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## The Importance of Being Emotional: How do Emotions Affect Entrepreneurial Opportunity Evaluation and Exploitation?

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# The Importance of Being Emotional: How do Emotions Affect Entrepreneurial Opportunity Evaluation and Exploitation?

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## Abstract

We examine the impact of positive (joy) and negative (fear) emotions on distinct phases of the entrepreneurial process. To analyze the effects of emotions on entrepreneurial opportunity evaluation and exploitation we use an experimental design completed by 146 participants from 40 young entrepreneurial firms. As predicted by the emotion-as-information theory and by the concept-priming theory, induced emotions change perception and decision-making of unrelated economic situations, namely entrepreneurial evaluation and exploitation. The results demonstrate that on the one hand, positive emotions affect opportunity evaluation positively and on the other hand, exploitation, negatively. Surprisingly, it is shown that negative emotions influence not only opportunity evaluation, but also opportunity exploitation negatively.

## 1. Introduction

Traditionally, it is implied that people exhibit perfect rationality and have consistent preferences as they pursue the idea of expected utility maximization (Leiser and Azar, 2008). Therefore, cognitive biases and emotions are assumed to be non-existent. However, many studies challenge the assumption that the standard model is a perfectly rational decision maker (Ben-Shakhar et al., 2007). Researchers following the notion of new institutional economics have started to extend the basic model by assuming bounded rationality (Dequech, 2006; Casson, 2005; Shane, 2000, 2003; Delfgaauw and Dur, 2007) and behavioral scholars are now broadening the model by incorporating robust psychological findings (Kräkel, 2008; Ben-Shakhar et al., 2007; Dew et al., 2008; Hayton et al., 2002).

Entrepreneurship research has only recently begun to focus more on the effect of cognitions and emotions. However, the theoretical and empirical research has been fragmented and limited (Brundin et al., 2008; Cardon et al., 2009; Corbett, 2007; Corbett and Hmieleski, 2007). Nonetheless, several authors (e.g. Baron, 1998, Baron and Ward, 2004; Mitchell et al., 2007) emphasize the importance of cognition within the entrepreneurial context. Defining entrepreneurship as a cognitive process (e.g. Shane and Venkaraman, 2000; Shane, 2003), scholars have analyzed cognitive biases that distinguish entrepreneurs from other groups of people (Baron, 1998; Sarasvathy et al., 1998). For instance, individuals who try to exploit a new opportunity have been shown to be more likely than others to assume that things will turn out well (Baron, 1998, 2004; Simon and Houghton, 2003; Hmieleski and Baron, 2009). Many additional studies have analyzed other cognitive heuristics, such as the planning fallacy (e.g. Keh et al., 2002), the illusion of control (e.g. Keh et al., 2002; Simon and Houghton, 2002), the belief in the law of small numbers (e.g. Keh et al., 2002; Simon and Houghton, 2002), reasoning by analogy (e.g. Simon and Houghton, 2002), risk propensity (e.g. Forlani and Mullins, 2000; Mullins and Forlani, 2005) and certain learning capabilities (Corbett, 2007). Therefore, it has been argued that non-rational decision-making caused by the use of heuristics may be, under certain conditions of environmental uncertainty and complexity, an effective and efficient guide to decision-making (Mitchell et al., 2007; Busenitz and Barney, 1997). Furthermore, it has been argued that cognitive biases are relatively stable for individuals over time, situation and context (Schulman et al., 1993).

Emotion, on the other hand, is said to be an affective experience that arises from an event (Côté, 2005). Emotions are relatively intense; however, they do not last very long (e.g. Frijda, 1986; Lazarus, 1991; Levenson, 1994). Therefore, the assumptions of rationality, as well as that of consistent preference, are both challenged as soon as emotion is considered. The role of emotion and the importance of being emotional has attracted growing attention in economics over the past decade (Elster, 1996, 1998; Frank, 1988; Loewenstein, 1996, 2000). However, it is surprising that emotions have only recently been recognized to play a significant role in the entrepreneurial process (Goss,

2005a, 2005b, 2008; Cardon et al., 2005; Foo, forthcoming; Foo et al., 2009). To overcome this lack of research and structure, Baron's (2008) recent theoretical contribution builds on existing general psychological research findings of emotions and cognitions to explain the effects of positive emotions in the entrepreneurial process.

Leaning on a wide-ranging body of psychological research, it has been denoted that emotions provoke strong effects on cognition (e.g., Forgas, 2000; Isen, 2002). Furthermore, two general explanations exist as to why emotions may play an even more important role in an entrepreneurial context, than in a general organizational setting. Firstly, the environments in which entrepreneurs act are usually unpredictable and uncertain. In such situations, emotion can determine specific actions or decision-effects, which it may not shape in environments that are less uncertain and less unpredictable (e.g., Forgas and George, 2001; Hsu et al., 2005). Secondly, specific tasks that entrepreneurs perform, such as decision-making and judgment (Ireland et al., 2003) are ones that have previously been shown to be strongly affected by emotion (Baron, 2008). Hence, economic models that allow for bounded rationality and incorporate the effect of emotions are more appropriate within the entrepreneurial context.

Thus, on the one hand, the relevance of emotions in entrepreneurship seems even more important than in many other organizational settings. On the other hand, very little theoretical and empirical work exists concerning the notion of emotion and its influence on entrepreneurship. Hence, to exploring such relationships to gain a better understanding in an entrepreneurial context seems crucial. Existing literature and research examining these issues so far has been limited in three important ways.

The first of these is to explain the effect of emotions on opportunity exploiting. Baron (2008) focuses on the effects of emotion on stress tolerance and the ability to acquire new resources. Although these aspects may be important, it has remained virtually unchallenged that resource allocation and risk taking is at least as important in order to exploit new ideas successfully. Accordingly, it seems essential to expand on Baron's theoretical model by including these elements. Moreover, other theoretical explanations such as the emotion-maintenance hypothesis that may explain the influence of emotion on certain entrepreneurial cognitive processes have not yet been presented by Baron (2008).

The second of these limitations is that despite the growing theoretical interest among scholars, very little empirical economic research on emotion has been conducted (Bosman et al. 2005). Although more specific psychological research links emotion with cognitive processes, this relationship has to date been documented in only a few narrow experimental setups. There have not been many complementary analyses in more realistic settings (e.g. Kliger and Levy, 2003; Chuang and Lin, 2007). To our knowledge there has been very little work so far that examines the relationship between emotions and entrepreneurship empirically and almost no experimental approaches to studying entrepreneurship and emotions. For instance, Brundin et al. (2008) analyzes how and why emotional displays of managers influence the willingness of employees to act entrepreneurially. Although this work offers an interesting starting point, it is limited in one aspect. It does not distinguish between the different aspects of the entrepreneurial process. This is a troubling oversight given that opportunity evaluation and exploitation may not always be correlated with emotional states in the same direction. Thus, there is the need for additional empirical research that is more entrepreneurially focused than that of past research and that would enable a differentiated analysis of the effect of emotions in distinct entrepreneurial phases.

The third limitation is that the effect of emotion and entrepreneurship so far has been analyzed only on the basis of correlations from self-reported data (Brundin et al., 2008; Foo et al., 2009). However, to identify causal interactions between emotions and the entrepreneurial processes, it is necessary to induce emotions in an experimental setting. Nonetheless, it is important to provide the utmost flexibility to non-student participants, and therefore it might be necessary to offer an online experimental tool. Although psychological research uses various tools to induce emotions such as mood-suggestive photographs, autobiographical recalls, film clips and music tracks, not all of these methods seem feasible to induce positive and negative emotions via an online experiment (Görizt and Moser, 2006).

