

Decision Making in Innovation and Entrepreneurship
- A Collection of Conjoint-based Studies -

Dissertation

zur Erlangung des akademischen Grades

doctor rerum politicarum

(Dr. rer. pol.)

vorgelegt dem

Rat der Wirtschaftswissenschaftlichen Fakultät

der Friedrich-Schiller-Universität Jena

am 27.01.2010

von: Dipl. Vw. Anja Klaukien

geboren am 18.04.1982 in Jena

Gutachter:

(1) Prof. David B. Audretsch (PhD), Indiana University, Bloomington, IN, USA

(2) Prof. Dr. Peter Walgenbach, Friedrich-Schiller-Universität Jena

(3) Prof. Dean A. Shepherd (PhD), Indiana University, Bloomington, IN, USA

Datum der Verteidigung: 16. Juni 2010

Table of contents

List of figures	VI
List of tables	VII
1 Introduction	1
1.1 The importance of innovation and entrepreneurship	3
1.2 Cognition and decision making in entrepreneurship and innovation	6
1.3 Methodological choice	8
1.4 Structure and scope of this thesis	11
2 Entrepreneurs' decision policies for opportunity exploitation: The role of environmental heterogeneity	16
2.1 Introduction	17
2.2 Theory development	21
2.3 Methodology	31
2.3.1 Sampling and participants	31
2.3.2 Experimental design and procedure	33
2.3.3 Measures	34
2.3.4 Post-experiment questionnaire	36
2.3.5 Statistical analysis	37
2.4 Results	37
2.4.1 Reliability, manipulation checks, and correlations	37
2.4.2 Results of the HLM analysis	38
2.5 Discussion and conclusion	41
3 Entrepreneurs' passion for work, excitement, and the decision to exploit opportunities	49
3.1 Introduction	50
3.2 Theory development	53
3.3 Methodology	63
3.3.1 Sample	63
3.3.2 Experimental design and procedure	65
3.3.3 Affect manipulation	66
3.3.4 Measures	67
3.3.5 Post-experiment questionnaire	71

3.3.6 Statistical analysis	71
3.4 Results	72
3.4.1 Reliability, descriptive statistics, and correlations	72
3.4.2 Results of the HLM analysis	73
3.5 Discussion and conclusion	76
4 Work stress, fear of failure, and entrepreneurs' decision to exploit opportunities	83
4.1 Introduction	84
4.2 Theory development	87
4.3 Methodology	93
4.3.1 Sampling and participants	93
4.3.2 Experimental design and procedure	94
4.3.3 Measures	96
4.3.4 Post-experiment questionnaire	99
4.3.5 Statistical analysis	99
4.4 Results	99
4.4.1 Reliability and correlations	99
4.4.2 Results of the HLM analysis	100
4.5 Discussion and conclusion	103
5 Entrepreneurs' displays of passion and employees' commitment to new ventures ...	110
5.1 Introduction	111
5.2 Theory development	114
5.3 Methodology	125
5.3.1 Data and sample	125
5.3.2 Conjoint analysis	126
5.3.3 Research instrument	128
5.3.4 Experimental design	130
5.3.5 Statistical method	131
5.4 Results	131
5.5 Discussion and conclusion	134
6 Networks and innovation managers' decision to persist with underperforming R&D projects	142
6.1 Introduction	143
6.2 Theory development	146

6.3 Methodology	155
6.3.1 Sample and data collection	155
6.3.2 Conjoint analysis.....	156
6.3.3 Decision situation and research variables	157
6.3.4 Reliability.....	159
6.3.5 Experimental design.....	160
6.3.6 Potential methodological limitations	160
6.4 Results.....	163
6.5 Discussion and conclusion.....	166
7 Conclusions and new avenues of research on affect and cognition in innovation and entrepreneurship	173
7.1 Summary of results and contributions	173
7.2 New research avenues.....	177
8 References	VIII
9 Summary in German	XXXIII
10 Appendix	XXXVIII
10.1 Conjoint study presented in chapter 2, 3, and 4	XXXVIII
10.1.1 Introduction of the conjoint experiment.....	XXXVIII
10.1.2 Example scenario of the conjoint experiment.....	XLI
10.1.3 Design of the four experiment versions	XLII
10.2 Conjoint study presented in chapter 5.....	XLVI
10.2.1 Introduction of the conjoint experiment.....	XLVI
10.2.2 Example scenario of the conjoint experiment.....	L
10.2.3 Design of the four experiment versions	LI
10.3 Conjoint study presented in chapter 6.....	LV
10.3.1 Introduction of the conjoint experiment.....	LV
10.3.2 Example scenario of the conjoint experiment.....	LVIII
10.3.3 Design of the four experiment versions	LIX
Statutory declaration	LXIII
Resume.....	LXIV

List of figures

Figure 1: Proportion of new businesses founded in the United States in 1992 still alive, by year.....	2
Figure 2: Brunswik's lens model.....	9
Figure 3: Heterogeneity, low founder experience (LFE), high founder experience (HFE) and the likelihood to exploit an opportunity	41
Figure 4: Obsessive passion, excitement and entrepreneurs' decision to exploit opportunities.....	76
Figure 5: Job stress, fear of failure and the entrepreneurs' decisions to exploit opportunities.....	103
Figure 6: Interaction effects (A) between perceived passion for inventing and similarity in non-financial goals, and (B) between perceived passion for developing and similarity in non-financial goals.....	134
Figure 7: Conceptual model	149
Figure 8: Interactions of feedback with (A) network Size, (B) network density, and (C) communication frequency.....	165

List of tables

Table 1: Descriptive statistics and Pearson correlations (Level 2 variables).....	38
Table 2: Entrepreneurs' likelihood to exploit an opportunity.....	39
Table 3: Descriptive statistics and Pearson correlations (Level 3 variables).....	73
Table 4: Entrepreneurs' likelihood to exploit a new opportunity.....	74
Table 5: Descriptive statistics and Pearson correlations (Level 2 variables).....	100
Table 6: Entrepreneur's likelihood to exploit an opportunity.	101
Table 7: Employees' affective commitment.....	132
Table 8: Scientists' decisions to persist with underperforming R&D projects.....	164
Table 9: Conjoint experiment version 1.....	XLII
Table 10: Conjoint experiment version 2.....	XLIII
Table 11: Conjoint experiment version 3.....	XLIV
Table 12: Conjoint experiment version 4.....	XLV
Table 13: Conjoint experiment version 1.....	LI
Table 14: Conjoint experiment version 2.....	LII
Table 15: Conjoint experiment version 3.....	LIII
Table 16: Conjoint experiment version 4.....	LIV
Table 17: Conjoint experiment version 1.....	LIX
Table 18: Conjoint experiment version 2.....	LX
Table 19: Conjoint experiment version 3.....	LXI
Table 20: Conjoint experiment version 4.....	LXII

1 Introduction

We come across innovative products every single day. We read the news using our mobile phones or laptop computers. When lost, GPS helps guide us to our destination. En route, the on-board computer will tell us when to buy gas, when to change tires, even insisting that we buckle up. Books appear electronically on portable readers, and it seems easier to communicate with our colleagues virtually than physically visiting them in their next-door offices.

These innovative products are here because researchers and entrepreneurs put them there. Researchers at universities, research institutes, and in the private sector provide essential insights into new technologies while performing basic research (Jaffe & Lerner, 2001). Entrepreneurs then take and apply these findings to everyday problems. They then face great uncertainty while launching the resulting new products and services into the market (Knight, 1921; Schumpeter, 1934). Both researchers and entrepreneurs play essential roles in generating growth in modern economies.

This thesis focuses on the decision making in entrepreneurship and innovation. I investigate important decisions regarding the exploitation of an entrepreneurial opportunity, employees' commitment and the persistence in an underperforming research project.

The chance that any given research project or firm foundation will be successful is limited. Nine out of ten product innovations pursued by German companies fail (Kerka, Kriegesmann, Schwering, & Happich, 2006). New businesses failure rates can be as high as 70% within the first ten years (Shane, 2008). The high failure rates of new ventures is observed in most developed economies, such as the United States and Canada (Dunne, Roberts, & Samuelson, 1988; Geroski, 1995; Shane, 2008) and is illustrated in Figure 1. Observing these high exit rates of small entrants, Geroski

suggested that there are “barriers to survival” (Geroski, 1995, p. 424) as opposed to barriers to entry.

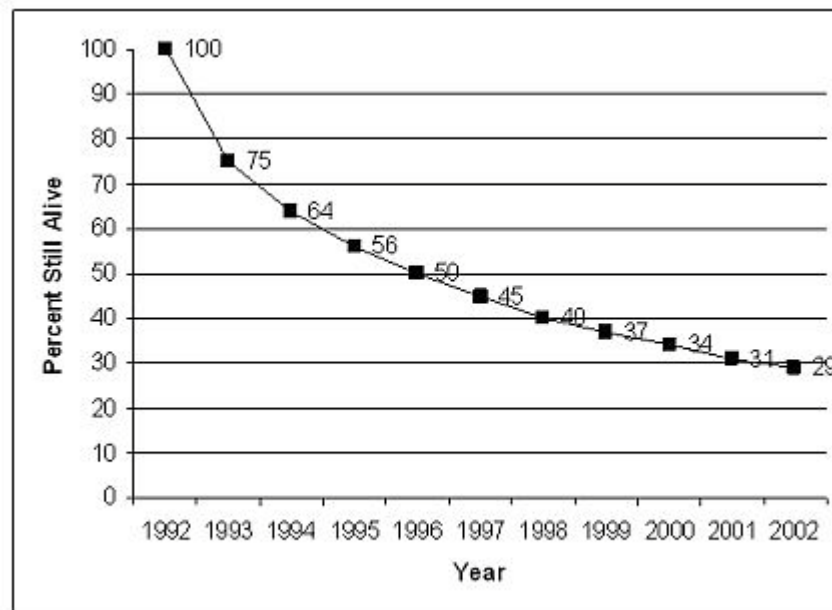


Figure 1: Proportion of new businesses founded in the United States in 1992 still alive, by year.

Source: Shane (2008, p. 99)

Failures of new ventures or research projects do not imply that they did not create value as positive externalities arise with these incidents (Audretsch, Keilbach, & Lehmann, 2006). However, it is desirable to avoid venture failures. Successful ventures can prevent entrepreneurs from bearing financial losses (Shane, 2008) and from suffering from grief over their lost business (Shepherd, 2009). Literature shows that most innovation and venture creation failures have simple causes. Research project managers often lack a contact person within the companies that they can address with new product ideas. They also complain about long evaluation procedures (Kerka et al., 2006). Explanations for new venture failure often blame management incompetence. For example, failure can result from excessively speedy venture expansion, lack of liquidity

planning, and marketing deficiencies. The behavioral aspects of the entrepreneurs, such as over-optimism and unawareness of the environment, are also explanations of new venture failures (Berryman, 1983). Given these sources of business and project failures, it is important to investigate entrepreneurs' and project managers' decision making. Insights gained can provide practical implications for entrepreneurs and project managers while advancing the field of entrepreneurship education (e.g., Shaw, Fisher, & Southey, 1999; Shepherd, 2004). The aim of this thesis is to analyze cutting-edge problems of entrepreneurship and innovation research by combining this research stream with findings from the literature on social psychology and on cognition.

The remainder of this introductory part is structured as follows. In section 1.1 I emphasize the importance of innovation and entrepreneurship. I then explore how research on cognition, decision-making, and behavior provide essential insights for this field of research in section 1.2. This is followed by an overview over the method of conjoint analysis that unifies all research questions addressed in this thesis (section 1.3). Finally, I illustrate the topics and the structure of this thesis in section 1.4.

1.1 The importance of innovation and entrepreneurship

In Schumpeter's view, competition of innovation ('new commodity'), and not price competition, is the true nature of competition:

Economists are at long last emerging from the stage in which price competition was all that they saw. ... However, it is still competition in within a rigid pattern of invariant conditions, methods of production and forms of industrial organization in particular, that practically monopolizes attention. But in capitalist reality as distinguished from its

textbook picture, it is not that kind of competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization ... – competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firm but at their foundations and their very lives. (Schumpeter, 1942, 84)

Innovation is “generally understood as the introduction of a new thing or method” to the market (Luecke & Katz, 2003, p. 2). It is the introduction of a new good, a new method of production, the opening of a new market, the detection of a new source of supply of raw materials, or the new organization of any industry (Schumpeter, 1934). Innovators are the prime movers of economic change. These can either be entrepreneurs who have the entrepreneurial spirit and enter the market, the Schumpeter Mark I (Schumpeter, 1934) or large companies possessing the necessary resources and capital to engage in research and development, known as Schumpeter Mark II (Schumpeter, 1942).

The term entrepreneurship is defined in terms of who the entrepreneur is and what he or she does. This is because the phenomenon of entrepreneurship actually involves two phenomena: the presence of opportunities and the presence of individuals exploiting these opportunities (Venkataraman, 1997). An entrepreneurial opportunity arises when “new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their costs of production” (Shane & Venkataraman, 2000, p. 220). An entrepreneur is willing to exploit such an opportunity. He or she introduces an idea or an invention into the market (Schumpeter, 1942). Entrepreneurs

that enter the market must be different from incumbents to break through the significant market entry barriers. Doing so, entrepreneurs ‘creatively destroy’ the existing product and technology standards thus changing the prevailing organization of the industry they enter, and at the same time advancing technological development.

