.95%), construction (7.89%), trade, catering, repair (5.26%), transport (10.9%), ICT (11.40%), other business services (16.23%), care and welfare (13.16%), education and training (16.67%), and other services (13.60%). Regarding the business tenure, more than 50 percent of the firms have been founded 10 years ago or less. The means, standard deviations, and correlations of all variables are summarized in Table 2.

To investigate whether multicollinearity is a threat, variance inflation factors were estimated. “The VIF measures how much multicollinearity has increased the variance of a slope estimate” (p.53 Stine, 1995). No variance inflation scores were greater than 2.25, therefore, multicollinearity does not seem to pose a threat to the present analysis (Fox, 1997; Neter et al., 1996; Tabachnick and Fidell, 2001).

### 4.2 Hypothesis testing

To test Hypotheses 1-6, coefficients were estimated via OLS and tested via t-tests (Table 3). Hypotheses 1 and 2 suggest that PA (NA) are positively (negatively) related to *current performance*. The results of the OLS analysis are presented in Table 3, which shows that the relationships between both PA (coefficient = 0.34, n.s.) and NA (coefficient = -0.129, n.s.) and *current performance* are not significant. Thus, no support was obtained for H1 and H2. Similar, H3 and H4 suggest that PA (NA) are positively (negatively) related to *growth performance*. Table 3 shows that the relationships between both PA (coefficient = 0.112, n.s.) and NA (coefficient = -0.114, n.s.) and *growth performance* are not significant. Thus, H3 and H4 are not supported.

Table 2  
*Means, standard deviations, and correlations*

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
PC1	.001	1.503												
PC2	.007	1.041	-.072											
PA	3.667	.461	.127	.125										
NA	1.588	.565	-.084	.004	.033									
Skills	3.508	.588	.250	.155	.259	-.323								
Liquidity	3.215	.935	.065	-.148	-.125	-.197	.1628							
Sector	6.781	2.423	-.080	.095	.199	.047	.127	.040						
Firm Age	12.439	9.064	.106	.165	.105	-0.10	.142	.035	.056					
Gender	1.254	.436	-.380	-.017	.086	.027	-.087	.125	.336	.013				
Age	50.439	8.731	-.155	-.237	-.156	-.185	.075	.26	.027	-.236	.054			
Education	1.274	1.179	-.067	-.040	-.152	.047	-.076	-.242	-.314	-.21	-.197	-.086		
Working hours	44.697	15.500	.397	.085	.091	.021	-.006	-.252	-.119	-.065	-.294	-.23	.24	
Experience	13.048	7.962	.095	.080	.090	-.126	.086	.029	.03	.070	.048	-.344	-.18	-.112

Note. PC1 = current performance, PC2 = growth performance. SD = Standard Deviation.

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05 (two-sided tests)

Hypotheses 5 and 6 predict that PA (NA) are positively (negatively) related to entrepreneurial skills. Table 3 shows that the relationship between both PA and NA and entrepreneurial skills is significant, with PA being positively (coefficient = 0.358, p<0.001) and NA being negatively (coefficient = -0.303, p<0.001) related to entrepreneurial skills. Therefore, Hypotheses 5 and 6 are supported.

Table 3

*OLS regression results: PA and NA on current performance, growth performance, and entrepreneurial skills*

	Current performance	Growth Performance	Entrepreneurial Skills
PA	.340 (.191)	.112 (.153)	.358*** (.080)
NA	-.129 (.156)	-.114 (.125)	-.303*** (.065)
Liquidity	.295** (.098)	-.118 (.079)	.094* (.041)
Sector	.001 (.039)	.038 (.031)	.035* (.016)
Firm Age	.003 (.013)	.023* (.010)	.008 (.005)
Gender	-1.146*** (.212)	-.054 (.170)	-.225* (.089)
Age	-.014 (.011)	-.026** (.009)	.003 (.005)
Education	-.189* (.080)	-.036 (.064)	.028 (.034)
Working hours	.035*** (.006)	.001 (.005)	.001 (.003)
Experience	.012 (.016)	-.020 (.013)	-.003 (.007)
Constant	-31.226 (24.842)	-4.851 (19.877)	-8.092 (10.371)
N (observations)	228	228	228
R <sup>2</sup>	.330	.106	.237
Adjusted R <sup>2</sup>	.299	.065	.202

Note. This table shows coefficients and standard errors in parentheses.