The goal of this investigation is to address these gaps to gain greater understanding of distinct entrepreneurial phases by focusing on the effects of positive and negative emotions in opportunity evaluation and exploitation, and to assess them through an experimental online research setting. Hence, this research makes some important contributions to previously conducted research. First, it offers additional support for the general need to incorporate emotions in economic modeling.

Furthermore, it expands on Baron (2008), proposing a certain influence of emotions incorporating additional aspects of the entrepreneurial process that have not yet been addressed. The second contribution it offers though the empirical setting, it endeavors to overcome some of the shortcomings of past empirical research by focusing on entrepreneurship and distinguishing between the distinct phases of entrepreneurship. We examine these relationships utilizing an online experiment with entrepreneurs which induces positive and negative emotions and which presents a case study in the context of entrepreneurship. Hence, third, it contributes to future research, because it offers an experimental approach to inducing positive and negative emotions via an online experiment. In doing so, we seek to establish the theoretical and practical value of analyzing emotions present in the entrepreneurial setting.

## 2. Theory and hypotheses development

The following section is twofold. First, we describe potential underlying mechanisms that describe the effect of emotions and cognition. Second, we outline the potential influence of emotions in opportunity evaluation and opportunity exploitation. This focus ignores the influence of emotions in opportunity recognition, even though it has been considered as a fundamental phase of creating a new venture (e.g. Ardichvili et al., 2003; Baron, 2006; Shane, 2003). However, opportunity recognition is a process that is not only characterized by creative thinking (Knight, 2005), but also by the access to information via life experience (Shepherd and DeTienne, 2005) and social networks (Evald and Klyver, 2006). In turn, building a knowledge base and a personal social network requires long-term involvement that is most likely determined by in large though the general characteristic and circumstance of the individual, rather than the short-term effects of emotional experiences. That is why it is reasonable here to concentrate on the influence of emotions in opportunity evaluation and exploitation, as these phases of the entrepreneurial process are more likely to be influenced by emotion. Therefore a theoretical explanation is suggested for the influence of emotion in the entrepreneurial evaluation and exploitation of opportunities. Hence, through this research, our intention is to provide a broader understanding of different effects of emotion within the distinct phases of entrepreneurship.

### 2.1 Underlying mechanism of emotions' effect on cognitive processes

Scholars, who study emotions, are still confronted by a distinct diversity of definitions for emotions (for a brief review, see Seo and Barrett, 2007 and Russell, 2003). Indeed, there is little consensus to indicate as to where emotions end and where its consequences begin (e.g. Eisenberg, 2000). On a very broad basis, researchers agree that emotions involve the interaction of cognitive and non-cognitive neural systems (Cacioppo and Gardner, 1999). In line with this understanding, emotions are defined as an integration of intrinsic and adaptive subsystems resulting from the evolutionary needs of survival (Ashkanasy, 2003).

The interaction between emotions and cognition are reciprocal in nature so that, as suggested by several authors, feelings shape thought and thought shapes feelings (e.g., Isen and Baron, 1991). To illustrate this, Lazarus (1991), on one hand, concluded that emotions are set off by cognitions. On the other hand, Zajonc (1985) argued that emotions are essentially instinctive reactions and therefore constitute antecedents. Following current appraisal theories, cognitions (opinion, belief and judgment) are believed to play a central role in the formation of emotions (e.g. Lazarus, 1991; Roseman, 2001; Barsade and Gibson, 2007). Thereby, emotions are defined as affective experiences, including such things as joy, surprise, anger, fear and hope. In this line of argumentation, emotions typically arise when an event (stimulus) is appraised as relevant for one's concerns or interests (Côté, 2005). Positive emotions result when one's interests are promoted. When one's interests are dissatisfied, then negative emotions are activated (Bosman et al. 2005). Emotions are relatively intense; however, they do not last very long (e.g. Frijda, 1986; Lazarus, 1991; Levenson, 1994). The pattern of appraisals determines what emotion is experienced. As a consequence to the appearance of emotions a number of responses are activated, such as action tendencies, cognitive tendencies, subjective internal experiences, facial, bodily expressions and physiological changes (Zimbardo and Gerrig, 2003). Côté (2005) used the example of the threat of being laid off to illustrate how complex patterns of change occur after emotional experience has been elicited. We will use the following example, similar to that used by Côté (2005), but more directly related to the entrepreneurial context, to illustrate the sequence of the emotional process. Due to a global finance crisis that had lead to a financial bind, the threat of difficulties in acquiring new capital appeared. From this perceived threat by the entrepreneur, it may have elicited an emotion of fear and as a consequence, where the entrepreneur may have been motivated to work even harder (action tendency) as he strived to try and push the marketability of the new opportunity (cognitive tendency). He talked with friends and told them how

worried he was about the poor financial situation of his start-up (subjective internal experiences). The raising of eyebrows would most likely occur (facial and bodily expressions) and the increase of blood pressure and heart rate (physiological change) would be likely also to take place.

Importantly, once fear (or any other emotion) is elicited, it may be most likely to influence unrelated events (Schwarz and Clore, 2003). Hence, affect can influence the cognitive processes, such as decision-making, even when the emotion does not stem from the objects, persons, or events being evaluated (Forgas, 2000; Gangemi and Mancini, 2007; Foo, forthcoming).

Many economic researchers who explore the interaction of emotions and cognition usually employ a valence-based approach. Valence, is defined as the extent to which an experience is pleasurable (Elster, 1998; Forgas 1995; Higgins, 1997).

State (or event-generated) emotions are changes in current feelings produced primarily by external events (Baron 2008). In this line of argumentation, emotions typically arise when an event (stimulus) is appraised as relevant for one's concerns or interests. Positive emotions result when interests are promoted. When interests are dissatisfied, negative emotions are activated (Bosman et al. 2005). To view these event-generated emotions in an economic model, behavioral economists consider emotions as (psychological) costs or benefits in the utility function.

In contrast, trait (dispositional) emotions are stable tendencies to experience specific emotional reactions across many situations (e.g., Isen, 1999). Past research in psychology shows that emotions influence the process of decision-making by changing the perception and evaluation of other costs and benefits (Bosman et al., 2005; Elster, 1998). Optimism may be seen as such a trait emotion, as it is defined as "generalized expectancies for experiencing positive outcomes" (Hmieliski and Baron, 2009). Embedded within the extant field of optimism literature it has been indicated by research that optimism influences the beliefs of individuals about achieving goals (Scheier et al., 2001) and that it has a curvilinear relationship with decision-making (Casson, 2005) and performance (Brown and Marshall, 2001). The focus of this work will be on state emotions, but wherever helpful we will refer to the extant work on optimism in entrepreneurship to explain potential effects of emotions on opportunity evaluation and exploitation.

To understand how emotions change perception and evaluation different theoretical models have been suggested and empirically tested. The underlying mechanism of emotion cognition interaction is typically explained in two major ways. Both ideas have in common that they presume that emotions change the way in which information is processed. They differ in how they change information processing (Clore and Tamir, 2002). The first is based on the informative character of emotions and assumes that emotions offer additional information that is processed (Schwarz and Clore, 2003). The second relates to the potential priming effect of emotions and assumes that emotions filter the kind of information that is processed (Bower and Forgas, 2001).