However, it is not only entrepreneurial activity itself that ensures technical progress and the consequential economic growth. The threatened destruction of monopolies by entrepreneurial entry into the market forces incumbent firms to stay competitive and invest profits into research and development that ultimately provides market share preserving innovations (Schumpeter, 1942). Schumpeter (1934; 1942) argues that society needs to allow innovation and entrepreneurship in order to achieve sustained long-term economic growth. Innovation becomes mandatory for a firm to survive under capitalism (Baumol, 2002). That as large firms resist change, its innovators must become entrepreneurial, starting new firms in order to commercialize their ideas. Empirical evidence proves that even though the failure rates of new ventures are high, smaller firms exhibit systematically higher growth rates than larger firms (Birch, 1979; Caves, 1998; Geroski, 1995; Sutton, 1997). In certain industries, small firms are the engines of innovative activities (Acs & Audretsch, 1988, 1990). Innovation entails technological improvement for multiple firms and accelerated GDP growth (Baumol, 2002). For this reason, entrepreneurship is proposed to provide the engine for economic growth, as it revolutionizes production patterns by exploiting an invention (Schumpeter, 1942). Thus, Lazear emphasizes that the “entrepreneurs is the single most important player in a modern economy” (Lazear, 2002, p. 1).

1.2 Cognition and decision making in entrepreneurship and innovation

Cognition is the mental process of knowing. It includes aspects such as awareness, perception, reasoning, and judgment and determines how individuals perceive their environment and understand, diagnose and solve problems (Broadbent, 1958). Individuals cannot be aware of all aspects in their environment (Ocasio, 1997). Especially in highly complex and uncertain environments attention cannot be devoted to all sectors (Cyert & March, 1963; Johnston & Heinz, 1978; Ocasio, 1997). Individuals differ in their allocation of attention in a complex environment (Cho & Hambrick, 2006; Downey & Slocum, 1982; Ocasio, 1997) and tend to employ heuristics to deal with this complexity. Heuristics are simplifying rules of thumbs in judgment and decision making (Simon, 1957; Tversky & Kahneman, 1974). Tversky and Kahneman (1974) describe common heuristics in judgment such as representativeness, availability, and anchoring.

Cognition plays a crucial role in decision making. Investigating cognitive factors in decision making increases the understanding of possible errors and helps individuals to make more accurate decisions. Especially in uncertain and complex environments individuals are prone to heuristics and decision biases. Entrepreneurs and research project managers act in highly uncertain and complex environments (Knight, 1921). Earlier studies, for example, showed that entrepreneurs are inclined to believe in small numbers and overemphasize the extent to which they can control the outcome (Simon, Houghton, & Aquino, 2000). They also tend to develop unsuccessful efforts for longer time as their decisions are influenced by overoptimism (Lowe & Ziedonis, 2006). Baron (2004) suggests that entrepreneurs are more susceptible to these biases than other people and suggests three types of heuristics, most likely to occur in entrepreneurial judgment and decision making. These include the *optimistic bias*, the tendency to expect things to turn out well (Shepperd, Ouellette, & Fernandez, 1996), the *planning fallacy*, the

tendency to believe that a project can be completed in less time than actually needed (Buehler, Griffin, & Ross, 2002), and *affect infusion*, the tendency that experienced affective states impact perception and decision making (Forgas, 1995). However, Burmeister and Schade (2007) find that entrepreneurs are not more susceptible to the status-quo bias than students and bankers.

Heuristics, however, do not necessarily lead to irrational decision making. Given the bounded rationality of individuals, heuristics can be useful as they require reduced information-processing and cognitive effort (e.g., Cosmides & Tooby, 1992; Gigerenzer, 1996a, 1996b; Gigerenzer & Goldstein, 1996; Simon, 1990; Todd & Gigerenzer, 2000). Hence, the impact of decision biases in innovation and entrepreneurship on long-term performance is unclear. For example, affective states can impact entrepreneurial decision making (Baron, 2008). Positive affective states can lead the entrepreneur to act early due to mood-congruency (Schwarz, 1990; Schwarz & Clore, 1988). The entrepreneur will exploit an opportunity without ensuring that resources are sufficiently developed. This could increase the probability of a failure of the new venture. Acting early could, on the other side, also be a successful strategy to gain “first mover” advantages. Likewise, influences of the social network can, on the one side, encourage the researcher to persist in an underperforming research project for too long and cause substantial losses. On the other side, it could encourage the researcher to persist in a project that eventually will turn out to be successful.

The aim of this thesis is to gain insight into the cognitive processes in the decision making of entrepreneurs and project managers. It is important to investigate the decision making of these actors. Insights in this field will help them to better understand the decision making process and to make accurate decisions. However, implications for

success or failure of research projects and new ventures in the long-term can not be drawn.

1.3 Methodological choice

To investigate behavior and decision making of entrepreneurs, employees and researchers of new ventures I apply the lens analogy suggested by Brunswik (1952) and use conjoint analysis to empirically test my hypotheses. Brunswik (1952) defines two systems, the task system and the cognitive system, to determine how observers use objective cues (correctly or incorrectly) to perceive reality. The *task system* consists of the initial focal variable (IFV) and various decision cues (X_1 to X_n). The initial focal variable represents the initial focus, given by a hunger stimulus or a central motivational state. Since individuals cannot pay attention to all stimuli available in their environment (Ocasio, 1997) they concentrate on a limited number of decision cues. The *cognitive system* describes the relationship between the set of cues (X_1 to X_n) and the judgment or terminal focal point (TFP). The relation between initial and terminal focal point are referred to as “accomplishment” or “achievement” (Figure 2). The overall pattern achievements, initial focus and terminal focus, resemble the form of a convex lens (Brunswik, 1952).

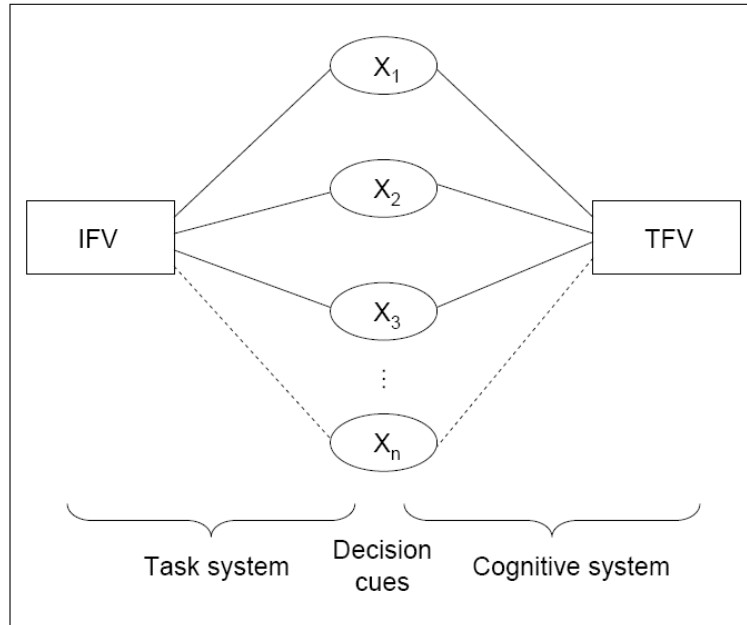


Figure 2: Brunswik's lens model

Source: modified from Brunswik (1952).

Conjoint analysis allows to study individuals' cognitive systems and judgment (Shepherd & Zacharakis, 1997). It is *"a technique that requires respondents to make a series of judgments based on a set of attributes (cues) from which the underlying structure of their cognitive system can be investigated"* (Shepherd & Zacharakis, 1997, p. 211). Hence, conjoint analysis is a valuable tool for testing theories on how individuals make decisions and can enhance the entrepreneurship field.

Compared to retrospective survey data, the participants' answers in a conjoint task will be less biased by, for example, the hindsight bias. Rather, subjects are asked to make a series of judgments or decisions during the course of the task while they face a realistic decision scenario. This provides a more accurate reflection of the actual decision making process. Conjoint analysis also allows researchers to analyze the underlying structure of decision making, e.g., which cues are significantly used in the individuals' judgments, how these cues are used, and how important each cue is

relatively to other cues (Shepherd & Zacharakis, 1997). It allows to provide, for example, a ranking of investment decisions (Muzyka, Birley, & Leleuy, 1996). Furthermore, with conjoint analysis one can model interactions between the decision parameters. This reflects the dynamic decision making process and research can gain a deeper understanding of the drivers of entrepreneurial decision making (Shepherd & Zacharakis, 1997).

Of course, no method is free of disadvantages. The external validity can be limited in a paper-and-pencil decision making task. However, if the conjoint task represents real life tasks of the participants, as it may, for example, be designed together with experts from the field, this method can contribute to a more accurate understanding of the decision making process (Stewart, 1993). Participants may also place importance on given attributes only because they are presented in the experiment. Including more detailed descriptions, however, would make the task unmanageable as the time to complete the decision making task increases with more detailed descriptions. Shepanski, Tubbs, and Grimlund (1992) argue that experienced judges are unlikely to place importance on decision cues only because they are presented. A careful selection of an appropriate sample frame is therefore important. Furthermore, it is difficult to make a decision or to judge about a project or venture in isolation. These limitations should be considered when designing and testing conjoint studies (Shepherd & Zacharakis, 1997). I discuss and explain how I overcome these shortcomings in each chapter of this thesis.

Due to its striking advantages in investigating decision making processes conjoint analysis builds the common base for all five papers presented in this thesis. The papers presented in chapter 2, 3, and 4 are based on the same data acquisition conducted with entrepreneurs in business incubators throughout Germany between March and November 2008. The paper presented in chapter 5 is based on a study conducted with

employees in German start-up companies throughout Germany between January and August 2009. In chapter 6, I present a paper based on a study conducted with life science researchers at the Friedrich-Schiller-University and other research institutes in Jena, Germany, during summer 2006.

1.4 Structure and scope of this thesis

As argued above, the field of innovation and entrepreneurship becomes increasingly important. However, our knowledge on decision making in this highly uncertain environment is limited. Which role does entrepreneurial cognition play when perceiving a highly heterogeneous environment? How does affect influence entrepreneurial decision making? And given that entrepreneurs experience considerable levels of stress, how does this stress affect their decision policies? Is the commitment of employees affected by the entrepreneur's affective displays? And finally, does the social network influence a researcher's decision to persist in a research project although the project does not seem to lead to any results? In order to find answers to these questions I combine research on entrepreneurship and innovation with findings in social and cognitive psychology and examine the impact of perceived firm environment, affect infusion, emotional contagion, and social networks on actors' decision making.

This thesis consists of five empirical studies that cover a broad spectrum of topics such as the decision to exploit an opportunity, the commitment to work in a new venture, and the decision to persist in an underperforming research project. It includes different actors in an innovative environment such as researchers, entrepreneurs, and employees of young start-up companies. Methodologically, I will include statistical analysis using the conjoint method and psychological scales in order to investigate the decision making of actors in an innovative and entrepreneurial environment. In order to

address influences on decision making by affect infusion I use mood induction by displaying pictures of the International Affective Picture System (IAPS, Lang, Bradley, & Cuthbert, 2005). The IPAS is well established and used in psychological research (e.g., Bradley, Cuthbert, & Lang, 1996; Bradley & Lang, 1999; Lang et al., 2005), however, it has not been applied to economic topics before.

I dedicate a separate chapter to each empirical study. Each chapter can be seen as one research paper and each is introduced by a general topic description to place it in the context of existing research. I will then discuss the findings of the studies, illustrate limitations, and suggest further research avenues.

Chapters 2, 3, and 4 investigate the entrepreneurial decision to exploit an opportunity and build the core of this thesis. In chapter 2 I compare entrepreneurs of different experience regarding their resource allocation decisions in a heterogeneous firm environment. The study is conducted with 86 entrepreneurs, located in German business incubators. I analyze three-way-interactions between the emphasis placed on different resources, perceived external heterogeneity, and the entrepreneur's experience to found a new venture. The findings of this study extend the literature on new venture's environment by focusing on the role of entrepreneurial scripts in entrepreneurial decision making.

The following two chapters investigate the conjoint influence between longer lasting trait-like and more transient and short-lived affective states. In order to examine the effect of affective states on decision making, 92 and 80 entrepreneurs, respectively, are asked to assess their likelihood to exploit a hypothetical opportunity.

Chapter 3 investigates the impact of two different kinds of passion, harmonious and obsessive passion (Vallerand et al., 2003), on the entrepreneurial decision to exploit an opportunity. Additionally, I introduce the influence of the more transient affective

state of excitement, as it is likely that entrepreneurs experience both passion and excitement simultaneously. I contribute to the literature on affect in entrepreneurial decision making as I present the first study to investigate the conjoint impact of passion and excitement on entrepreneurial decision making. It appears that the impact of affective states on entrepreneurial decision making is more complex and can only be comprehensively analyzed by conjointly examining different types of affective states. Further, I distinguish between two different kinds of passion suggested by Vallerand et al. (2003), harmonious and obsessive passion, proposing that both kinds of passion impact entrepreneurial decision making differently. Finally, this empirical study is, to my knowledge, the first attempt to directly manipulate entrepreneurial affect by exposing entrepreneurs to affect-inducing pictures (Lang et al., 2005) during a decision making task.