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05 (two-sided tests)

To test Hypotheses 7 and 8, coefficients were estimated via OLS and tested via t-tests (Table 4). The hypotheses suggest that entrepreneurial skills are positively related to both *current performance* and *growth performance*. Table 4 shows that entrepreneurial skills significantly predict *current performance* (coefficient = 0.459, p<0.01) and *growth performance* (coefficient = 0.288, p<0.05). Thus, hypotheses 7 and 8 are supported.

Table 4

*OLS regression results: entrepreneurial skills on current performance and growth performance*

	Current performance	Growth Performance
Entrepreneurial Skills	.459** (.160)	.288* (.129)
PA	.176 (.197)	.009 (.158)
NA	.010 (.161)	-.026 (.130)
Liquidity	.252* (.098)	-.145 (.079)
Sector	-.015 (.038)	.028 (.031)
Firm founded	-.001 (.013)	.021* (.010)
Gender	-1.043*** (.212)	.010 (.171)
Age	-.015 (.011)	-.027** (.009)
Education	-.201** (.079)	-.044 (.064)
Working Hours	.036*** (.006)	.001 (.005)
Experience	.014 (.015)	-.019 (.12)
Constant	-27.508 (24.471)	-2.52 (19.724)
N (observations)	228	228
R <sup>2</sup>	.355	.126
Adjusted R <sup>2</sup>	.322	.082

Note. This table shows coefficients and standard errors in parentheses.

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05 (two-sided tests)

To test Hypotheses 9-12, I conducted a Sobel test (Table 5). Hypotheses 9 and 11 predict that entrepreneurial skills mediate the relation between both PA and NA and *current performance*. I find that the indirect effects for the relation between PA and *current performance* (coefficient = 0.165, p<0.05) and NA and *current performance* (coefficient = -0.153, p<0.01) are statistically significant. Thus, Hypotheses 9 and 11 are supported.

Table 5

*Sobel test*

	Current performance			Growth Performance		
	Indirect	Direct	Total	Indirect	Direct	Total
PA	.165* (.067)	.177 (.196)	.342 (.191)	.107* (.051)	.006 (.158)	.113 (.153)
NA	-.153** (.058)	-.021 (.160)	-.132 (.157)	-.089* (.043)	-.026 (.129)	-.115 (.125)

Note. N = 228. This table shows coefficients and standard errors in parentheses.

\*\*\*p<0.001; \*\*p<0.01; \*p<0.05 (two-sided tests)

Hypotheses 10 and 12 predict that entrepreneurial skills mediate the relation between both PA and NA and *growth performance*. Table 5 reveals the results of the Sobel test, indicating that the indirect

effects for the relation between PA and *growth performance* (coefficient = 0.107,  $p < 0.05$ ) and NA and *growth performance* (coefficient = -0.089,  $p < 0.05$ ) are statistically significant. Thus, Hypotheses, 10 and 12 are also supported.

### 4.3 Additional Analyses

I perform two additional analyses to test the robustness of the obtained results. I repeat the analysis whether entrepreneurial skills mediate the relationships between both affect dimensions and the two firm performance measures, by testing the indirect effect with bootstrapping (Table 6), as the assumption of the Sobel test that the indirect effect is normally distributed may be flawed (MacKinnon et al., 2002). Bootstrapping, in contrast, makes no such assumption (Efron & Tibshirani, 1993).

The bootstrapping results confirm that entrepreneurial skills mediate the relationship between PA and *current performance* (coefficient = 0.175, bootstrap SE = 0.072, 95 % CI from 0.066 to 0.346) and between NA and current financial performance (coefficient = -0.176, bootstrap SE = 0.064, 95 % CI from -0.312 to -0.067). Hence, hypotheses 9 and 11 are further supported.

Table 6  
*Bootstrapping*

	Current performance			Growth Performance		
	Coefficient	SE	CI	Coefficient	SE	CI
PA	.175	.072	.053 .317 (P) .066 .346 (BC)	.085	.051	.013 .225 (P) .022 .242 (BC)
NA	-.176	.064	-.289 -.061 (P) -.312 -.067 (BC)	-.085	.045	-.18 -.011 (P) -.187 -.016 (BC)

Note. P = Percentile based interval. BC = Bias corrected interval. CI = Confidence Interval. SE = bootstrap standard error. Coefficients, standard errors, and confidence intervals for indirect effects are calculated using bootstrapping (500 replications)

In addition, bootstrapping results confirm that entrepreneurial skills mediate the relationship between PA and *growth performance* (coefficient = 0.85, bootstrap SE = 0.051, 95 % CI from 0.022 to 0.242) and between NA and *growth performance* (coefficient = -0.85, bootstrap SE = 0.045, 95 % CI from -0.187 to -0.016). Hence, hypotheses 10 and 12 are further supported.