The emotion-as-information theory suggests that emotions provide people with heuristic cues (e.g., Bless, 2001; Clore et al., 2001; Martin, 2001; Schwarz, 2001). Hence, emotions offer additional information for deducing reactions to a specific event or stimulus (Schwarz and Clore, 2003; Ellsworth and Scherer, 2003). Positive emotions indicate an unproblematic state of affairs, and thereby trigger looser, less systematic, and more expansive, divergent thinking (e.g., Isen, 2001). Negative emotions signal a problematic environment and boost people to systematically address the problem and find solutions (Schwarz and Clore, 2003). In addition to the informative character of an emotion, Isen and Patrick (1983) regard emotion maintenance as a key motive (Carver, 2003). The emotion-maintenance hypothesis concludes that people in positive emotional states are trying to preserve these positive emotions and to alter negative ones. Thus, on the one hand, in a positive emotional state, people will tackle a situation (or problem) in a less problematic manner and will therefore be less willing to put effort and resources into solving the task. On the other hand, in a negative emotional state, people will interpret a situation (or problem) in a more problematic manner and will therefore be more willing to work harder to solve the task in the hope of reducing the negative emotional state.

Compared to the emotion-as-information theory, the concept-priming theory offers another explanation for the effect of emotions on cognition. The concept-priming theory assumes that emotions prime concepts and memories (Bower and Forgas, 2001). It briefly argues that emotions serve to prime emotion-congruent memories, which in turn serve as the basis for the evaluation process (Baron, 2008). Therefore, it is assumed that emotions control perception by influencing what is accessible by memory, when judgment takes place which is based on what is retrieved from memory (Clore and Tamir 2002). For instance, when individuals are in a positive emotional state, positive associations or

memories are brought to mind. Vice versa, when individuals are in a negative emotional state, negative associations and memories are activated (e.g. Bower, 1991). Emotions should therefore automatically prime previously contemplated related ideas and memories by facilitating their use in tasks that require constructive thinking.

It is important to note that these theories may assume different effects on cognition. On the one hand, following the general emotion-as-information theory and the concept-priming theory, positive emotions positively influence perception and decision-making and negative emotions have a rather negative effect. On the other hand, the emotion-maintenance hypothesis suggests the exact opposite, that positive emotions have a negative effect on cognitive performance and vice versa.

Furthermore, it is important to note that past research has shown that an emotional state can sometimes help us to respond more quickly and effectively without impairing the quality of the outcome (Isen and Means, 1983). At other times, an emotional state can foster cognitive and judgmental errors leading to sub-optimal, even mistaken judgment and decisions (Forgas, 1998). A priori it is almost impossible to know whether the potential irrationality that occurs due to emotions may ameliorate the objective evaluation of an opportunity or the use of resources in order to exploit an opportunity. Shown in the following sections, is how certain emotions may have a positive or negative effect on opportunity evaluation and exploitation. Here, we will be referring to the 'perceived value' of the opportunity. Still, it is possible, but of minor importance to our experiment, that this change in evaluation and exploitation willingness may be "incorrect".

## 2.2 Opportunity evaluation

Following the definition of entrepreneurship by Shane et al. (2003), the evaluation of potential new ideas is a fundamental cognitive process for entrepreneurial success. A few scholars have started recently to analyze the effect of emotions on entrepreneurial opportunity evaluation (Welpel et al., 2008). Hence, the extensive work on the impact of emotions on judgment and decision-making seems to be a promising starting point (Baron, 2008).

The influence of emotions on judgment and decision-making has often been explained by the concept-priming theory (e.g. Clore and Tamir, 2002). It is predicted that people in positive emotional states tend to rely on positive memories while evaluating a situation. People in negative emotional states are expected to rely on negatively associated memories while evaluating a situation. Forgas (2002a, 2002b) points out, that numerous studies provided empirical support for these predictions (e.g., Baron, 1987; Bower, 1991; Clark and Isen, 1982; Forgas and Bower, 1987; Isen, 1987; Sedikides, 1992, 1995). The more positive memories are considered to evaluate the situation, the more positive the evaluation will finally be. And vice versa, the more negative memories are considered to evaluate the situation, the less positive the evaluation will be. However, the priming-effect of emotions is not an invariable phenomenon and there are certain limitations to be considered (Clore and Tamir, 2002). The priming model suggests that judgment and evaluation are based on what is recalled from memory. Yet some scholars question whether evaluation is in fact typically based on memory recall from past experience (e.g., Clore and Tamir, 2002).

Research suggests that the effect of emotions on decision-making and evaluation is most likely present when decision-makers are faced with complex and challenging situations that involve the use of open, constructive processing strategies that facilitate the use of information primed by current emotions (Forgas 2002a; Berkowitz et al. 2000; Bless and Forgas 2000; Bower 1991; Clore et al. 1994; Forgas and Ciarrochi 2001; Kuvaas and Kaufmann 2004). The effect of emotions on opportunity evaluation can also be deduced from the emotion-as-information theory. Thereby, it is assumed that people in positive emotional states will use the emotion as additional information and interpret the situation as an unproblematic one (e.g. Isen, 2001). Hence, *ceteris paribus*, they will tend to evaluate a situation less risky than a person who is not in the same positive emotional state. As a consequence, the entrepreneur who is in a positive emotional state will evaluate an opportunity more positively. The opposite is true for an entrepreneur in a negative emotional state. Nonetheless it is important to note, that this evaluation reflects only a subjective perceived value of the opportunity, which may or may not be of objective value (Shane and Venkaraman, 2000; Eckhardt and Shane, 2003; Vaghely and Julien, 2010).

Furthermore, past research also suggests that individuals that are in a negative frame of mind are more likely to follow a more analytic approach to understanding situations and focus more on

understanding the data at hand and less on pre-existing schemas, scripts, and top-down simplifying heuristics (Kaufmann, 2003; Schwarz and Clore, 2003). This might not always be as favorable as the use of heuristics and therefore potential non-rational decision-making may be on the grounds of environmental uncertainty and complexity an effective and efficient guide to decision-making (Busenitz and Barney, 1997). If heuristics such as the cognitive optimism bias and risk perception is reduced by negative emotional experiences the current individual risk perception of an opportunity and thereby its evaluation will be changed (Grichnik, 2008; Palich and Bagby 1995). Therefore, the effect of negative emotions may lead to a more pessimistic evaluation of the opportunity. A positive emotional state may lead to a more optimistic evaluation of the same opportunity.

Since entrepreneurs often have to evaluate complex and challenging situations in environments that are generally difficult to predict (e.g., Lichtenstein et al., 2006; Sarasvathy, 2001, 2004; Dew et al. 2008) and since evaluation in complex situations tends to increase the effect of emotion on the evaluation process, it seems reasonable to assume that emotion greatly influences this aspect of the entrepreneurial process. Hence, it can be concluded that positive emotions are positively related to preferences regarding the evaluation of a new opportunity and negative emotions are negatively related to preferences regarding the evaluation of a new opportunity. Together, previous findings and considerations of the role of emotions in judgment and decision-making suggest the following hypotheses.

**Hypothesis 1a:** Entrepreneurs who are in a positive emotional state will evaluate new business opportunities more positive than those who are under neutral conditions.

**Hypothesis 1b:** Entrepreneurs who are in a negative emotional state will evaluate new business opportunities more negative than those who are under neutral conditions.

### 2.3 Opportunity exploitation

Another fundamental set of research questions about entrepreneurship is “why, when and how some people [...] exploit” (Shane and Venkataraman, 2000, p. 218; Sadler-Smith et al., 2003) new opportunities. Although there is no disagreement in the fact that the evaluation of an opportunity influences the willingness to take actions and start new ventures, there is a distinct difference between evaluation and exploitation. The later involves decisive action, i.e. a concrete decision on how to allocate available resources. Although scholars have recognized that emotional state may play a significant role in the entrepreneurial exploitation process, research to date in this area has been fragmented (Cardon et al., 2005; Foo et al., 2009).