In chapter 4 I examine the impact of work stress on entrepreneurs' decision to exploit an opportunity. This study contributes to the literature on entrepreneurial stress while focusing on the impact of experienced stress on decision making. Again, I draw a finer-grained picture of this relationship and acknowledge, additionally to the more transient impact of work stress, a moderating effect of the trait-like affective state fear of failure. Furthermore, the study extends the psychological theory on affect-as-information as I suggest that stress can not only challenge the entrepreneur and encourage him or her to exploit further opportunities. Experienced fear of failure can impact this relationship and diminish this motivating effect.

In chapter 5 I switch from the perspective of the decision makers in the innovative and entrepreneurial context to its subordinates, namely to the employees of new start-up firms. I investigate how entrepreneurial passion (Cardon, Wincent, Singh, & Drnovsek, 2009) displayed by their supervisor affects the employees commitment to

work for the new venture. Further, I analyze how similarity in financial and non-financial goals between entrepreneurs and employees moderates the relationship between entrepreneurial passion and employees' commitment. The 90 employees in this study were asked to assess their commitment in hypothetical work scenarios described by the level of entrepreneurs' displays of passion and their similarity to the entrepreneur regarding their goals. This study contributes to literature on entrepreneurial passion, affective displays at work, and the role of entrepreneurs as leaders.

The study presented in chapter 6 sheds light on project managers' decision of whether to persist with an underperforming research project. Basic research is an important source of useful information and corporate patents, and it triggers local R&D spending and innovation (e.g., Audretsch & Stephan, 1996; Jaffe, 1989). Investigating project managers' decisions is important as substantial losses can occur due to faulty decisions as innovative product development projects are often characterized by long time horizons and substantial financial costs (e.g., DiMasi, Hansen, & Grabowski, 2003). This study was conducted with 51 scientists from university and research institutes. The researchers taking part in this study had to assess the likelihood to persist in an underperforming research project, given the feedback received from their network partners and various structural aspects of their network such as network density, network size, bond strength, and communication frequency. The findings contribute to the project management literature by focusing on the social environment of the decision maker as one so far neglected factor explaining persistence decisions. Further, this study investigates the contingency relationships between feedback received from network partners and network structure and highlights a potential dark side of networks by showing that networks can encourage decision makers to persist with their investment in an underperforming – and potentially failing – project.

Finally, chapter 7 will briefly summarize the results of this thesis and its contributions. I will draw final conclusions and suggest new research fields which scholars in the field of innovative and entrepreneurial decision making might follow in the future.

2 Entrepreneurs' decision policies for opportunity exploitation: The role of environmental heterogeneity ♦

This chapter investigates how the perception of the firm's environment impacts the entrepreneur's decision to exploit an opportunity. I investigate the influence of environmental heterogeneity on entrepreneurs' emphasis on resources when assessing the likelihood to exploit. One crucial aspect in the environment-exploitation relationship is the entrepreneur's experience to found a business. Founder experience appears to be an important moderator as it explains individual differences in the likelihood to exploit an opportunity while facing a heterogeneous environment. Section 2.1 will give an introduction to the topic. Then I derive my hypotheses by elaborating existing theory on firm environment and entrepreneurial experience in Section 2.2. I will describe the research design in Section 2.3 and present the results of the study in Section 2.4. In Section 2.5 I will discuss my findings, highlight limitations and suggest opportunities of further research.

♦ This section is based on Klaukien (2009).

2.1 Introduction

An entrepreneurial opportunity refers to new goods, services, raw materials, and organizing methods that can be introduced and sold at greater than their costs of production (Shane & Venkataraman, 2000). Exploiting the opportunity requires building efficient business systems for full-scale operations to gain returns from the new products or services (March, 1991). However, not every opportunity recognized by entrepreneurs will be immediately exploited (Hitt, Ireland, Camp, & Sexton, 2002; Shane & Venkataraman, 2000). In their decision to exploit, entrepreneurs face the trade-off between acting early to maximize lead time or acting later after uncertainty surrounding the opportunity is, at least partly, resolved (Wernerfelt & Karnani, 1987). Resource availability plays an important role in resolving this uncertainty. Choi and Shepherd (2004) show that entrepreneurs are more likely to exploit an opportunity when they perceive important resources, such as their knowledge of customer demand, enabling technologies, managerial capabilities and stakeholder support, as available. If these resources are not available, entrepreneurs are more likely to postpone opportunity exploitation in order to continue with resource development and resolve uncertainty before exploitation.

However, as Choi and Shepherd (2004) show, the relationship between resource availability and entrepreneurs' decision to exploit is more complex. For example, lead time of a new product moderates this relationship since high lead time magnifies the impact that knowledge of customer demand, technology development, and stakeholder support have on the entrepreneurs' likelihood to exploit. This finding raises the question of whether there are more factors influencing this relationship. And as the new firm's environment has an important influence on various aspects of a firm, such as the

organization's structure, its innovativeness, and its performance (e.g., Miller, 1983; Pennings, 1975; Tung, 1979; Wiklund & Shepherd, 2005), this paper focuses on the impact of one aspect of firm environment -- entrepreneurs' perceived heterogeneity -- on the before mentioned resource availability - exploitation relationship.

Scholars have focused on environmental characteristics such as dynamism (e.g., Dess & Beard, 1984; Galbraith, 1973; Jurkovich, 1974; Miles, Snow, & Pfeffer, 1974; Wiklund & Shepherd, 2005; Zahra & Bogner, 2000), which reflects both the rate as well as the unpredictability of change in an industry (Jurkovich, 1974; Miles et al., 1974). Uncertainty rises with dynamism and therewith increasing demands in information-processing will impact the organization structure of a firm (Galbraith, 1973). Hostility, or environmental capacity, in firm environments has also been widely examined in previous research (e.g., Covin & Slevin, 1989; Starbuck, 1976; Zahra & Bogner, 2000) and describes an unfavourable business climate, such as high competition for resources or market opportunities (Iansiti, 1995). Organizations try to avoid hostile environments and seek environments that permit organizational growth and stability (Starbuck, 1976). Acting in less hostile environments enables organizations to produce slack resources which in turn can provide a buffer for periods of scarcity or are used to engage in research and development to generate innovations (Cyert & March, 1963).

Only few scholars, however, have investigated heterogeneous firm environments so far (e.g., Dess & Beard, 1984; Katz & Kahn, 1966; Thompson, 1967; Zahra & Bogner, 2000). Heterogeneity is defined as „*the diversity of market segments within an industry*” (Zahra & Bogner, 2000, p. 140). Miller (1987) operationalizes heterogeneity as the needed diversity in production and marketing methods to cater to different customers. Actors in these markets have to address a large number of interconnected sectors (Zahra & Bogner, 2000) and interact with a variety of actors in different sectors

(Evan, 1966). Furthermore, environmental heterogeneity requires specialization in diversified areas and coordination between the specialists for each field (Lawrence & Lorsch, 1967). This complexity is caused by confronting multiple market segments and facing numerous and diverse competitors (Porter, 1980).

Entrepreneurs typically act in heterogeneous environments (Miller & Friesen, 1982) and heterogeneity is seen as both, the cause and the consequence of entrepreneurial activity (Miller, 1983). I concentrate on environmental heterogeneity as it represents the intersection of the individual entrepreneur and his or her firm environment. Environmental heterogeneity results from the “industry’s natural conditions *and* from choices the companies themselves make” (Zahra & Bogner, 2000, p. 140, italics added). This entrepreneurial choice in facing a heterogeneous environment is meaningful as I focus on individual decision making and acknowledge differences in individuals’ decision making policies. These differences can arise from differences in the experience in founding a business. While focusing on heterogeneity, I will control for the other two dimensions of firm environments, dynamism and heterogeneity (Dess & Beard, 1984). I use a field experiment with 86 entrepreneurs drawing 1376 opportunity exploitation decisions in different environments. My study makes several contributions to the existing literature.

First, while many existing studies focus on firm environment and its impact on organizational structures (Pennings, 1975; Thompson, 1967; Tung, 1979), firms’ strategic choice (Child, 1972; Miller, 1983) or firm performance (Zahra & Bogner, 2000), there is less understanding on how firm environment impacts the strategic decisions made within the firm. I contribute to this literature stream by directly investigating the impact of firm environment on the entrepreneurs’ decision making process. Entrepreneurs often interact in heterogeneous environments (Miller & Friesen,

1982), and acting in a heterogeneous environment may be a strategic choice of the entrepreneur (Zahra & Bogner, 2000). An investigation of this impact on entrepreneurial decision making promises important theoretical insights. More specifically, I suggest that environmental heterogeneity impacts the emphasis entrepreneurs place on important resource parameters when exploiting an opportunity.

Second, I acknowledge individual differences in the impact of heterogeneity on entrepreneurial decision making. There is evidence that experienced entrepreneurs have developed certain expert scripts (Mitchell, Smith, Seawright, & Morse, 2000), and that entrepreneurs' prototypes in opportunity recognition differ with entrepreneurial experience (Baron & Ensley, 2006). Experience has been found to have an important impact on individual decision making (e.g., Shepherd, Zacharakis, & Baron, 2003). Heterogeneous environments impose the potential to learn from a broad experience with competitors and customers and to adapt to the demands of this complexity (Miller & Friesen, 1982; Wilson, 1966). The entrepreneurs' experience to found a business may thus be a crucial factor in strategic decision making when facing a heterogeneous environment. My paper contributes to existing knowledge on entrepreneurial experience as I combine findings from two prominent studies by Mitchell et al. (2000) on entrepreneurial scripts and by Baron and Ensley (2006) on prototypes in opportunity recognition and relate them to entrepreneurial decision making in heterogeneous environments.

Third, I suggest that entrepreneurial experience may moderate the impact of perceived environmental heterogeneity on the entrepreneurs' decision to exploit an opportunity. By suggesting a three-way-interaction between founder experience, environmental heterogeneity, and the emphasis placed on resource availability when exploiting an opportunity I acknowledge that environmental influences on the firm's

strategic decisions are complex (Wiklund & Shepherd, 2005; Zahra & Bogner, 2000). I investigate this complexity by focusing on factors of both, the external (environmental heterogeneity) and the internal (founder experience) environment of the firm and their conjoint impact on decision making of the entrepreneur.

I proceed as follows. First, I review theoretical aspects on heterogeneity and its impact on the entrepreneurs' cognition as well as previous findings on entrepreneurial experience. I relate these arguments on the entrepreneurs' decisions to exploit an opportunity and derive my hypotheses accordingly. Second, I explain the method used to investigate the entrepreneurs' decision making. Third, I present the results of my study. Finally, I discuss my results and relate them to previous findings in the literature.

2.2 Theory development

“[S]trategic decisions are [...] incredibly complex” (Hitt & Tyler, 1991, p. 345), and even more so in a heterogeneous environment (Zahra & Bogner, 2000). The more diverse the environment, the more complex is the nature of an opportunity and the decision to exploit this opportunity. In a complex environment, entrepreneurs interact with many different actors, which raises uncertainty as unanticipated events are more likely to occur (Duncan, 1972; Pennings, 1975; Tung, 1979). For example, new competitors may appear in one market segment that threaten the new product's or service's market value, or technology standards may change in another segment that require rapid changes of the product's or service's enabling technologies.

In order to grasp the complexity of an opportunity, decision makers must possess cognitive capacities and cognitive complexity. Managers are assumed to have a certain minimum level of cognitive complexity, due to the range of tasks they must accomplish while fulfilling their responsibilities (Hitt & Tyler, 1991). Still, their levels of cognitive

complexity vary. Managers with greater cognitive complexity are found to be aware of more alternatives, are able to differentiate between a larger number of dimensions, and have thus greater discretion in strategic choices (Hambrick & Finkelstein, 1987). Cognitive complexity also helps managers to perceive uncertainty in an environment and that way affects the managers' performance (Downey & Slocum, 1982). Cognitive capacities are necessary to monitor the environment and to deal with the perceived complexity. These capacities are defined as "the limited pool of energy, resources, or fuel by which some cognitive operations or processes are mobilized and maintained" (Johnston & Heinz, 1978, p. 422).

However, cognitive complexity and cognitive capacities of managers and entrepreneurs are taxed (Walsh, 1988) and attention cannot be devoted to all sectors (Cyert & March, 1963; Johnston & Heinz, 1978). In Ocasio's (1997) attention-based view he describes attention as "the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-making on both (a) issues: the available repertoire of categories for making sense of the environment: problems, opportunities, and threats; and (b) answers: the available repertoire of action alternatives: proposals, routines, projects, programs, and procedures" (Ocasio, 1997, p. 189).

Individuals are likely to differ in their attention to a complex environment and in their ways to deal with it (Cho & Hambrick, 2006; e.g., Downey & Slocum, 1982; Ocasio, 1997). Entrepreneurial experience may be one factor that influences entrepreneurs' attention to their firms' environment. Experience has been found to be a crucial factor in strategic decision making. For example, experienced managers differ from their less experienced counterparts in decisions regarding compensation of executives (Hitt & Barr, 1989). They also make more successful choices by testing and 'fine-tuning' cognitive models (Fredrickson, 1985).