Second, the present study used an average of the 10 items of each dimension of affect, to study the effects of PA and NA respectively. This kind of valence based approach does not account for potentially differing effects of different emotions (feelings) of the same valence, e.g. strong and interested. But these emotions of the same valence might affect the decisions of individuals differently (Lerner and Keltner, 2000) and thereby his/her performance. A robustness check was conducted to estimate the effects of each of the 20 affect items on the respective firm performance measures. The robustness check reveals that some specific feelings had significant effects (Excited, Strong, Irritable)

while the overwhelming amount did not. Overall two, “Strong” (coefficient = 0.319,  $p < 0.05$ ) and “Irritable” (coefficient = -0.215,  $p < 0.05$ ), of the 20 items had significant effects on *current performance*, while one item, “Excited” (coefficient = 0.147,  $p < 0.05$ ), had significant effects on *growth performance*. These findings indicate that the valence based approach does not cause conflicting results.

## 5 Discussion & Contribution

Following claims to further investigate underlying mechanisms of the affect firm performance relationship (e.g. Baron & Tang, 2011), the present study investigated the potentially mediating role of entrepreneurial skills. I found that entrepreneurial skills mediate the relationship between affect and both the *current performance* and *growth performance*.

The present study thereby adds to our understanding of the complex processes which underlie the relationship of individual-level variables and firm performance. Understanding these complex processes has been identified as an important task by many researchers in the field of entrepreneurship (e.g. Baum & Locke, 2004) and previous literature investigating other underlying mechanisms is scarce. Except for one study, which investigated the mediating role of creativity in the PA-firm innovation relationship (Baron & Tang, 2011), no other previous study has statistically tested for mediators underlying the affect-firm performance relationship.

Further, no previous study has empirically investigated mechanisms underlying the relationship between NA and firm performance. I suggest, however, that an understanding of the relation between both NA and PA and firm performance is important, since both dimensions of affect are largely independent of one another (e.g. Watson & Clark, 1984). The present study finds that both relationships between PA and NA and firm performance are significantly mediated by entrepreneurial skills. This finding has practical implications. First, it implies that individuals high on PA and low on NA have better chances to become a successful entrepreneur. It also implies that a one-sided approach to increase PA may be ineffective if it is accompanied by a simultaneous increase in NA.

Another contribution of the present study derives from the performance measures that were employed. Both measures, *current performance* and *growth performance*, estimate the financial performance of a firm. No previous study has empirically investigated mechanisms underlying the relationship between affect and the financial performance of a firm. It is, however, pivotal to understand what drives the financial success of a firm as it constitutes one of the most important firm performance measures (Maltz, Shenhar, & Reilly, 2003). The present study finds that entrepreneurial skills mediate the relationships between affect and both financial firm performance measures and thereby adds to our understanding what drives the financial success of a firm.

Considering that firm performance of entrepreneurs constitutes an important predictor of economic growth, another implication of the present study is that PA and NA might not only influence the firm performance, through entrepreneurial skills, but, in a wider context, the growth of an economy.

The present study also supplements two largely independent streams of research, one stream linking affect with entrepreneurial skills (e.g. Baron, 2008) and one linking entrepreneurial skills with firm performance (e.g. Shane, 2003), by empirically investigating both relationships. Consistent with previous literature I found support for a significant relation between affect and entrepreneurial skills (Baron, 2008). More precisely, I found that PA enhances and NA reduces entrepreneurial skills. These results are consistent with and empirically verify the predictions made by Baron (2008). Further, in line with previous studies (e.g. Shane, 2003) the present study found that entrepreneurial skills positively predict firm performance. More precisely, I found that entrepreneurial skills positively predict both the *current performance* and *growth* performance. Therefore, the present study adds to previous studies, by empirically verifying the positive influence of entrepreneurial skills on firm performance (e.g. Baron, 2008).