Recently, Cardon et al. (2009) have proposed a theoretical model on the influence of entrepreneurial passion, which suggests, that “intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur” (Cardon et al., 2009, p. 12) are tied to venture growth, i.e. entrepreneurial exploitation. They argue that this type of positive feeling enhances the willingness of entrepreneurs to take risks involved in venture creation and it increases the willingness to allocate more resources to the venture. It is interesting to mention here that research on optimism predicts the exact opposite. Thereby, a generalized expectancy for experiencing positive results is linked to negative outcomes (e.g. Hmieleski and Baron, 2009). Therefore, it is likely that opposing stable personal tendencies, such as optimism and entrepreneurial passion balance themselves out. However, this line of argumentation is role-specific and does not focus on emotions that occur as a result of surrounding events in the entrepreneur’s immediate environment (situational approach).

Hence, once more it seems necessary to lean on existing research on general decision-making and resource allocation to find out more about the relationship between emotions and entrepreneurship. The emotion-maintenance hypothesis offers insights in the emotion cognition link and suggests that people self-regulate their behavior to reduce discrepancies between actual states and desired states (Carver, 2003). Hence, negative emotions may increase the focus toward a certain goal and indicate the need to strive harder in order to achieve them (Schwarz, 2001). Therefore, actions involving high risk would become favorable when negative emotion indicated a high discrepancy between actual and desired states (Carver, 2003). Positive emotion indicates that goal achievement is going well (Schwarz and Clore, 1983, 2003). Positive emotion would indicate a low discrepancy between actual and desired states and therefore increase aversion towards actions that involve risk. Thus, the effect of emotions on taking action is explained by the wish to maintain a positive emotional state or diminish a negative emotional state (Chuang and Lin, 2007). Priming may even foster this effect. On the one hand, according to the priming hypothesis, negative emotions increase negative evaluation of a

situation and therefore increase the perceived discrepancies between actual and desired states. On the other hand, positive emotions influence the evaluation of a situation more positive and therefore decrease the perceived discrepancies. As mentioned above, the increased or decreased willingness to allocate resources to exploit the opportunity is the result of an individual's preference structure. It may or may not be an economical or rational improvement to an allocation decision made without the influence of an emotional experience.

It is important to note, that at first glance, the interpretation of the model presented by Cardon et al. (2009) and the emotion-maintenance theory seem to lead to contradicting results. However, it is important to bear in mind that Cardon et al. (2009) defined passion as intense positive feelings that cannot be easily diminished. Emotional states analyzed within the emotion-maintenance hypothesis are rather fragile and can easily be diminished by situational changes. Since entrepreneurs often have to decide whether to allocate more or less personal income and time to exploit an opportunity, and since all of these decisions comprise a certain amount of risk, it seems reasonable to lean on theories that explain the interaction between emotion and personal risk-taking to analyze the effect of emotion on entrepreneurial exploitation. When applied to entrepreneurs, negative emotions may indicate that progress toward opportunity exploitation is slower than desired and that they should then in turn increase the resources allocated to the exploitation (Foo et al. 2009). Hence, building upon the emotion-maintenance theory, it can be assumed that positive emotions are negatively related to the exploitation of new opportunities and negative emotions are positively related to the exploitation of new opportunities. These considerations point to the following hypotheses.

**Hypothesis 2a:** Entrepreneurs' intention to exploit new business opportunities will be lower when they are in a positive emotional state than in a neutral condition.

**Hypothesis 2b:** Entrepreneurs' intention to exploit new business opportunities will be higher when they are in a negative emotional state than in a neutral condition.

### 3. Description of the Experiment and Method

#### 3.1 Participants

It has been our goal to attain entrepreneurial individuals from young entrepreneurial firms. Hence, in order to identify young entrepreneurial firms, we have followed a two-fold process. First, we have used the directory of leading German online news forum ([www.deutsche-startups.de](http://www.deutsche-startups.de)<sup>1</sup>) focusing on the German entrepreneurship community. We have cross-checked the information provided in the directory by researching additional data provided by the respective company's internet pages and by the data bases of LexisNexis, Hoppenstedt and Creditreform. Second, to ensure a broader sample, that does not just include web 2.0 companies, we have identified additional firms presented as portfolio companies on the internet pages of German venture capitalists. The original sample consisted of 514 firms. Thereafter, we have endeavored to contact the CEOs of all the companies on the list. Out of the 514 companies we were able to talk to interact with 150 CEOs, 110 declined to take part in the study since they were too busy, currently in a restructuring phase or already out of business. So we ended up with a group of 40 companies located in Germany, each having at least three employees ( $M = 16.3$ ,  $SD = 12.1$ ) and a business model that indicated high entrepreneurial activities. The companies were founded between 2004 and 2008 (84% of them between 2006 and 2008). The majority of the firms (48%) are web 2.0 start-ups, another 12% are part of the new media industry, 21% are part of the high tech industry and the remaining 19% of the firms belonged to other industries. To reduce specific firm biases we decided to ask at least three individuals per company to take part in the study. Hence, we allowed non-founders to take part in the study. As entrepreneurs are not defined or equal to founders, but defined by their actions or the environment in which they work (Shane and Venkataraman, 2000), this approach appeared to be an appropriate method. Although the larger number of participants per company increased time restricted refusals, we felt the advantages outweigh the limitations. CEOs have been asked to inform employees about the online survey and provide us with their own email addresses and email addresses of participating co-founders and employees. By the deadline a total of 146 candidates had volunteered to participate in the online experiment. Participants' ages range from 18 to 55 years ( $M = 30.6$ ,  $SD = 6.69$ ) and as is typical in most young entrepreneurial firms (Brundin et al., 2008) the majority of the participants were male (92 men / 69.2%). Whereas 31.3% own (a significant share of) the firm, 17.9% earned a variable

<sup>1</sup> German equivalent to [www.techcrunch.com](http://www.techcrunch.com)

performance based salary and the remaining 40.8% had fixed salaries. Working experience ranges from 0.2 to 25 years ( $M = 6.3$ ,  $SD = 5.45$ ). Regarding their educational backgrounds, 22.0% have senior high school qualifications (German Abitur); a further 10.4% have received a university degree (Bachelor); 54.5% have a higher university degree (German Diplom or Master) and 13.1% have other forms of education achievements.