Hence, entrepreneurs that are experienced in founding a business, compared to less experienced entrepreneurs, may have a more diverse schema of the firm's environment and of the opportunity they are about to exploit (issues), as well as of possible strategies to deal with this diversity (answers). These differences are likely to have an impact on the entrepreneurs' strategic decision making, and more specifically on the decision to exploit an opportunity. Mitchell and colleagues (2000) suggest that experienced entrepreneurs have unique knowledge structures, such as ability, willingness, and arrangement scripts, that enable them to recognize and exploit opportunities. These entrepreneurial scripts are action-based knowledge structures that are relevant for entrepreneurial decision making and improved information-processing (Mitchell et al., 2000). As a result, they use available information significantly better than nonexperts and nonentrepreneurs. There are also differences in the recognition of opportunity patterns between experienced and novice entrepreneurs. While experienced entrepreneurs concentrate on solving a customer's problem, on bearing manageable risk, and on the ability to generate a positive cash flow, novice entrepreneurs tend to focus on "newness" and "uniqueness", and on the potential to change the industry (Baron & Ensley, 2006).

I suggest that experienced entrepreneurs who are evaluating an opportunity are likely to place more emphasis on the nature of the opportunity (customer demand, technology development) and on the flexibility to deal with unanticipated events surrounding the opportunity (stakeholder support to access resources) when facing a heterogeneous environment. This emphasis increases cognitive capacities needed for exploitation and to deal with the highly complex environment. It also helps to ensure their goal to bear a manageable risk and to generate a positive cash-flow. On the other side, entrepreneurs less experienced with founding a venture may place less emphasis on

the nature of the opportunity, but focus more on the efficient exploitation of the opportunity (managerial capabilities to facilitate exploitation) when facing heterogeneity. Concentrating on the efficiency of opportunity exploitation allows fast exploitation and fast introduction of a new product or service to the market. This makes a change of the industry more likely. However, I cannot determine whether entrepreneurial experience generally improves entrepreneurs' decision making in a heterogeneous environment, hence, which strategy will lead to firm success in the long-run. Shepherd et al. (2003) make the argument that experience might be a "two-folded sword": While more experience increases the individual's knowledge, decisions may also become more and more channelled the more experience the individual accumulates (Cho & Hambrick, 2006; Shepherd et al., 2003).

Stakeholder support and environmental heterogeneity. Stakeholder support is crucial for survival and firm performance (Berman, Wicks, Kotha, & Jones, 1999; Clarkson, 1995; Freeman, 1984), and it is important to develop stakeholder support for opportunity exploitation (Choi & Shepherd, 2004; Eisenhardt, Kahwajy, & Bourgeois, 1997; Hambrick, 1995). The firm's management team and its employees need to be committed to support and execute opportunity exploitation in the long-term and need to identify with, and work towards, the goals of the company (Noble & Mokwa, 1999). For example, investors and suppliers may provide resources in form of money, raw materials, and pre-products. If well managed, they may provide access to additional capital, more flexibility in resource delivery, and extended access to their own networks. If stakeholder support is well developed, the different groups of stakeholders (e.g., investors, employees, and suppliers) can be a source of cognitive capacities, complexity, and flexibility.

Entrepreneurs facing a heterogeneous environment need to devote attention to different events surrounding the opportunity. Attention of one entrepreneur or one entrepreneurial team may be affected by their perception and interpretation and hence be prone to biases. Important information may be filtered and attention may be devoted only to those information that is consistent to their cognitive scheme (Weick, 1979b). A diverse group of stakeholders or team members is likely to provide the necessary cognitive complexity to monitor and to respond to a heterogeneous environment. Experienced entrepreneurs, compared to novice entrepreneurs, have knowledge of available resources in their social network and may recognize those as a valuable source of cognitive complexity and capacity (Cho & Hambrick, 2006; Mitchell et al., 2000). For example, top management teams whose members vary in tenure and functional background are likely to share previously gained information and will debate and expand problem solving (Eisenhardt & Bourgeois, 1988). As a result they attend to a broader range of stimuli and are therefore better able to capture changes in the environment (Cho & Hambrick, 2006).

Additionally, environmental heterogeneity and therewith increasing perception of environmental complexity also demand frequent reaction to unanticipated events. Thus, heterogeneity taxes the resources of a firm (Zahra, Neubaum, & Huse, 1997). Flexibility is needed to deal with the perceived complexity in heterogeneous environments. It can, as well, be gained by developing stakeholder support. Stakeholders provide support in form of resources, time, and energy that is necessary for firm survival (Ansoff, 1965; Freeman, 1984). When established, entrepreneurs can rely on this support to have more flexibility when dealing with unanticipated events surrounding the opportunity. Access to resources increases cognitive capacities that are necessary to exploit an opportunity in a heterogeneous environment. Entrepreneurs do

not need to deal with establishing this support or gaining access to these resources along the way. Experienced entrepreneurs are likely to identify how this increase in cognitive complexity, cognitive capabilities, and flexibility can be beneficial in a heterogeneous environment. It will thus lead experienced entrepreneurs to further develop the relations with their stakeholders.

Less experienced entrepreneurs, however, have not yet developed arrangement scripts. They may have difficulties in establishing and developing stakeholder support. As a result, developing stakeholder support involves higher opportunity costs for less experienced entrepreneurs who will thus misvalue the cognitive diversity, capacity and flexibility they can gain from it. Hence, they do not view stakeholders as a source of cognitive diversity, capacity and flexibility and will not place greater emphasis on developing stakeholder support. Thus,

H1: The weight for stakeholder support increases with environmental heterogeneity, more for those with high founder experience than for those with low founder experience.

Development of enabling technology and environmental heterogeneity. To exploit an opportunity, the new products' or services' enabling technologies need to be sufficiently developed in order to ensure the quality and efficiency of the innovation. Uncertainty over development costs and the probability of accomplishing technology success remain if technologies are not fully developed when exploiting an opportunity (Dixit & Pindyck, 1994; Wernerfelt & Karnani, 1987) and increase the risk of failure (Meyer & Utterback, 1995). Exploiting an opportunity is a complex task; however, it becomes even more complex in a heterogeneous environment. While entrepreneurs are interacting with different interconnected sectors in a heterogeneous environment (Zahra & Bogner, 2000) uncertainty over unanticipated events rises (Duncan, 1972; Pennings,

1975; Tung, 1979). Two strategies regarding technology development can be appropriate when facing an uncertain environment. Entrepreneurs can focus on one technology and fully develop this technology before exploitation. This enables them to learn their technology and be better able to respond to frequent changes in a heterogeneous environment. However, entrepreneurs can also choose to develop the technology as they explore and learn more about the market. This strategy will enable them to adapt to the diverse demands of the market and may enable them to serve a broader spectrum of the market. Yet, entrepreneurs will face greater uncertainty about insufficiently developed technologies when exploiting the opportunity.

Experienced entrepreneurs who developed ability scripts can assess their capabilities, skills, knowledge, norms, and attitudes required to exploit an opportunity (Mitchell et al., 2000). At the same time, experienced entrepreneurs try to keep the risk manageable (Baron & Ensley, 2006). These entrepreneurs can foresee that acting in a heterogeneous environment will demand increased cognitive capacities. Hence, they may want to establish an anchor in emphasizing technology development. With sufficiently developed technology development, entrepreneurs simplify their environment as they do not have to deal with the risks of insufficient technology development. They realize that a sufficient development of technologies increases their cognitive capacities that in turn will benefit them while dealing with the complexity of heterogeneous environments.

Less experienced entrepreneurs' prototypes of exploiting an opportunity focus mainly on the "newness" and "uniqueness" of an idea (Baron & Ensley, 2006). They are also less able to assess their capabilities, skills, knowledge, norms, and attitudes to exploit an opportunity as they have not developed the necessary ability scripts (Mitchell et al., 2000). This suggests that, once less experienced entrepreneurs discovered a need

for their new product or service, they attempt to exploit this market and choose to develop enabling technologies for new products and services as they learn more about the market. When facing a heterogeneous environment, they hope to serve the full market and adapt technology to the diverse demands of the market. Although they will face great uncertainty of costs and accomplishment of technology development (Choi & Shepherd, 2004) they may optimistically believe that they can deal with this highly uncertain environment and therefore place less emphasis on technology development. However, it will allow less experienced entrepreneurs to explore broader parts of the market, and eventually find a suitable market segment or even shape the market by developing a new technology so far unknown to the existing market (Kim & Mauborgne, 2004). Thus,

H2: The weight for technology development increases with heterogeneity for those entrepreneurs with high founder experience but decreases with heterogeneity for those with low founder experience.

Managerial capabilities and environmental heterogeneity. When exploiting an opportunity, entrepreneurs must ensure production at a higher volume, inbound and outbound logistics, and customer service. They must also prepare for competition (Choi & Shepherd, 2004). To facilitate successful exploitation and ensuring a smooth flow of production, entrepreneurs must assess their stock of resources and evaluate which resources need to be obtained or renewed (Fiol, 1991; Penrose, 1995). These tasks are critical and complex and demand managerial capabilities. Managerial capabilities are the skills, knowledge, and experience that enable the entrepreneur to handle difficult and complex management and production tasks (Barney, 1991; Mahoney, 1995; Penrose, 1995). Better managerial capabilities ensure more efficiency in choosing and implementing activities necessary to produce and deliver a product or service (Collis,

1994). Entrepreneurs tend to allow a 'safe period' before exploiting an opportunity if managerial capabilities are not yet fully developed. During this time they develop routines, hire employees, develop social relations, and overcome management problems (Aldrich & Auster, 1986; Choi & Shepherd, 2004; Singh, Tucker, & House, 1986). Emphasizing the development of managerial capabilities will reduce the uncertainty related to an efficient facilitation of increased production, logistics and customer service. These are crucial when exploiting an opportunity in a heterogeneous environment as cognitive capacities are increased when managerial capabilities do not need to be established during opportunity exploitation.

However, experienced entrepreneurs may feel that managerial capabilities are not a scarce source and that they could develop this resource at any time. They rather focus on the nature of the opportunity and on the flexibility to deal with unanticipated events that are likely to occur in heterogeneous environments. Doing so, they ensure their prioritized goal of making risk more manageable (Baron & Ensley, 2006). Hence, they do not prioritize and are unlikely to focus on efficiency in exploiting the opportunity and may not see a need in further developing managerial capabilities at this point in time.

Less experienced entrepreneurs focus on the novelty and superiority of their new products or services and on the potential to change the industry by exploiting the opportunity quickly (Baron & Ensley, 2006). Thus, less experienced entrepreneurs are likely to focus on efficiency in opportunity exploitation to be more adaptable to different market segments. They may focus on facilitating opportunity exploitation to ensure efficiency. This reduces some of the complexity related to opportunity exploitation in a heterogeneous environment and thereby increase the cognitive capacities that are needed while exploiting the opportunity. Thus,

H3: The weight for managerial capabilities increases with heterogeneity, more for those with low founder experience than for those with high founder experience.

Customer demand and environmental heterogeneity. To ensure customer demand, customers must know about the new product and find it valuable (Aldrich & Fiol, 1994). Entrepreneurs face great demand uncertainty, when exploiting an opportunity (Knight, 1921). This uncertainty is even enhanced when entrepreneurs face a heterogeneous environment as they typically need to address and monitor different market segments to assess customer demand in each segment. They also need to perceive changes in customer demand in each sector (Zahra & Bogner, 2000). In order to reduce uncertainty while exploiting an opportunity, entrepreneurs tend to postpone exploitation if customer demand is not yet fully assessed (Choi & Shepherd, 2004). This is especially necessary when entrepreneurs face complex situations of a heterogeneous environment. Knowledge of customer demand reduces complexity and thereby increases cognitive capacities needed for exploitation in a heterogeneous environment.

Experienced entrepreneurs' prototype of opportunity recognition and exploitation focuses on, among other factors, solving a customer's problem. Willingness scripts developed by experienced entrepreneurs involve commitment to venturing and opportunity pursuit. These scripts clarify the understanding of the nature of opportunity exploitation decision and the associated risks. They lead entrepreneurs to "getting on with the task", thus motivating them to partly resolve the risk associated with opportunity exploitation and focusing on gaining knowledge of and further developing customer demand. Willingness scripts will therefore lead to emphasizing knowledge of customer demand and will in turn decrease uncertainty related to customer demand (Mitchell et al., 2000) and set free cognitive capacities that can be used to deal with the

heterogeneous environment. Thus, experienced entrepreneurs highly emphasize knowledge of customer demand when exploiting an opportunity, regardless of environmental heterogeneity.

Less experienced entrepreneurs have not yet developed the necessary willingness scripts. Thus, they may not be motivated to resolve the uncertainty related to lacking knowledge of customer demand while exploiting in a heterogeneous environment (Mitchell et al., 2000). As they prioritize the newness and uniqueness of their new products or services (Baron & Ensley, 2006), less experienced entrepreneurs want to act quickly and discount the complex information in a heterogeneous environment. Similarly as they want to develop the products' or services' enabling technologies as they learn more about the market, they want to develop customer demand "as they go" as they believe that the market is so diverse that there will be a market for their product in at least one of its segments. Thus,

H4: The weight on customer demand decreases with heterogeneity, more for those with low founder experience than for those with high founder experience.