In addition, the present study investigated whether affect directly predicts the two focal firm performance measures. In contrast to previous studies (e.g. Baron & Tang, 2011), the present study did not find a significant relation between affect and firm performance. A potential explanation for the insignificant total effects is that the affect of an individual may have indirect rather than direct effects on firm performance. This explanation is in line with previous research which investigated the influence of entrepreneurial traits, such as passion, on firm performance and only found indirect not however direct effects (e.g. Baum & Locke, 2004).

## **6 Limitations and future research**

While the findings of the present research are mostly in accord with the tested hypotheses, they are subject to important limitations. A first stream of limitations derives from the assumption that the mediation model is correctly specified, which means that all omitted effects and covariances are assumed to be zero (Kenny & Judd, 2014). However, the model has not accounted for some potentially important variables. First, the present study assumes a linear relationship between affect and the respective firm performance measures. In contrast, Baron et al. (2011) have shown that a non-linear, quadratic relationship would be closer to the true relationship. In other words, the present study has omitted potentially important non-linearities. Thus, future research should try to replicate the results while controlling for non-linearities. Second, a variety of variables potentially mediate the focal relationship. Apart from entrepreneurial skills, none of the other potential mediators were examined

in the present study. Future research should investigate the role of these other mediators, by taking cognitive processes, entrepreneurial skills, and goals into account. In addition, it cannot be ruled out that the independent variables affected and were affected by past firm performance and the causal relationships may be reciprocal. Furthermore, the model took only sole-proprietors from one geographical region, the Netherlands, into account. Future research should verify the obtained results by investigating entrepreneurs from other geographical regions.

Further limitations are due to the employed measures of firm performance. First, all of the employed measures are self-report in nature. Even though these measures were mainly based on ones used in previous research, they may be biased. Thus, future studies should replicate the present study using additional measures of these variables, to give more confidence to the obtained results.

Second, the presently employed firm performance measures have been too one-sided to estimate firm performance comprehensively. The present study has solely relied on financial performance measures to estimate firm performance. Even though, the financial performance may be one of the most important performance measures (Maltz, Shenhar, & Reilly, 2003), a mix of financial and non-financial measures is more suitable to capture firm performance comprehensively (e.g. Zahra & Covin, 1993). Future research should try to replicate the obtained results while employing financial and non-financial performance measures, including previously employed measures such as profit, innovation, satisfaction with firm performance, employee-, or sales growth (e.g. Baron & Tang, 2011; Gorgievski et al., 2014).

Third, the two presently employed measures of the firm performance deviate from previous studies which assessed financial firm performance. First, the present study employed a measure which estimated the *current performance*. Even though this measure included typically employed measures, such as income or revenue estimates, it deviated from previously used measures as those typically accounted for a growth over time (e.g. Gorgievski et al., 2014) while the present study did not. With regard to the performance measure *growth performance*, it is noteworthy that while previous studies have measured growth in terms of past growth, either through objective measures or self-reports (e.g. Baron et al. 2011; Gorgievski et al., 2014) the present study used self-reported expectations to estimate *growth performance*. The deviation of presently employed firm performance measures compared to previous studies is of importance as the effect of individual level variables may, at times, lead to favorable outcomes on one performance dimension and unfavorable outcomes on a different performance dimension (Lumpkin & Dess, 1996). Therefore, future research should not only try to replicate the present results by employing additional firm performance measures to financial performance but also by estimating the financial performance measures in a more similar manner compared to previous studies.

Further, the statistical tools which were employed to test for mediation, may be limited in their statistical power. The Sobel test assumes a normal distribution of the indirect effect, which may be erroneous (e.g. MacKinnon et al., 2002), as the distribution may neither be normal nor symmetrical (Bollen & Stine, 1990). For instance, Preacher and Hayes (2004) have shown that the Sobel test can suggest no mediation, while after bootstrapping the sampling distribution of the indirect effect, significant indirect effects were found. To circumvent this disadvantage of the Sobel test and give further confidence to the obtained results, the distribution of the indirect effect was bootstrapped, as bootstrapping does not make any assumption about the distribution of the indirect effect (Efron & Tibshirani, 1993). However, Koopman, Howe, Hollenbeck, and Sin (2015) have shown that bootstrapping has low statistical power under some conditions. Therefore, conclusions about causality in present study should not be drawn and future research should further verify the results by using an additional statistical test, such as the empirical M test (Holbert & Stephenson, 2003), to assess whether entrepreneurial skill mediate the relationship between affect and firm performance.

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