### 3.2 Procedures

Each participant received a personalized email with detailed instructions for participating in the experiment and a personal link to the online survey. Participants were asked to ensure that their information and communication technology equipment would allow a video clip to be played. Furthermore, participants were also asked to allow some extra time to ensure that they wouldn't be interrupted once starting the survey. Prior to any sort of manipulation, participants answered a number of questions regarding their emotional sensibility and current emotional states. We used an induction procedure equal to those used in prior studies (e.g., Gross and Levenson, 1995; Fong, 2006; Lerner et al., 2004). Participants were randomly assigned to either watch a film inducing a joyful emotional state ( $n = 52$ ), a film inducing a fearful emotional state ( $n = 47$ ) or no film at all ( $n = 47$ ). In the fear condition, participants watched a fear inducing video clip portraying a situation of a furious man menacing his wife. In the joviality condition, participants watched a joyful video clip, showing a scene of a comedian by a swimming pool<sup>2</sup>. Both film clips were about seven minutes in length. Immediately after viewing the clips, all participants in the joviality and the fear conditions have answered further questions regarding current emotional state prior to completing the short case study. Cases can take into consideration the complexities of the evaluation of opportunities and have been used in several studies with an entrepreneurship focus (e.g., Keh et al., 2002; Zacharakis and Shepherd, 2001). In order to test the robustness of our case study and our measures we asked 20 experts (entrepreneurs and other researchers) to critique our study. Thereby, we tested that the case presented did not appear absurd or bizarre (Friedman et al., 2006) and that it contained factors that are relevant in real life and factors that make up a realistic setting (Karren and Barringer, 2002). In line with past research we have kept the case to less than a page long. Hence, a large number of participants could be persuaded to take part in the study. Finally, participants have provided basic demographic information about themselves and the firms. Using this controlled setting, it allowed the possibility of experimentally manipulating emotions and cognitions. The experiment allowed to record cognition as a reaction to an emotional experience. These internal processes are otherwise very difficult to observe or analyze. Like all experimental designs, this experiment offers a high level of internal validity so that differences on the dependent variables between the conditions are exclusively evoked by the experimental manipulation (Croson and Gächter, 2010). All other influencing factors have been eliminated by randomly assigning the participants to the experimental conditions (McGraw, 1996). Therefore, causal inferences can be made, thus resulting in a more accurate understanding of distinct phases of the entrepreneurial process (Arenius and Minniti, 2005).

### 3.3 Measures

**Positive emotional state (joviality).** Drawing on the conceptual and empirical examination by Watson and Clark (1994), we use eight items from the PANAS-X joviality subscale (e.g., happy, joyful) in a standardized procedure to assess the individual's level of joviality prior to and after the emotion induction. These eight items together form a scale with high internal consistency (Cronbach's  $\alpha = .92$ , mean inter-item correlation  $r = .64$ ). The mean value of these eight items is the participant's "joviality" score. The higher the score, the less joyful is the participant's emotional state.

**Negative emotional state (fear).** To assess the individual's level of fear prior to and after the emotion induction, we use the six items of the PANAS-X (Watson and Clark, 1994) fear subscale (e.g., afraid, nervous) in a standardized procedure. These six items together form a scale with high internal consistency (Cronbach's  $\alpha = .81$ , mean inter-item correlation  $r = .52$ ). The mean value of these six items is the participant's "fear" score. The higher the score, the less fearful is the participant's emotional state.

<sup>2</sup> Both video clips have been tested in a pretest. Results of means with a sample of 20 participants indicated, that expected effects would hold in the experimental setting. These tendencies had been in line with past studies (e.g., Gross and Levenson, 1995) that induced emotions via (similar) video clips.

**Opportunity evaluation.** Forlani and Mullins (2000) and Shane and Venkataraman (2000) state among the most important factors pertaining to an entrepreneurial evaluation is the perceived risk, potential profit and the probability of success. In accordance with these factors, the participants of this empirical investigation have been asked to choose between scenarios (Mullins and Forlani, 2005; Palich and Bagby, 1995; Grichnik, 2008) or to evaluate the riskiness of one scenario (e.g. Foo, forthcoming). These scenarios have been very simplified and, therefore, in danger of not capturing emotional effects that determines specific decision-effects, which emotions may shape in situations that are more complex (e.g., Forgas and George, 2001; Hsu et al., 2005). As such, we have adapted the reflexive measure proposed by Keh et al. (2002) which has been used to measure the opportunity evaluation of an opportunity presented in a case study. Participants have answered three questions on 5-point rating scales from 1 (very weak) to 5 (extremely strong) on (a) how positive and (b) how promising they judge the proposed product innovation to be and (c) to what extent this situation is judged as an opportunity / chance. Note that these items represent a general evaluation of the situation, not a financial one. These three items together formed a scale with high internal consistency (Cronbach's alpha = .81, mean inter-item correlation  $r = .73$ ). The mean value of these three items is the participant's "evaluation" score. The higher the score, the more positive the evaluation of the presented opportunity is determined to be.

**Opportunity exploitation.** Entrepreneurs have to recombine resources (human capital and financial capital) in order to exploit new opportunities (Shane et al., 2003). Therefore, the entrepreneur has to choose how much of his personal resources to invest in order to exploit the opportunity. Therefore, opportunity exploitation (construct) is conceptualized as a set of resource allocation decisions (indicators). Exploitation does not exist as an independent entity. Rather, it is the result of a recombination of human and financial capital. Furthermore, a change in the indicators results in a change in the construct. The indicators do not share a common theme, which means that a change in the construct does not need to precede variation in the indicator. Therefore, all three theoretical considerations mentioned by Coltman et al. (2008) indicate that opportunity exploitation has to be a measured formative. Thereby, participants have been asked to answer three questions using 11-point rating scales from 0 (0%) to 10 (91-100%) on what percentage of (a) their own savings (40k EUR = 100%) and (b) a potential loan (40k EUR = 100%) would they be willing to invest in an increase in capital of the Newco Inc. and on (c) what percentage of leisure time (4 hours = 100%) would they be willing to give up in order to exploit the new product innovation. In exchange for less leisure time they would gain (additional) shares of Newco Inc., presented in the case study as spin off to exploit the product innovation. The higher the score, the higher the willingness is to allocate resources to the new opportunity. As exploitation is a formative index and not a reflective construct (Bollen, 1989; Churchill, 1979; Edwards and Bagozzi, 2000) reporting a measure for internal consistency is inappropriate.

## 4. Results

**Manipulations checks.** To ensure the effectiveness of the manipulation of the emotion induction, we have calculated participants' evaluation on the joviality PANAS-X subscale and the fear PANAS-X subscale. Hence, we have conducted a one-way analysis of variance ( $F_{\text{fear}} = 4.997$ ,  $p < 0.01$  /  $F_{\text{joy}} = 8.937$ ,  $p < 0.001$ ). The results show that the participants in the fear condition ( $M_{\text{fear}} = 4.3$ ,  $M_{\text{joy}} = 3.3$ ) felt more fearful and less joyful than in the control condition ( $M_{\text{fear}} = 4.4$ ,  $M_{\text{joy}} = 2.8$ ) and even more fearful and even less joyful compared to the participants in the joviality condition ( $M_{\text{fear}} = 4.7$ ,  $M_{\text{joy}} = 2.6$ ). These results suggest that the film clips used changed the emotional state of the participants. Hence, these results confirm the effectiveness of our manipulation of positive and negative emotions.

**Hypothesis testing.** The main purpose of this study is to examine the effect of positive and negative emotional states on entrepreneurial opportunity evaluation and exploitation. To ensure comparability, we have analyzed our collected data with the same method used in past research that analyzed the effects of emotions on behavior (e.g. Chuang and Lin, 2007). The one-way analysis of variance is used to test for differences among the independent groups (negative condition, neutral condition, positive condition) involved in the experiment. Hence, the statistical test is used to test for significant differences. Results are summarized in figure 1 and Table 1 and 2.

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Insert Figure 1 about here

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First, we have compared participants in the joviality condition with participants in the control condition. Regarding the evaluation of the new opportunity, the comparison of participants in the joviality condition ( $M = 10.71$ ,  $SD = 1.96$ ) and those in the control condition ( $M = 10.96$ ,  $SD = 1.44$ ) shows minimal differences. Hence, on the one hand, positively induced participants seem to perceive the opportunity less positive than participants in the control group. However, the analysis of variance does not show significance in mean differences. On the other hand, a more detailed analysis, using the PANAS-X scale compared to the type of condition as an independent variable, it shows a significant difference ( $F = 4.97$ ,  $p = 0.028$ ), the lower the positive emotional state, the less positive the evaluation of the opportunity is deemed to be. Hence, the hypothesis 1a that entrepreneurs who are induced into a positive emotional state will evaluate new business opportunities more positive than those that have not been induced into a positive emotional state can partially be supported by this study.