2.3 Methodology

2.3.1 Sampling and participants

To test the suggested hypotheses, I chose independent entrepreneurs involved in new ventures located in business incubators in Germany as the sampling frame. This population of entrepreneurs is particularly appropriate for this purpose as incubators are specifically designed for entrepreneurs to concentrate on the exploitation of new business opportunities (Rice, 2002). From a list of incubators issued by the German Federal Association of Innovation, Technology, and Start-Up Centers (ADT, 2008) and other public sources, I identified 15 incubators within a geographic distance of less than

300 km from my location. This geographic proximity was necessary as I visited the entrepreneurs personally to conduct the experiment in order to ensure the entrepreneurs' full concentration during the experiment. From the websites of the incubators, I captured a list of all incubator ventures and their founders, containing 446 ventures.

Subsidiaries of large firms were excluded from the sample because the decision policies of these entrepreneurs may be influenced by the strategic directions of their parent companies. I also excluded firms that were no longer run by the initial business founder. The remaining 185 entrepreneurs from this list were then contacted via phone or email between March and October 2008. I explained the purpose of the study and asked if they would be willing to participate. Participation was on a voluntary basis and those who participated received a small present after finishing their task. If the entrepreneur agreed to participate I scheduled an appointment with him or her. One hundred entrepreneurs denied my request for participation during the time frame of the study. Eighty-six entrepreneurs agreed to participate, representing a response rate of 46.4 %.

Sample characteristics correspond with those of other studies with entrepreneurs. Entrepreneurs' average age was 39.6 years (standard deviation 10.8 years), and 90.7 % of the sample was male. Seventy-four per cent held a Master's or higher degree. Twenty-four per cent had a background in engineering, 19.7 % in business administration, 19.7 % in computer sciences, and 18.6 % in natural sciences and mathematics. On average, participants had worked for 11.2 years in the private sector (std. dev. 7.9 years). The entrepreneurs founded 1.8 businesses on average (std. dev. 1.3). The average firm in our sample was 5 years old (std. dev. 5 years) and had 7.4 employees (std. dev. 9.9). Sixty-three per cent of the firms were technology-based

ventures (e.g., biotechnology, information technology, optical devices); the others belonged to various low technology based industries (e.g., marketing and trade).

2.3.2 Experimental design and procedure

I used a set of conjoint experiments to investigate entrepreneurs' decisions to exploit opportunities. In conducting the conjoint experiment, I followed Choi and Shepherd (2004) and described hypothetical entrepreneurial opportunities in terms of different levels of four decision attributes that represent the independent variables of the study (see below). To each profile, the entrepreneurs were asked to assess the likelihood that they would exploit the opportunity described.

Conjoint studies require full replication of profiles to allow for tests of reliability (Shepherd & Zacharakis, 1997). Hence, each entrepreneur assessed two identical, complete sets of conjoint profiles. Since all decision attributes were presented at one of two possible levels, a fully crossed factorial design would have required 16 (2^4) scenarios for each set of conjoint profiles. I thus applied an orthogonal fractional factorial design that limited the number of attribute combinations to eight, resulting in 16 profiles (original and fully replicated). The 16 profiles and the order of attributes within a profile were randomly assigned to four versions of the experiments to test for order effects. An ANOVA revealed no significant differences in means and variance between the four versions, suggesting that order effects are unlikely to have influenced the results.

A 'practice' profile (which was not part of the statistical analysis) was included at the beginning of the experiment to familiarize the participants with the decision situation before starting the decision making task. Thus, the entrepreneurs were confronted with 17 decision scenarios (practice profile, two sets of profiles).

I used a computer-based presentation and answer method that was individually conducted in the entrepreneurs' offices and which took about 40 minutes to complete. The experimenter presented the decision making task on a laptop and gave a short instruction. The experimenter stayed in the office during the course of the experiment to ensure that the entrepreneurs fully concentrated during the experiment and were not interrupted.

2.3.3 Measures

Dependent Variable. Opportunity exploitation is defined as the stage in which immediate full-scale operation, i.e. shipping the first product for revenues, is started (Schoonhoven, Eisenhardt, & Lyman, 1990). Following Choi and Shepherd (2004), entrepreneurs were asked to assess the likelihood of exploitation on a 7-point Likert-type scale anchored by the end points very unlikely ("1") and very likely ("7"). Thus, the dependent variable for this study is an entrepreneur's mean likelihood of opportunity exploitation controlling for the nature of the opportunity and the resources at hand (as detailed below).

Independent Variables. Each scenario is represented by four independent variables: Knowledge of customer demand, development of enabling technologies, managerial capabilities, and stakeholder support.

Stakeholder Support is defined as the level of supporters' commitment to the new venture ranging from high (supporters such as management team, investors, and suppliers are highly supportive for the new venture) to low (supporters such as management team, investors, and suppliers are marginally supportive for the new venture). The *Development of Enabling Technology* is the level of technology uncertainty (Reverse Coded) and ranges from high (the new venture has not yet

established the technologies necessary to fully grasp the new opportunity) to low (the new venture has established the new technologies necessary to fully grasp the new opportunity). *Managerial Capabilities* are defined as the managerial capabilities of the new venture and range from high (you and your management team have considerable skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production) to low (you and your management team have limited skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production). *Knowledge of Customer Demand* is the level of customer acceptance of the new product and ranges from high (customers have substantial knowledge about the new venture's product and services and you are quite certain that there is substantial future demand) to low (customers have little knowledge about the new venture's products and services and you are uncertain that there is substantial future demand). These operationalizations were taken from Choi and Shepherd (2004), which found that these attributes significantly impacted entrepreneurs' decision policies on opportunity exploitation.

Heterogeneity. Subjects were asked to assess the environmental *Heterogeneity* of their ventures on a 4-item scale, following Miller and Friesen (1982). I decided to measure the perception of environmental heterogeneity, rather than objective indicators as the perceived heterogeneity is likely to have a greater impact on the entrepreneurs' decision making (Boyd, Dess, & Rasheed, 1993). With the assistance of an English and a German native speaker, the scale was translated word by word into German, and by another person who is fluent in both languages back-translated into English. This procedure ensures maximum consistency between the translated and original scales (Brislin, 1970). A 7-point Likert-type scale anchored by "very undiversified" and "highly diversified" (item 1) and by "same for all our products" and "varies a great

deal” (items 2 to 4) was used to measure the entrepreneurs’ assessments. A confirmatory factor analysis revealed one factor with a Cronbach’s alpha of .73, similar to Miller and Friesen (1982). Thus, the scale used is sufficiently reliable (Hair, Black, Babin, Anderson, & Tatham, 2006). The overall scores for heterogeneity were obtained by averaging the four items. The variable was mean-centered before the statistical analysis.

Founder Experience. I used the number of ventures founded by the entrepreneur so far as a proxy to measure the entrepreneurs’ *Founder Experience*. This variable was coded with -.5 if the entrepreneur had founded one business so far and with .5 if the entrepreneur had founded 2 or more businesses so far.

Control variables. I used the participants’ *Age* (measured in years) and *Firm Size* (measured in number of employees) as control variables. Both variables were mean-centred and included in the analysis because they are known to influence decision making of entrepreneurs (Bird, 1989).

To control for other factors that potentially influence the decisions of participants, they were instructed that the opportunities described are based on an idea similar to their own business idea, that the time horizon for exploitation is 2 years, the financial market is very attractive for new ventures, and the threat of imitation by competitors is low (consistent with Choi & Shepherd, 2004). Participants were further asked to consider all other factors that may potentially influence their decision policy as constant across profiles.

2.3.4 Post-experiment questionnaire

After the conjoint experiment was completed, subjects were asked to fill out a post-experiment questionnaire. This questionnaire asked for information on their demographic characteristics which has been described earlier.

2.3.5 Statistical analysis

My experiment provided reliable answers from 86 participants, yielding $86 \times 16 = 1376$ observations. These data points, however, are not independent of each other as the 16 profiles are nested within an individual decision maker. I therefore used a 2-Level Hierarchical Linear Modeling (HLM2) approach which is appropriate for analysis of nested data (Raudenbush, Bryk, Cheong, & Congdon, 2004). The basic level of analysis (Level 1) is represented by the entrepreneurs' decisions, and the higher level represents the characteristics of the environment and of the individual (Level 2 – e.g., environmental heterogeneity, founder experience, age, and work experience).

2.4 Results

2.4.1 Reliability, manipulation checks, and correlations

Replicating the profiles in the conjoint experiments allowed me to test for the reliability of responses by calculating the Pearson correlation coefficients between the original and replication profiles of the conjoint experiment for each participant. Eighty-four percent of the entrepreneurs were significantly reliable in their responses ($p < .05$) with a mean correlation of .82. This is consistent with other conjoint studies such as Choi and Shepherd (2004) that had 96% with reliable answers with a mean correlation of .82. Ninety-two percent of the individual decision models were statistically significant ($p < .01$) with a mean R^2 of .76 (Choi & Shepherd, 2004: .72). These numbers indicate that participants answered reliably and consistently in the experimental task.

Descriptive statistics of Level 2 variables and their correlations are shown in Table 1. The variables of interest, *Heterogeneity* and *Founder Experience*, did not appear to correlate. However, the control variable *Dynamism* did correlate with *Hostility*

(.358) and *Heterogeneity* (.299), and *Heterogeneity* and *Hostility* did correlate (.255). Hence, I wanted to be conservative and calculated Variance Inflation Factors (VIFs) to test for potential multi-collinearity of Level 2 variables. All VIFs were below 10, which is the critical threshold for multivariate analysis (Hair et al., 2006). Thus, multi-collinearity is unlikely to have confounded the results.

Variables	Mean	S.D.	1	2	3	4	5
1. Dynamism	3.796	1.014					
2. Hostility	3.416	1.001	0.358**				
3. Heterogeneity	3.974	1.238	0.299**	0.255*			
4. Age	39.565	10.766	0.036	-0.021	-0.088		
5. Firm Size	7.416	9.893	-0.065	-0.102	0.131	0.239*	
6. Founder Experience	1.849	1.290	-0.006	-0.069	-0.097	-0.061	0.116

n= 86; ** p < .01, * p < .05.

Table 1: Descriptive statistics and Pearson correlations (Level 2 variables)

2.4.2 Results of the HLM analysis

I report the results (coefficients, standard errors and p-values) in Table 2. At the decision level of analysis (Level 1), I entered the four decision cues (*Stakeholder Support*, *Technology Uncertainty*, *Managerial Capabilities*, and *Knowledge of Customer Demand*). At Level 2, I introduced the variables *Heterogeneity* and *Founder Experience* and the *interaction term* of the two to investigate the impact of differences in these variables across individuals. Additionally, the control variables *Dynamism*, *Hostility*, *Age* and *Firm Size* were entered at Level 2.

Evaluation criteria	Coefficient	Standard error	t-ratio	p-value
Intercept	3.877	0.056	68.239	0.000
Main Effects				
Stakeholder Support	0.952	0.066	14.406	0.000
Development of Enabling Technologies	0.868	0.066	13.073	0.000
Managerial Capabilities	1.911	0.079	24.288	0.000
Knowledge of Customer Demand	1.975	0.083	23.707	0.000
Independent and Control Variables Level 2				
Dynamism	0.075	0.071	1.063	0.291
Hostility	0.108	0.053	2.058	0.043
Heterogeneity	-0.050	0.042	-1.210	0.023
Age	0.007	0.006	1.163	0.249
Size	0.008	0.005	1.570	0.120
Founder Experience	-0.280	0.317	0.882	0.381
Heterogeneity x Founder Experience	0.040	0.078	0.512	0.610
Level 2 - Level 1 Interactions				
with Stakeholder Support				
Heterogeneity	0.100	0.055	1.825	0.071
Founder Experience	-0.989	0.492	-2.011	0.047
Heterogeneity x Founder Experience	0.223	0.108	2.063	0.042
with Development of Enabling Technologies				
Heterogeneity	0.047	0.055	0.864	0.390
Founder Experience	-1.618	0.458	-3.531	0.001
Heterogeneity x Founder Experience	0.444	0.106	4.185	0.000
with Managerial Capabilities				
Heterogeneity	0.152	0.058	2.623	0.011
Founder Experience	1.137	0.426	2.669	0.010
Heterogeneity x Founder Experience	-0.335	0.104	-3.209	0.002
with Knowledge of Customer Demand				
Heterogeneity	0.073	0.060	-1.212	0.230
Founder Experience	-1.410	0.509	-2.769	0.007
Heterogeneity x Founder Experience	0.363	0.118	2.989	0.004

n=1376, nested within 86 entrepreneurs. Interactions between control variables at level 2 with level 2 variables were also included in the model but are not displayed in the table to keep it at a manageable size.

Table 2: Entrepreneurs' likelihood to exploit an opportunity

Direct effects. As shown in Table 2, all decision criteria at Level 1 have a significant, positive direct influence on entrepreneurs' decisions to exploit opportunities. I therefore confirm the findings of Choi and Shepherd (2004) who found that all decision cues were significantly used by entrepreneurs to assess the likelihood of opportunity exploitation.

Interaction effects. It was suggested that environmental *Heterogeneity* and *Founder Experience* conjointly influence the emphasis entrepreneurs place on important decision cues when exploiting an opportunity. I find significant, positive three-way interaction effects of Heterogeneity and Founder experience on the emphasis placed on Stakeholder Support, Technology Development, and Customer Demand. I find a significant, negative three-way interaction effect of Heterogeneity and Founder experience on the emphasis placed on Managerial Capabilities. Thus, Hypotheses 1-4 are supported. To better understand the nature of these significant three-way interactions, I present separate figures for low and high levels of Founder Experience (Figure 3). I plot the interaction on an x-axis of *Heterogeneity* and a y-axis of the entrepreneurs' the weight on *Stakeholder Support*, *Technology Development*, *Managerial Capabilities*, and *Customer Demand* while exploiting an opportunity. Further, I plot separate lines for high and low *Founder Experience*. Figure 3A shows that for entrepreneurs high in Founder Experience, a perception of Heterogeneity leads to an increased impact of perceived Stakeholder Support on the decision to exploit. In Figure 3B one can see that entrepreneurs high in Founder Experience place greater weight on Technology Development, while entrepreneurs low in Founder Experience place less emphasis on Technology Development when facing a heterogeneous environment. Figure 3C shows that entrepreneurs low in Founder experience place more weight on Managerial Capabilities when facing a heterogeneous environment while

Figure 3D illustrates that entrepreneurs low in Founder Experience, facing a heterogeneous environment, place less weight on Customer Demand.

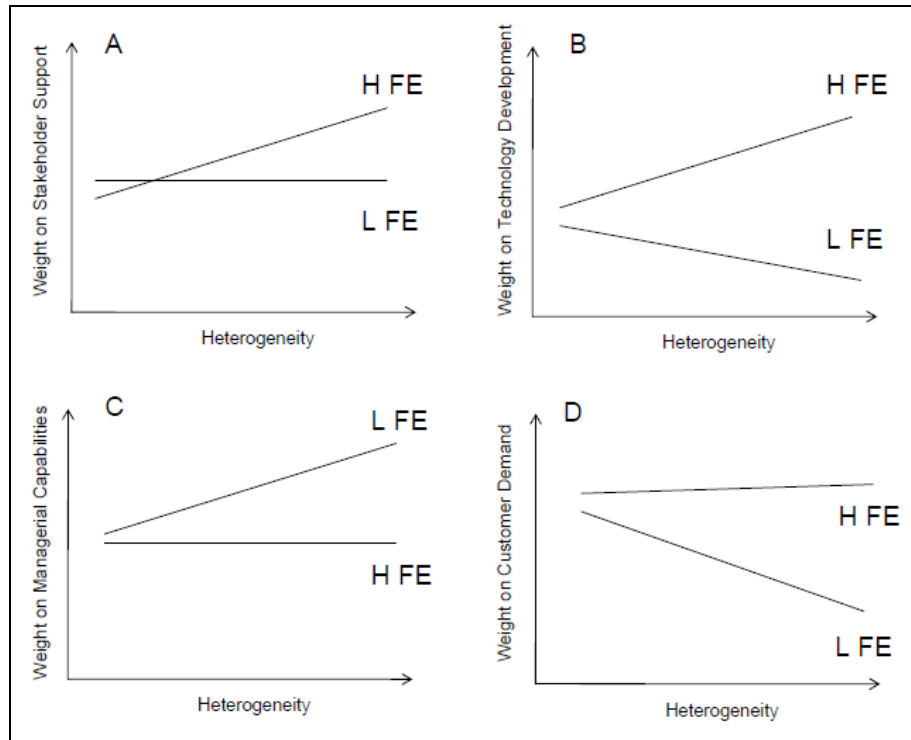


Figure 3: Heterogeneity, low founder experience (LFE), high founder experience (HFE) and the likelihood to exploit an opportunity

Source: Own illustration

2.5 Discussion and conclusion

Environmental impact on the firm has long been discussed in the management and entrepreneurship literatures (e.g., Child, 1972; Duncan, 1972; Miles et al., 1974; Miller, 1983; Miller, 1987; Pennings, 1975; Tung, 1979; Wiklund & Shepherd, 2005; Zahra & Bogner, 2000). In this study I incorporate research on environmental heterogeneity into an entrepreneurial decision making framework suggested by Choi and Shepherd (2004). I acknowledge that the impact of environmental heterogeneity on entrepreneurial decision making is complex and identify entrepreneurs' experience in

founding a business as an important moderator in this relationship. More specifically, my study shows that environmental heterogeneity and founder experience conjointly impact the emphasis entrepreneurs place on resources necessary to exploit an opportunity.

The empirical data support the expected three-way-interactions and the assumption that less experienced entrepreneurs focus on the efficiency in exploiting an opportunity and more experienced entrepreneurs on the nature of the opportunity and the flexibility in opportunity exploitation when facing a heterogeneous environment. These findings complement previous research by Baron and Ensley (2006) who find that entrepreneurs low in experience strive to change the market and introduce a new and unique product to the market. This study suggests that when facing a heterogeneous environment less experienced entrepreneurs want to exploit a wide range of different market segments and learn more about customer demands and to adapt their technology “as they go”, that is, during ongoing exploitation of the opportunity. This explains why less experienced entrepreneurs focus on managerial capabilities when facing a heterogeneous environment. These capabilities are necessary to ensure efficient opportunity exploitation (Collis, 1994) and to facilitate a successful introduction of the new service or product to the market.

Contrarily, I find that more experienced entrepreneurs generally focus on customer demand and emphasize technology development and stakeholder development even more when exploiting an opportunity in a heterogeneous environment. My results are in line with findings by Mitchell et al. (2000) who suggest that these entrepreneurs have developed certain entrepreneurial scripts that enable them to correctly assess their abilities (ability scripts), to efficiently use their resources and their social network (arrangement scripts), and to motivate themselves to resolve some of the uncertainty

(willingness scripts) when facing a highly complex environment. The data of my study show that more experienced entrepreneurs are more focused on the nature of the opportunity that is defined as the intersection of technology and the market (Venkataraman & Sarasvathy, 2001). Experienced entrepreneurs more correctly judge their abilities (Mitchell et al., 2002) and know that acting in a complex environment demands increased cognitive capacities. Hence, more experienced entrepreneurs are more likely to focus on the development of enabling technologies to learn their technology and increase their cognitive capacities to focus on unanticipated events in the environment. Furthermore, I find that rather than aiming at changing the market, more experienced entrepreneurs aim at solving a customer's problem. They have also developed willingness scripts that motivate them to "get on with the task" (Mitchell et al., 2002) and to gain more knowledge on and, if needed, to establish more customer demand. They, thus, concentrate on customer demand when exploiting an opportunity, regardless of whether they face a heterogeneous environment or not. Increased ability and arrangement scripts lead experienced entrepreneurs to focus more on the development of stakeholder support when facing a heterogeneous environment. Again, it appears that they correctly assess their abilities to deal with the complexity in this environment and recognize stakeholder support as a valuable source of flexibility and cognitive capacities which are needed in a heterogeneous environment. Also, they can easily establish relationships to potential stakeholders of different backgrounds due to arrangement scripts they have acquired in past venture creations (Mitchell et al., 2002). A large and diverse group of stakeholders is able to pay attention to different kinds of stimuli and is able to react to unanticipated events in a complex environment. Hence, opportunity costs for creating these relationships are low which leads experienced

entrepreneurs to perceive stakeholder support as a valuable source of cognitive complexity and is beneficial when facing a heterogeneous environment.

I make several contributions to the existing literature on firm environment, entrepreneurial experience, and entrepreneurial decision making. First, research on firm environment investigates its impact on organizational structures (Pennings, 1975; Thompson, 1967; Tung, 1979), firms' strategic choice (Child, 1972; Miller, 1983) or firm performance (Zahra & Bogner, 2000). There is, however, only limited knowledge on how firm environment impacts the strategic decisions made within the firm (Zahra & Bogner, 2000). I contribute to this literature stream by incorporating environmental heterogeneity into a framework of the entrepreneurs' decision making policies. By looking at heterogeneity and its impact on decision making I focus on the intersection of the internal and external environment (Zahra & Bogner, 2000). Understanding the impact of environmental factors on entrepreneurial decision making helps to gain further insight into relationships to firm structure, strategic decision making and innovativeness discovered in previous findings. For example, Chandler (1962) suggests that environmental heterogeneity and product diversification result in a decentralized firm structure. I can show that experienced entrepreneurs place increased weight on developing stakeholder support, including the improvement of the support of their management team and employees. These entrepreneurs may realize that they can not face the complex environment on their own and that strong commitment of their work team ensures success in decentralization later on. Zahra and Bogner (2000) find that companies facing heterogeneous environments emphasize technology development, the introduction of new products, and entering strategic alliances. This way they address new customers, improve technological capabilities and gain increased profit and growth. My study, however, shows that only experienced entrepreneurs emphasize technology

development and knowledge customer demand when exploiting an opportunity in a heterogeneous environment.

Second, I contribute to existing knowledge on entrepreneurial experience. I combine two important findings in this literature stream. Baron and Ensley (2006) found that prototypes for opportunity recognition differ between experienced and non-experienced entrepreneurs. Entrepreneurs with less experience in founding a business prioritize “uniqueness” and “newness” when exploiting an opportunity. They want to change the market and, thus, want to quickly introduce a new product or service to the market to be the “first mover”. Contrary, more experienced entrepreneurs focus on solving a customers’ problem, bearing a manageable risk and generating a positive cash-flow. Entrepreneurs experienced in founding a business have also developed entrepreneurial scripts. These scripts are action-based knowledge structures that are relevant for entrepreneurial decision making and improve information-processing (Mitchell et al., 2000). I combine these two important findings on entrepreneurial experience while looking at the impact of environmental heterogeneity on entrepreneurs’ decision policies. I show that experience in founding a business -- hence, different prototypes in opportunity recognition and different knowledge structures -- moderate the emphasis entrepreneurs place on resources while exploiting an opportunity in a heterogeneous environment.

Third, by looking at the moderating effects of experience on the heterogeneity-exploitation relationship, I test three-way-interactions that provide a finer-grained picture of decision policies of entrepreneurs. I show that decision policies of entrepreneurs are complex and that environmental factors may not only have a direct impact on their decisions. Rather, founder experience interacts with the impact of environmental heterogeneity on the emphasis placed on different resources when

exploiting an opportunity. Previous studies on heterogeneity have emphasized that environmental impact on organizational structure and firm performance is moderated by different factors. For example, Pennings' (1975) findings suggest that environment variables impact organizations on different technology dimensions. Environmental characteristics, such as heterogeneity, dynamism, and hostility, and technology strategy conjointly influence firm performance (Zahra & Bogner, 2000). Also, environmental dynamism impacts small business performance depending on the firm's entrepreneurial orientation and its access to capital (Wiklund & Shepherd, 2005). I identify founder experience as another factor that moderates the impact of environment on entrepreneurial decision making and add to existing knowledge on the complex relationship between environment and firm performance, strategic choice, and decision making.

My study has limitations that offer opportunities for future research. First, one shortcoming is that I focus on only one environmental effect, namely heterogeneity, and its impact on entrepreneurial decision making. I concentrate on heterogeneity as the intersection of the external and internal environment of the firm. However, there are more environmental factors and characteristics (Aldrich, 1979; Dess & Beard, 1984; Zahra & Bogner, 2000) that may impact entrepreneurial decision policies. Future research can focus on these factors and investigate their impact on entrepreneurs' decisions.

Second, I limit my attention to entrepreneurial experience as a moderator in the heterogeneity – resource assessment relationship. My findings suggest that this relationship is complex and that various factors may impact this relationship. To create an even finer-grained picture of these relationships, more possible factors should be

investigated in relation to the impact of environmental characteristics on entrepreneurial decision making.

Finally, I cannot draw conclusions which strategy in reacting to a heterogeneous environment will be more successful. Shepherd et al. (2003) and Cho and Hambrick (2006) describe experience as a “two-folded sword”. More experience may increase the individual’s knowledge, however, decisions may also become more and more channelled the more experience the individual accumulates. In that sense, a promising strategy may be to focus on the technology development, knowledge of customer demand, and stakeholder support to partly resolve uncertainty and thereby increase cognitive capacities needed for opportunity exploitation in a heterogeneous environment. However, it may also be a successful strategy to concentrate on developing managerial capabilities to ensure the efficiency of opportunity exploitation but to extend technology development and knowledge of customer demand “as they go”. Ucbasaran et al. (2008) suggest that habitual entrepreneurs are more successful than novice entrepreneurs, which may speak in favor for the strategy pursued by experienced entrepreneurs. Nevertheless, future research may relate my findings to long-term success of a firm and further improve our understanding of how environmental factors impact firms’ strategies and their success.

To conclude, firm environment is an important influence on the organizational structure (Pennings, 1975; Thompson, 1967; Tung, 1979), on strategic choice, and firm performance (Wiklund & Shepherd, 2005; Zahra & Bogner, 2000). My study suggests that environmental characteristics impact entrepreneurial decision making. Even more importantly, I find that environmental heterogeneity does not influence all entrepreneurs or one particular entrepreneur over time in the same way. Founder experience has been found to moderate the relationship of environmental heterogeneity and the emphasis

placed on resources when exploiting an opportunity. These findings suggest that the impact of environmental characteristics on strategic decisions is complex and deserves more attention in the literature. My study adds to the literature on entrepreneurial decision making, firm environment, and entrepreneurial experience and intends to inspire further research on the role of environmental characteristics in entrepreneurial decision making.