The intention to exploit a new opportunity seems to depend on the emotional state. The mean score of the exploitation scale of participants in the joviality condition ( $M = 15.04$ ,  $SD = 6.84$ ) are lower than the mean score of the control group ( $M = 17.47$ ,  $SD = 6.88$ ), indicating less resources are allocated to the new opportunity. The analysis of variance indicates that the interaction of exploitation intention and emotional state is statistically significant ( $F = 3.10$ , one-tailed  $p = 0.041$ ). Therefore, the hypothesis 2a that entrepreneurs who are induced into a positive emotional state will be less willing to exploit new business opportunities than those that have not been induced into a positive emotional state is supported by this study.

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Insert Table 1 about here

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Second, we have analyzed the influence of negative emotions (fear) on entrepreneurial opportunity evaluation and exploitation by comparing participants in the fear condition and participants in the control condition. The comparison of means shows that participants in the fear condition ( $M = 11.25$ ,  $SD = 1.95$ ) evaluate the opportunity presented in the case study more positive than participants of the control group ( $M = 10.96$ ,  $SD = 1.44$ ). Thus, on the one hand, negatively induced participants seem to perceive the opportunity more positive than participants of the control group. However, the analysis of variance does not show significance in mean differences. On the other hand, the usage of the PANAS-X subscale of fear as an independent variable shows without strong significance, the lower the negative emotional state the less negative the evaluation of the opportunity is deemed to be. Hence, the hypothesis 1b that entrepreneurs who are induced into a negative emotional state will evaluate new business opportunities more negative than those that have not been induced into a negative emotional state cannot be emphatically supported.

The mean score of the exploitation scale of participants of the fear condition ( $M = 15.79$ ,  $SD = 7.60$ ) is lower than the mean score of participants of the control condition ( $M = 17.47$ ,  $SD = 6.88$ ). The analysis of variance indicates that the influence the emotional state on the exploitation intention is statistically significant ( $F = 3.01$ , one tailed  $p < 0.043$ ). The hypothesis 2b assumes that entrepreneurs who are induced into a negative emotional state will be more willing to exploit new business opportunities than those that have not been induced into a negative emotional state. The results do not support this assumption but in fact the exact opposite.

Intrigued by the correlation between evaluation and exploitation we assumed some kind of mediating effect. Therefore, we analyzed the effect of evaluation on exploitation to increase our understanding of the effect of emotions on entrepreneurial exploitation. Thereby we performed a mediation analyses based on bootstrap sampling (5000 resamples) according to the approach of Preacher and Hayes (2004). From our findings we could not confirm a mediation effect of evaluation in the exploiting intention.

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Insert Table 2 and 3 about here

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## 5. Discussion and Conclusion

The purpose of our study has been to investigate how positive emotions (joviality) and negative emotions (fear) shape opportunity evaluation and opportunity exploitation. Rational choice models would have argued that the evaluation and exploitation of a new opportunity is based on rational decisions (Leiser and Azar, 2008). Contrary to this assumption, past cognitive research has shown that entrepreneurs have stable tendencies to behave irrationally. So far, recent work has concentrated on these stable tendencies, such as optimism, status quo bias, illusion of control and avoidance of sunk costs (Baron, 2004; Mitchell et al., 2007; Burmeister and Schade, 2007; Hmieleski and Baron, 2009). We argued that entrepreneurial behavior is not only influenced by stable cognitive biases, but also by short-term emotional experiences. Based upon existing psychological research on emotion and cognition, we have argued that positive emotions impact opportunity evaluation positively and the exploitation negatively. Vice versa, we have predicted that negative emotions influence opportunity evaluation negatively and the exploitation positively. We have used an experimental design to test the hypotheses empirically and find agreement between these theories that consider the importance of being emotional and the empirical data.

Consistent with the concept-priming theory, findings indicate that positive emotions foster a positive evaluation of a new opportunity, whereas negative emotions rather negatively influence the evaluation of a new opportunity. However, only the influence of positive emotions on opportunity evaluation was statistically significant, while the effect of negative emotions on opportunity evaluation was negligible. Furthermore, when predicting the willingness to exploit new opportunities by positive and negative emotional states, the results show that positive and negative emotions significantly decrease the preferences of entrepreneurs to allocate additional time and resources to the exploitation of new opportunities.

Some of these findings are both counter-intuitive and intriguing. They are counter-intuitive, because one might suppose, due to the emotion maintenance hypothesis that positive emotions influence entrepreneurial opportunity exploitation negatively and negative emotions influence opportunity exploitation positively. In contrast, from our study, the participants in the fear condition were less willing to exploit these opportunities than the participants in the control condition, although one might also assume this effect to be reserved only for the participants in the joy condition.

These findings are intriguing because they seem to be inconsistent with prior theoretical and empirical research that indicates no relationship (rational choice models) or a linear relationship between emotional state (emotion-as-information and concept-priming theory) and the effect on distinct phases of the entrepreneurial process. Furthermore, these findings are intriguing because they show not only that stable cognitive biases, such as optimism (Hmieleski and Baron, 2009) or risk propensity (Palich and Bagby, 1995) influence entrepreneurship, but relatively short-term emotional experiences also have the power to increase irrational behavior. Opportunity evaluation has been successfully explained by the emotion-as-information theory. However, opportunity exploitation could not be completely explained by the emotion-maintenance hypothesis. We had expected that when negative emotions increased the willingness to exploit opportunities, positive emotions would decrease the willingness to exploit opportunities. Hence, the theory did not offer an explanation as to why positive and negative emotions might both lead to less opportunity exploitation.

Interestingly though, our findings are somewhat in line with Davis' (2009) recent meta-analysis of the relationship between emotions and creativity. Thus, the positive effect on creativity of positive emotion is strongly significant in contrast to neutral emotional states, but the effect shrinks when weighed against negative emotional states. Hence, if negative emotions are induced, opportunity recognition might be positively influenced (George and Zhou, 2002). This effect, however, seems to be weaker than the effect of positive emotions. The fact that Davis (2009) could not significantly prove that negative emotions improve creativity is in line with our results. Nonetheless it is important to note, that this meta-analysis has been about the effect of emotions on creativity.

This line of argument might also hold for the effect of emotions on opportunity exploitation. In addition, an article by Foo et al. (2009), investigating the link between proactive behaviors and emotions, endeavors to explain the surprising positive effect of positive and negative emotions on proactive behaviors by expanding on the emotion-as-information theory. In line with their argument, one might assume that the willingness to allocate resources to exploit a new opportunity in the near future would be negatively influenced by negative emotions as these negative emotions turn the attention of the individuals toward tasks that require immediate attention.

Furthermore, we have used joy and fear as explicit examples of a positive and a negative emotion. These two emotions, although distinct in valence, may have certain similarities that might have led to an equal effect on opportunity exploitation. Smith and Ellsworth (1985) show that joy and fear are quite similar in the appraisal tendency category of attentional activity. On the one hand, assuming that attentional activity is key to the decision to exploit an opportunity, one might not be too surprised to find that joy and fear both decrease the willingness to exploit. On the other hand, joy and fear differ in their appraisal tendency of control and certainty. These are definitely two important aspects that influence, for example, the willingness to allocate financial resources. Thereby a similar effect of joy and fear on exploitation seems doubtful. To increase our understanding of this surprising finding, it would therefore be helpful to repeat our study using a number of other distinct emotions and compare them to our results.