3 Entrepreneurs' passion for work, excitement, and the decision to exploit opportunities[♦]

This paper deals with the impact of positive affective states on entrepreneurial decision making. I propose that both harmonious and obsessive passion can trigger entrepreneurs' decision to exploit new opportunities, and that this effect is contingent on their experiences of excitement. A new method of mood induction is used to induce excitement in a within-subject design. I find that harmonious passion drives entrepreneurs toward the decision to exploit an opportunity. The relationship between obsessive passion and the decision to exploit is positive when entrepreneurs experience excitement. My results emphasize that passion for work and other, more transient, affective experiences interdependently impact entrepreneurs' judgment and decision policies. I provide an introduction to the topic in Section 3.1. In Section 3.2 I review theory on passion and positive affect and derive my hypotheses. Section 3.3 deals with the method I used to test my hypotheses. The results of the study are presented in Section 3.4. In Section 3.5 I discuss these results.

[♦] This section is based on Klaukien, Shepherd and Patzelt (2009) and is currently under revision at the Journal of Management. An earlier version of the paper was presented at the Babson College Entrepreneurship Research Conference, June 5-7, 2008, in Chapel Hill, NC, USA.

3.1 Introduction

Managers who are passionate about their work invest high levels of effort without even noticing it (Chang, 2001b) and experience success and failure as a personal incident (Baron, 2008; Shepherd, 2003). Passionate managers are enthusiastic about their work and display an untiring activity and energetic pursuit of a challenging idea (Chang, 2001b). A lack of passion can lead to business failure while prevailing passion nurtures persistence even when facing difficulties (Cardon et al., 2009; Cardon, Zietsma, Saporito, Matherne, & Davis, 2005; Chen, Yao, & Kotha, 2009). Indeed, passion is “[p]erhaps the most observed phenomenon of the entrepreneurial process” (Smilor, 1997, p. 342).

Since passion for work appears so central in the context of entrepreneurship, a variety of studies have analyzed the role of passion in the entrepreneurial process (e.g., Baum & Locke, 2004; Baum, Locke, & Smith, 2001; Shane, Locke, & Collins, 2003; Smilor, 1997). This literature, however, has been highly fragmented and often exploratory. More recently, Cardon and colleagues (2009) integrated this disparate work and provided a theoretical framework for the nature and outcomes of entrepreneurial passion. This framework suggests that entrepreneurial passion triggers goal-related cognitions and behaviors that affect entrepreneurs’ effectiveness in their roles as inventors, founders, and venture developers. Following Vallerand et al. (2003) we define *entrepreneurs’ passion for work* as a strong inclination toward work activities entrepreneurs like, find important, and in which they invest time and energy. While these authors and others have considerably advanced our understanding of entrepreneurial passion and highlighted the likely inter-relationship of passion and

cognition, surprisingly, there has been an insufficient investigation of the link between entrepreneurial passion and decision making and between different types of passion.

In this paper, we build on the emotion and decision making literatures and use an experimental design and conjoint analysis to investigate how entrepreneurs' passion for work impacts their decision to exploit opportunities - - a decision that is central to entrepreneurial activity (Choi & Shepherd, 2004; McMullen & Shepherd, 2006). We acknowledge that entrepreneurs differ in the internalization of passionate work activities into their self-identity and distinguish between **harmonious passion for work** – *an autonomous internalization and free choice of engagement in work-related activities* -- and **obsessive passion for work** -- *a controlled internalization that creates an internal pressure to engage in work-related activities* (Vallerand et al., 2003, p. 756). Our model takes into account that while entrepreneurial passion involves consciously experienced changes in affect (Cardon et al., 2009), entrepreneurs make additional affective experiences that are not related to their passion for work.¹ We investigate the role of these affective experiences on the relationship between passion (harmonious and obsessive passion) and entrepreneurs' opportunity exploitation decisions. We focus on experiences of **excitement** – a positive affective state defined as *the combination of high pleasure and high arousal* (Russel, 1980, p. 1164). We empirically manipulate entrepreneurs' excitement levels during an experimental opportunity evaluation task by visual induction using the International Affective Picture System of the University of Florida (IAPS, Lang et al., 2005). In doing so, we contribute to existing literature in three important ways.

¹ We acknowledge that they might be better prepared for exploitation. The positive affect experienced by harmoniously passionate entrepreneurs increases cognitive flexibility and creativity (Baron, 2004; Isen, 1999; Isen & Daubman, 1984; Ward, 2004) and may help them find non-obvious alternatives to acquire the resources necessary for exploitation (Baron, 2008) and modes of exploitation compatible with their existing business strategy.

First, research has investigated the impact of entrepreneurial passion on venture growth (Baum & Locke, 2004; Baum et al., 2001), investor commitment (Chen et al., 2009), and venture survival (Baron & Hannan, 2002), but it has not yet explored how passion impacts the decision policies of entrepreneurs. We propose and find that both harmonious and obsessive passion influence the decision to exploit opportunities but do so in different ways. Harmonious passion has a positive direct influence on the decision to exploit opportunities whereas obsessive passion does not have a significant direct influence. Therefore, while the direct influence of harmonious passion is consistent with previous studies of passion (but in the new context of the opportunity exploitation decision), our finer-grained treatment of passion allowed us to capture an important distinction between two types of passion.

Second, while previous research has primarily focused on the direct effect of passion on decisions and behaviors, such an approach for the current study would have led to the tentative conclusion that entrepreneurs' obsessive passion for work does not influence the opportunity exploitation decision. Rather, the relationship between obsessive passion and the decision to exploit is more complex; it depends on the affective state of excitement. This finding suggests that interactions between passion and other affective states (excitement) provide deeper insights into entrepreneurs' assessments and meets the calls of those advocating a more complex picture of the relationship between affect and decision making (e.g., David, Green, Martin, & Suls, 1997; Feist, Bodner, Jacobs, Miles, & Tan, 1995; Mageau & Vallerand, 2007).

Finally, with a few exceptions (e.g., David et al., 1997; Feist et al., 1995; Mageau & Vallerand, 2007) researchers have viewed feelings (such as passion, Cardon et al., 2009) and other affective states as independently rather than *conjointly* influencing judgment and decision making (e.g., Dreman, 2004; Forgas, Bower, &

Krantz, 1984; Forgas, Bower, & Moylan, 1990; Levy, Murphy, & Lee, 2008). This is surprising because most individuals experience a variety of feelings and affective states simultaneously in everyday life (Sherer & Tannenbaum, 1986). Importantly, we provide evidence of such a conjoint effect because we show that entrepreneurs' passion for work (a feeling) and their non-passion related excitement (an affective state) interdependently impact their decision to exploit an entrepreneurial opportunity.

We structure the remainder of this paper in the following way. First, we investigate how harmonious and obsessive passion influences an entrepreneur's decision to exploit an opportunity, and how his or her level of excitement moderates these relationships. Second, we explain our methodology and sampling procedure before we present our results. Finally, we discuss the findings of our study and draw conclusions.

3.2 Theory development

Opportunity exploitation and entrepreneurial passion. Opportunity exploitation is the beginning of immediate full-scale operations on the product or service arising from the opportunity and the decision to exploit an opportunity is a commitment to market entry (Choi & Shepherd, 2004). Models of opportunity exploitation have identified two broad factors that explain exploitation decisions: entrepreneurs' assessments of feasibility and desirability of exploitation (Krueger, 1993, 2000). While feasibility assessments depend on, for example, the availability of important resources (such as technologies, managerial capabilities, and stakeholder support) and knowledge (Choi & Shepherd, 2004; McMullen & Shepherd, 2006), desirability refers to the entrepreneurs' motivation to exploit.

Passion for work can serve as a strong motivator for entrepreneurs (e.g., Baum & Locke, 2004; Cardon et al., 2009; Cardon et al., 2005; Smilor, 1997). Passion for work

develops when entrepreneurs highly value their work activities, like to engage in those activities, and do so on a regular basis (Aron, Aron, & Smollan, 1992; Vallerand et al., 2003) leading to an integration of work in their self-identity (Cardon et al., 2009). For example, the founders of Microsoft and Apple Computers, Bill Gates and Steve Jobs, are often referred to as “Mr. Microsoft” and “Mr. Apple” in the media. In many public appearances both Bill Gates and Steve Jobs have demonstrated their enthusiasm for their work and their firms and (implicitly or explicitly) presented themselves as “Mr. Microsoft” and “Mr. Apple”, suggesting that their work activities have become integral parts of their self-image. Gates and Jobs are not simply the founders of Microsoft and Apple, but the firms they founded have become part of their identity and help them to define who they are as a person. Importantly, however, there is variance in the degree to which entrepreneurs can internalize their work activities into their self-identity leading to the development of either Harmonious Passion or Obsessive Passion. It is important to note that although there is some correlation between Harmonious and Obsessive Passion both represent independent dimensions and are not the ends of a continuum (see, Vallerand et al., 2003).

Harmonious Passion refers to an autonomous internalization of an activity in one’s identity that leads individuals to choose to engage in the activity that they like (Vallerand et al., 2003, p. 756). Entrepreneurs who are harmoniously passionate about their work willingly and freely choose to engage in work activities. For these entrepreneurs, no contingencies (e.g. social pressures, the necessity to earn a living for their family or to maintain a certain life style) are attached to work. Although work significantly contributes to the formation of their identity, the space work occupies in forming this identity does not rigorously dominate other aspects of the entrepreneurs’ lives. Instead, these entrepreneurs are able to harmoniously balance different aspects of

their lives in forming their identities. For example, harmoniously passionate entrepreneurs can also integrate roles as family members, sports team members, and guitar players into their identity and these roles will not be overly dominated by their work role.

Entrepreneurs who feel harmonious passion for work typically experience positive affect during work “because the autonomous internalization of the activity leads the person to engage in the task in a more flexible manner and thus to experience task engagement more fully” (Vallerand et al., 2003, p. 757). For example, after the birth of a first child entrepreneurs will take on additional roles as mothers or fathers. These additional roles may be highly valued by them and they will invest significant amounts of time and effort in their family at the expense of their engagement at work. To the extent that their passion for work is harmonious, they have the flexibility to integrate this new role into their identity in addition to and in harmony with their work role. This flexible integration of roles and the entrepreneurs’ control over their work activities will facilitate better concentration and the experience of positive affect, absorption, and flow at work (Vallerand et al., 2003). We propose that the positive affect that harmoniously passionate entrepreneurs experience at work will enhance the likelihood that they will exploit new, additional opportunities they recognize (holding constant the characteristics of the opportunity and other motivating factors). This is because positive affect influences entrepreneurs’ analytic thinking, risk taking propensity, creativity, and stress tolerance.

First, entrepreneurs who experience positive affect at work use heuristics more than effortful and systematic processing strategies (for empirical evidence see Innes & Ahrens, 1991; Park & Banaji, 2000; Schwarz, 1990) because experiencing positive affect requires cognitive capacity that is now no longer available for analytic and careful

thinking (Mackie & Worth, 1989, 1991). When these entrepreneurs evaluate a potential new opportunity, they are unlikely to pay adequate attention to information on, for example, the availability of resources and the conditions of the (competitive) environment. Instead, they feel “ready” to exploit even without investing considerable time and effort into thorough consideration of the current internal and external situation.

Second, when evaluating a new opportunity, harmoniously passionate entrepreneurs will perceive fewer threats to the success of early exploitation because due to their positive affective state they tend to underestimate risks (Johnson & Tversky, 1983) and perceive more control over their environment (Alloy & Abramson, 1979; Alloy, Abramson, & Viscusi, 1981). Outcome uncertainty is a major impediment to opportunity exploitation for entrepreneurs (McMullen & Shepherd, 2006; Wernerfelt & Karnani, 1987), but those who underestimate these uncertainties will be more likely to exploit early without trying to collect and evaluate information about customers, markets, available technologies, and so on (c.f. Choi & Shepherd, 2004). Similarly, those who perceive more control over their environment may believe that they can influence the market and competitive situation once they have started exploitation. These entrepreneurs will spend less effort on information collection and evaluation and are more likely to exploit early than less passionate entrepreneur who believe they have little control over environmental conditions.

Third, positive affect experienced by harmoniously passionate entrepreneurs increases cognitive flexibility and creativity (Isen, 1999; Isen & Daubman, 1984; Isen, Niedenthal, & Cantor, 1992; Kahn & Isen, 1993) since it enables individuals to expand or combine cognitive frameworks in new ways (Baron, 2004; Ward, 2004). For example, creativity can trigger the exploitation of new opportunities because it facilitates entrepreneurs finding ways of exploitation compatible with their existing

business strategy. Further, creative entrepreneurs are more likely to find non-obvious alternatives to acquire the resources necessary for exploitation (Baron, 2008). Finally, creativity can enhance the entrepreneurs' ability to find a viable means of exploitation and adapt their exploitation strategy even in dynamic environments with changing customer demands, competitive landscapes, and stakeholder support.

Finally, to the extent that the exploitation of a new opportunity represents an additional work load and elevated levels of stress for harmoniously passionate entrepreneurs, their experiences of positive affect can enhance their capacity to tolerate these higher stress levels. Drawing on research showing that the experience of positive affect is associated with improved personal health (Lyubomirsky, King, & Diener, 2005) and a better functioning of the immune system (Booth & Pennebaker, 2000), Baron (2008) argued that positive affect increases entrepreneurs' abilities to cope with, and resist, high stress levels (Carver & Scheier, 2001). Thus, harmonious passion tends to improve entrepreneurs' physical health and stress resistance, leading them to more readily accept additional work load arising from immediate opportunity exploitation than entrepreneurs who are less passionate. Thus,

H 1: The more harmoniously passionate the entrepreneur, the higher the likelihood that he or she will exploit a new, additional opportunity.