This study contributes to the literature mentioned above in several ways. First, existing studies provide compelling evidence that cognitive factors influence entrepreneurship (Mitchell et al., 2002, 2004, 2007). While this research is essential, factors beyond cognition impact the entrepreneurial process (Baron, 2008). Scholars (e.g., Sarason et al., 2006) have called for a more complete theorizing of the entrepreneurial process that is able to incorporate the dynamic interaction of the individual and the opportunity. Our work builds on the theoretical work of Baron (2008), who has suggested, but not proved, a number of propositions regarding the role of positive emotions in the entrepreneurial process. We have extended on this conceptual work by including the effect of negative emotions to entrepreneurial opportunity evaluation and exploitation, and by clarifying additional mechanisms that correspond between emotion and the willingness to allocate resources to exploit new opportunities. Drawing on the emotion-maintenance hypothesis, we argue theoretically that positive emotions decrease the willingness to exploit new opportunities and negative emotions increase the willingness to exploit new opportunities.

Second, our study answers the call of Cardon et al. (2009), Goss (2007) and Shepherd (2004) for empirical investigation into the role of emotions in the entrepreneurial process. In order to account for different effects of emotions on distinct phases of the entrepreneurial process, our study distinguishes between opportunity evaluation and exploitation. In addition, it is one of the first empirical investigations that is specifically focused on an entrepreneurial setting investigating relatively short-term emotional experiences, instead of seemingly stable affective affairs, such as entrepreneurial passion or optimism. Consistent with the arguments of Baron (2008) evaluation is positively influenced by positive emotions. Surprisingly, exploitation seems also to be negatively related to negative emotions. Hence, it has shown that more additional theoretical work is required to examine the effect of negative emotions on opportunity exploitation.

Third, since it is difficult to schedule meetings with entrepreneurs, as they tend to work in a very time restricted environment, our online experiment proved to be an ideal way to interrogate entrepreneurs. The online experiment approach adds to the flexibility of gaining data and, in our case, enabling the entrepreneur to squeeze the survey into an already hectic day. When it comes to analyzing emotions by inducing emotional states, a complete variety of emotion induction methods does not seem feasible (Göritz and Moser, 2006). Presenting a short film sequences has here proved to be a suitable and reliable method of inducing positive and negative emotions (Gross and Levenson, 1995, 1997; Tiedens and Linton, 2001). Though too, not without its limitations, such as the need for appropriate infrastructure (access to high-speed internet with audio compatibility), the induction of emotion through the online film clip has its advantages over existing procedures, since it ensures the possibility of inducing positive and negative emotions. Previous online methods did not always succeed in inducing positive emotions. Hence, we succeeded in offering a compelling tool that can be used in future research with entrepreneurs. Past research had often to rely on student samples, and therefore it was sometimes weak in external reliability. For instance, this weakness of external reliability might have been disproportionately high when effects of emotion in entrepreneurship are correlated with certain cognitive biases, which are said to be typical characteristics for entrepreneurs. To research these types of questions, an online experiment for entrepreneurs seems ideally appropriate.

Several limitations of this study should also be considered. First, we have asked participants to report on their emotional state before and after having seen the video clip and it can be argued that this procedure might have reduced the effect of the emotion induction (Keltner et al., 1993; Schwarz and Clore, 1983). Although we used film clips that have been proven to be effective (e.g. Gross and Levenson, 1995), we wanted to be able to show that the positive and negative emotion induction also held ground in an online experimental setting. Prior research has offered some doubts as to the effectiveness of inducing positive emotions through the means of an online survey (Göritz and Moser, 2006). We felt the need to test for the efficiency of the emotion induction was higher than the risk to decrease the effect of the induction. Furthermore, using the PANAS enabled us to undertake a more detailed analysis of the effect of emotions in opportunity evaluation.

Second, participants self-reported their emotional states and it can be argued that these states have not been objectively measured (e.g., Nisbett and Wilson, 1977). However we are confident in the generalizability of our findings; nonetheless, more extensive tests could be useful. Hence, the use of a Magnetic Resonance Imaging (MRI), for example, could measure responses more accurately. Nonetheless, there are two reasons why we have decided to use the Watson and Clark's (1994) scale. It would have been very difficult (if not impossible) to persuade our participants to come to a certain facility, do an MRI and answer our questions. In addition, most studies on positive and negative emotions have utilized the PANAS, and we have been eager to use a commonly accepted measure so that our findings can be compared to existing research results.

Third, this study has utilized a questionnaire experiment with a short case study. Participants have been confronted with an entrepreneurial situation that provides information about a potential new product innovation. Although this approach offers a greater amount of information and more complexity than the hypothetical scenario technique (e.g. Burmeister and Schade, 2007; Brundin et al., 2008), it is still a simplification of what would normally be entailed. Hence, as emotions are shown to play a more important role in complex settings than in less uncertain and less unpredictable ones (Forgas and George, 2001), our results should be generalized with caution. Nonetheless, they offer a promising first insight into the importance of emotions in distinct phases of the entrepreneurial process. Even so, it is important to note that one main advantage of the hypothetical scenario technique is the possibility to define the optimal choice. With our case study, we could only show shifts in choice, but not the optimizing effects. If other researchers would want to find out more about the optimizing effect of emotions on decision, then they could ask an expert group to evaluate the case study (Corbett, 2007). However, even an expert group would not be free of biases to some degree.

Fourth, some additional external validity concerning our experiment has to be raised (Croson and Gächter, 2010). Apart from simplifying reality (Campdell and Ogden, 2006), our experiment tends to measure reported behavioral intentions to the presented situations, rather than actual behavior (Martin et al., 2007). Furthermore, decision in the hypothetical situation may differ from a decision in a real life situation, as the former does not have real life consequences for the participants (Greitemeyer and Weiner, 2006). Although these concerns cannot be ignored, decisions in a hypothetical situation are found to be a proxy for real life decision-making (Douglas and Shepherd, 2002).

Lastly, in order to measure opportunity exploitation, we have used a construction that measures behavioral intention as a proxy for future behavioral choices. Behavioral intentions are said to be the last step before the actual behavior is conducted (i.e., before resources are allocated). They have been defined as the subjective probability that an individual will perform a certain behavior (Fishbein and Ajzen, 1975). Thereby, intentions capture all motivational factors that affect behavior. Hence, they indicate the amount of effort and determination being exercised to act upon the future behavioral action. These intentions have constantly been found to be significantly precise for predicting behavior (Ajzen, Czasch and Flood, 2009) and are commonly used in entrepreneurship research for studying future entrepreneurial behavior (e.g. Thompson, 2009; Linan and Santos, 2007; Krueger et al., 2000).

Future work could build on the results of this study in a number of ways. This study provides a promising starting point towards understanding the effects of emotion on different phases of the entrepreneurial process. Future research could get to the bottom of moderating factors that influence the effect of positive and negative emotions on the different phases of the entrepreneurial process. One promising path could be to investigate different supportive contexts (e.g. family support: Madjar et al., 2002, VC support or other work-related individuals: Madjar, 2008; McColl-Kennedy and Anderson, 2002) that may influence the effect of emotion. For instance, supportive contexts for creativity provided by supervisors have been shown to play a significant role in the impact of emotions on creativity

(George and Zhou, 2007). Hence, it can be assumed that supportive contexts such as family support and VC support might play a crucial role in the effect of emotions on entrepreneurship.

Another promising avenue to investigate may be to incorporate recent research on entrepreneurial passion (Cardon et al., 2009; Chen et al., 2009). Passion, compared to positive emotions, is said to be relatively stable over time, rather than to vary based on situational stimuli. It would be very interesting to analyze to what degree entrepreneurial passion may contribute to the effect of positive and negative emotions on the entrepreneurial process. Does a high level of passion reduce negative effects of negative emotions on opportunity evaluation? Or does a high level of passion reduce positive effects of positive emotions on opportunity evaluation? So far, the relationship between passion and emotion has not been analyzed in entrepreneurship research. As opposed to passion, the effect of possible punishment could also shed some light on the intriguing results of this study. Dohmen (2005) shows, that threat of punishment does not only increase the willingness to exert high levels of effort, but also creates pressure. This pressure has been shown to cause paradoxical performance effects. It would be equally interesting to analyze the effects of optimism on the effect of emotions on entrepreneurial opportunity evaluation and exploitation.

Finally, the role of emotion in the entrepreneurial process should be investigated further. Present entrepreneurship literature and behavioral economics in general (e.g., Koellinger et al., 2007; Lee et al. 2005; Shepherd, 2004; Sternberg et al., 2006) provide clear evidence that emotion has a systematic influence on entrepreneurship. Future research should investigate the influence of a greater variety of emotions. Rather than just differentiating between positive and negative emotions as presented here in this study, it may be fruitful to compare a range of negative emotions such as fear sadness and anger and a broader spectrum of positive emotions too, such as joy, self-assurance and hope.

To conclude, this study indicates that emotions do indeed play a role in the entrepreneurial process. Most notably, it has been shown that this effect differs within the different phases of entrepreneurship. In fact, it appears that positive emotions influence opportunity evaluation positively and negative emotions influence opportunity evaluation negatively. Opportunity exploitation is affected negatively by positive emotions. Surprisingly, the findings suggest that negative emotions do not enhance opportunity exploitation. Future research could respond to the call to explore moderating factors that might explain these surprising results regarding the effect of emotions on the entrepreneurial process.

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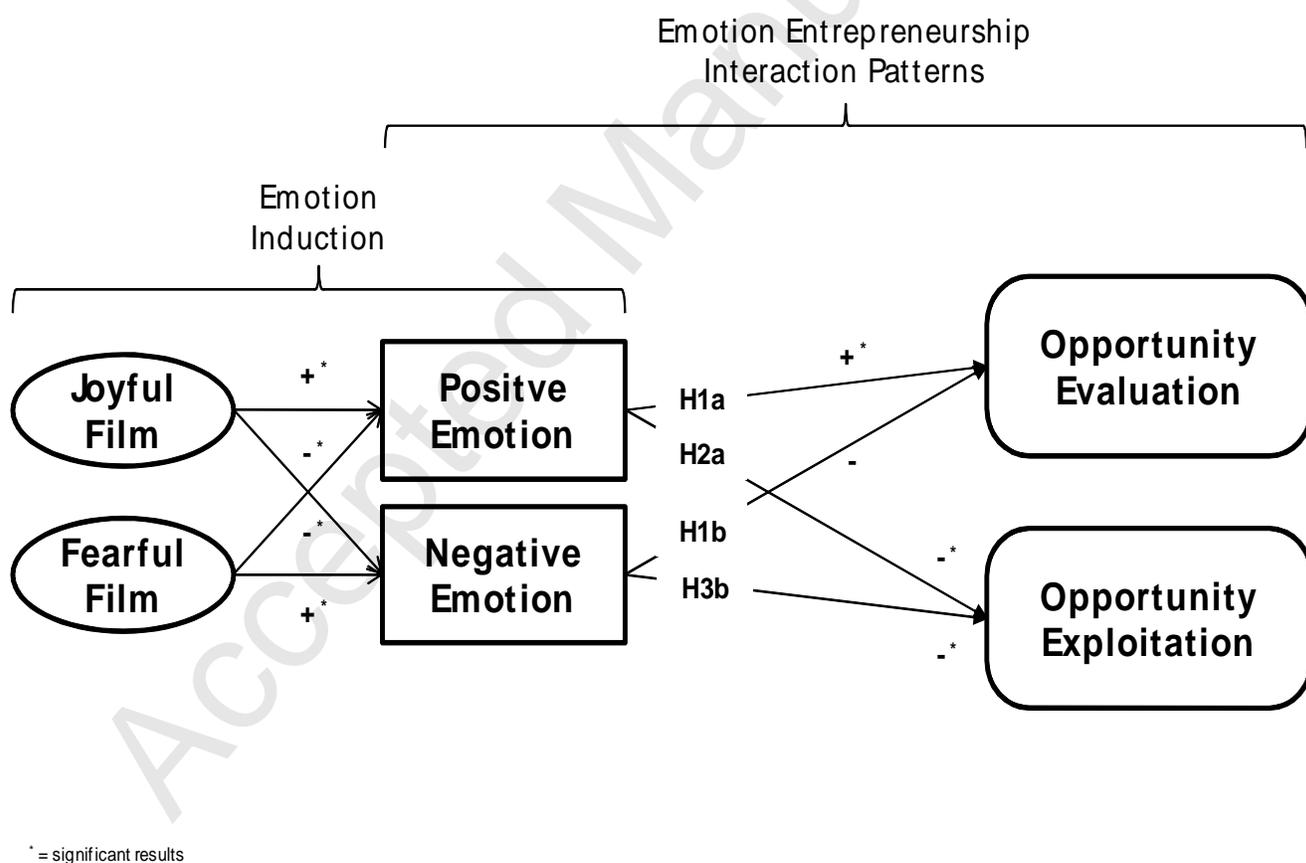
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**Fig. 1.** Model of the influence of emotions in entrepreneurship.



**Table 1.** Correlations of Emotion and distinct phases of entrepreneurship (positive and neutral condition).

### Correlations

		type of emotion		
		induction	evaluation	exploitation
type of emotion induction	Pearson Correlation	1	-.071	.176*
	Sig. (1-tailed)		.241	.041
evaluation	Pearson Correlation	.038	1	-.345**
	Sig. (1-tailed)	.355		.000
exploitation	Pearson Correlation	-.176*	-.327**	1
	Sig. (1-tailed)	.041	.000	

**Table 2.** Correlations of Emotion and distinct phases of entrepreneurship (neg. and neutral condition).

<b>Correlations</b>				
		type of emotion		
		induction	evaluation	exploitation
type of emotion induction	Pearson Correlation	1	-.133	.188*
	Sig. (1-tailed)		.115	.043
evaluation	Pearson Correlation	.179	1	-.286**
	Sig. (1-tailed)	.052		.004
exploitation	Pearson Correlation	.188*	.426**	1
	Sig. (1-tailed)	.043	.000	

**Table 3.** Descriptive results under different emotional states.

<b>Descriptive Statistics</b>						
		N	Minimum	Maximum	Mean	Std. Deviation
fear	evaluation	48	6,00	15,00	11,2500	1,95154
	exploitation	48	3,00	33,00	15,7917	7,59888
control	evaluation	47	7,00	13,00	10,9574	1,44399
	exploitation	47	3,00	30,00	17,4681	6,88051
joy	evaluation	52	3,00	13,00	10,7115	1,95374
	exploitation	52	3,00	32,00	15,0385	6,84266