Obsessive passion refers to a controlled internalization of an activity in one's identity that creates an internal pressure to engage in the activity that the person likes (Vallerand et al., 2003, p. 756). Controlled internalization originates from a perceived obligation to pursue the activity because certain intrapersonal or interpersonal contingencies are attached to it. For example, an entrepreneur may be a member in a business association or an entrepreneurs' club where social acceptance requires that he or she successfully run their business regardless of the costs and effort required.

Alternatively, the entrepreneurs' self-esteem may be to a large extent coupled to the success of their business leading them to invest considerable personal resources and effort into work activities. Entrepreneurs may also be forced to maintain a certain standard of living for their families creating a necessity to make work the central part of their lives. They are forced to engage in it because of the contingencies that come to influence them. These entrepreneurs perceive little other choice but to invest high levels of effort in their work; they are controlled by their passion for work. It is believed that obsessively passionate entrepreneurs are typically unable to achieve a harmonious integration of work, family, and other roles in forming their identity because work takes a disproportionate amount of space in their self-identity leading to conflict with other activities in their lives (c.f. Vallerand et al., 2003).

Although most studies implicitly assume that entrepreneurs' passion for work is harmonious, anecdotal evidence suggests that obsessive passion is also frequent among entrepreneurs. For instance, one entrepreneur interviewed by Boyd and Gumpert (1983a) did not consider selling his company, despite serious health problems caused by the severe stress he suffered from work. Selling his company would have been like "sell[ing] [his] kids and wife and dog and [he] won't sell [his] business, whether it's succeeding or failing. It's a commitment" (Boyd & Gumpert, 1983a, p. 45). This suggests that the entrepreneur could not control his passion for the business anymore, but rather that his work controlled him and he could not reduce his involvement despite the health problems experienced. Further, Wasserman (2008) stated that entrepreneurs' passion leads them to pursue their businesses despite negative consequences such as stress. Finally, Cardon et al. (2005) argued that entrepreneurial passion can have dysfunctional consequences such as overwhelming and escalating commitment to work.

In contrast to harmonious passion, obsessive passion leads entrepreneurs to experience less positive affect during work “because a controlled internalization breeds an internal compulsion to engage in the activity, leading to a more rigid and conflicted form of task engagement. Such pressured engagement should prevent the person from fully focusing on the task at hand and take away the positive affective outcomes that would be normally experienced” (Vallerand et al., 2003, p. 757). Thus, obsessive passion has little, if any influence on entrepreneurs’ experiencing positive affect at work and thus will have little influence on entrepreneurs’ opportunity exploitation decisions.

However, it appears that the contingencies attached to their work activities can drive entrepreneurs who feel obsessively passionate about their work to exploit new and additional opportunities by influencing their cognitive-attention strategies (Mischel & Ayduk, 2002, 2004; Mischel, Cantor, & Feldman, 1996). For example, entrepreneurs who feel less obsessively passionate about their work may consider the exploitation of a particular opportunity as requiring too many resources (c.f., Séguin-Levesque, Laliberté, Pelletier, & Vallerand, 2003) or entail risks of failure that are too high (c.f. Vallerand et al., 2003), and therefore resist the temptation to exploit. However, those that feel more obsessive passion are likely to focus less on resource availability and risk and more on whether exploitation can gain them social acceptance or help them keep their self-image as “a real entrepreneur who does not let go of an opportunity” thereby maintaining their self-esteem. Further, to the extent that the opportunity provides immediate financial rewards (even in the face of uncertain or negative future rewards) that maintain their own and their family’s life style, these entrepreneurs are likely to proceed with exploitation. These arguments are supported by studies showing that in situations where difficult, long-term goals (such as developing a sustainable successful business) prevail individuals often have problems to resist the temptation of focusing on an immediate

reward (e.g., gaining social acceptance or maintaining self-esteem) at the cost of neglecting those long-term goals (referred to as the “Delay Gratification Paradigm”, Metcalfe & Mischel, 1999; Mischel, 1974; Mischel, Shoda, & Rodriguez, 1989; Rachman & de Silva, 1978; Rasmussen & Eisen, 1992).

Moreover, entrepreneurs obsessively passionate about their work are likely to experience negative affect when not engaging in work activities (Vallerand et al., 2003). Due to the contingencies attached to their work and the pressure they feel to pursue this work, it will be difficult or impossible for them to fully focus on non-work related activities without thinking of work. This may lead to frustration and anger that they are prevented from engaging in work activities and limit their possibilities to relax and experience joy and pleasure when pursuing other activities. Exploiting a new opportunity in addition to their current work activities may serve to legitimate more hours and effort put into work at the expense of non-work related activities, thereby diminishing frustration and anger outside work. For example, the entrepreneurs may state to family members or friends that the opportunity they recognized is unique and that the pursuit is essential for the success for their business thus legitimating spending less time with family and friends and more time at work. Thus,

H 2: The more obsessively passionate the entrepreneur, the higher the likelihood that he or she will exploit a new, additional opportunity.

The Moderating Role of Excitement. While passion for work induces a change in entrepreneurs’ affective state when engaging in work-related activities, entrepreneurs may experience additional affect at work from other sources. More specifically, entrepreneurs can experience changes in affect that are, in contrast to passion for work, not based on conscious reflection upon work-related activities. For example, these additional experiences of affect may be episodic and activated subconsciously or

unconsciously by external events (Cardon et al., 2009), or they may arise from non-work related activities and spill over to the entrepreneurs' work environment (Isen, 1987; Weiss & Cropanzano, 1996).

In this article, we focus on excitement as an example for positive affect entrepreneurs can experience in addition to passion-related affect during work. Excitement refers to the combination of high pleasure and high arousal (Russel, 1980, p. 1164). That is, excitement is a strong, positive affective experience. For example, experiences of excitement that arise from non-work related activities may result from reading an exciting book, watching an exciting picture or movie, being successful at sports events, winning a lottery, the forthcoming wedding or the birth of a child. To the extent this excitement spills over to the entrepreneurs' work environment, it will influence their opportunity exploitation decisions. We acknowledge that excitement may also result from entrepreneurs' passion for work (Cardon et al., 2009), however, as the above examples illustrate, there are many sources for non-passion related excitement. We are interested in disentangling both sources to focus on excitement that does not originate from entrepreneurs' passion for work. We propose that experiences of non-passion related excitement impact the relationships between passion and the decision to exploit opportunities. The nature of this moderating role of passion, however, likely differs for harmonious and obsessive passion.

First, excitement will likely diminish the effect of harmonious passion for work on entrepreneurs' motivation to exploit new opportunities. Excitement is a positive affective state with a high activation level (Russel, 1980) and this high intensity will render as less salient the positive affect generated by harmonious passion when engaged in work activities. For example, when employees are fearful and anxious of being laid off during organizational downsizing, support by co-workers can induce positive affect

such as enthusiasm for a new challenge outside the organization that renders the negative affect less salient (Weiss & Cropanzano, 1996). Such “affective episodes” suggest that events inducing excitement in entrepreneurs can diminish the salience of positive affect experienced from harmoniously passionate work activities.

Further, excitement may partly substitute for the positive affect entrepreneurs experience from harmonious passion. Entrepreneurs who experience excitement from an event in their work or family life will be driven toward action (Russel, 1980) and opportunity exploitation even if they have little passion for their work. For example, excitement as positive affect may temporarily increase heuristic thinking (Schwarz, 1990), over-optimism and perceptions of environmental control (Alloy & Abramson, 1979; Alloy et al., 1981), cognitive flexibility and creativity (Isen, 1999; Isen & Daubman, 1984; Isen et al., 1992; Kahn & Isen, 1993), and stress tolerance (Baron, 2008), all of which drive entrepreneurs to exploit opportunities (see above). If excitement already activates these “mechanisms” in entrepreneurs, additional positive affect from harmonious passion will have diminished impact on further activation. Thus,

H 3: The positive relationship between harmonious passion and entrepreneurs' likelihood to exploit an opportunity is weaker (less positive) when entrepreneurs additionally experience excitement than when they do not experience additional excitement.

In contrast to this negatively moderating (substituting) role of excitement on the harmonious passion-exploitation relationship, we suggest that excitement enhances (magnifies) the relationship between obsessive passion and entrepreneurs' motivation to exploit new opportunities. Specifically, excitement experienced by obsessively passionate entrepreneurs may further diminish their abilities to resist the temptation to exploit an opportunity. Resistance and self-regulation requires that entrepreneurs attend to long-term goals and thoroughly evaluate whether exploitation complies with these

goals (e.g., sustainable success of their current business). Those who are highly obsessively passionate are particularly vulnerable to interruptions to their long-term goal-directed efforts when they experience a stimulus that draws their attention to an alternative goal (Simon, 1967), which can then become prioritized (Carver & Scheier, 2001). Excitement can represent an affective stimulus that drives those entrepreneurs high in obsessive passion to action (Russel, 1980) and imposes the alternative goal of exploiting a new opportunity immediately at the expense of the long-term goals of the business. Entrepreneurs who are less obsessively passionate will be more able to self-regulate and resist this stimulus and more carefully assess whether immediate opportunity exploitation complies with the long-term goals of their ventures or not. Thus,

H 4: The positive relationship between Obsessive Passion and entrepreneurs' likelihood to exploit an opportunity is stronger when entrepreneurs additionally experience excitement than when they do not experience excitement.

3.3 Methodology

3.3.1 Sample

For a sampling frame we chose independent entrepreneurs involved in new ventures located in business incubators in Germany. This population of entrepreneurs is particularly appropriate for our purpose because incubators are specifically designed for entrepreneurs to concentrate on the exploitation of new business opportunities (Rice, 2002). From public sources and a list of incubators issued by the German Federal Association of Innovation, Technology, and Start-Up Centers (ADT, 2008), we identified 15 incubators within a geographic distance of less than 300 km from the location of the first author. This geographic proximity was necessary because we

planned to visit entrepreneurs personally to conduct the experiment (see below). From the websites of the incubators, we captured a list of all incubator ventures and their founders.

All together, our list contained 446 ventures. Subsidiaries of large firms were excluded from the sample because the decision policies of these entrepreneurs may be influenced by the strategic directions of their parent companies. We also excluded firms that were no longer run by the initial business founders. One hundred and eighty five entrepreneurs from this list were then contacted via phone or email between March and October 2008. We explained the purpose of the study and asked if they would be willing to participate. Participation was on a voluntary basis and those who participated received a small present after finishing their task. If the entrepreneur agreed to participate we scheduled an appointment with him or her. Ninety-three entrepreneurs denied our request for participation during the time frame of the study, mainly stating that the study would take too much of their time. Ninety-two entrepreneurs agreed to participate, representing a response rate of 50.3 %.

Entrepreneurs' average age was 39 years (standard deviation 11 years), and 90 % of the sample was male. Seventy-four per cent held a Masters or higher degree. Twenty-three per cent had a background in engineering, 23% in natural sciences and mathematics, 19% in computer sciences, and 18% in business administration. On average, participants had worked for 11 years in the private sector (std. dev. 8 years). The average firm in our sample was 4.5 years old (std. dev. 4.7 years) and had 7.1 employees (std. dev. 9.9). Seventy-eight per cent of the firms were technology-based ventures (e.g., biotechnology, information technology, optical devices) and the remaining ventures belonged to various low technology based industries (e.g., marketing, trade).

3.3.2 Experimental design and procedure

Following Choi and Shepherd (2004), we used a set of conjoint experiments to investigate entrepreneurs' decisions to exploit opportunities. As these authors did, we described hypothetical entrepreneurial opportunities in terms of different levels of four decision attributes that constitute important resources influencing entrepreneurs' exploitation decisions (knowledge of customer demand, development of enabling technology, managerial capabilities, and stakeholder support). To each profile, the entrepreneurs assessed the likelihood that they would exploit the opportunity described.

We used a within-subject design to test the affect manipulation on the entrepreneurs' decision policies. Since conjoint studies require full replication of profiles to allow for tests of reliability (Shepherd & Zacharakis, 1997), each entrepreneur assessed four identical, complete sets of conjoint profiles – two sets before affect manipulation (original and replication) and two sets after affect manipulation (original and replication). Since all decision attributes were presented at one of two possible levels, a fully crossed factorial design would have required 16 (2^4) scenarios for each set of conjoint profiles. We thus applied an orthogonal fractional factorial design that limited the number of attribute combinations to eight, resulting in 16 profiles (original and fully replicated) before and 16 profiles (original and fully replicated) after affect manipulation. The 16 profiles and the order of attributes within a profile were randomly assigned to four versions of the experiments to test for order effects. An ANOVA revealed no significant differences in means and variance between the four versions ($p > .10$); thus, order effects are unlikely to influence the results.

We also included a 'practice' profile (which was not part of the statistical analysis) at the beginning of the experiment to familiarize the participants with the decision situation before starting the decision making task. Thus, the entrepreneurs were

confronted with 33 decision scenarios (practice profile, two sets of profiles before affect manipulation, two sets of conjoint profiles after affect manipulation).

We used a computer-based presentation and answer method that was individually conducted in the entrepreneurs' offices and which took about 40 minutes to complete. The experimenter presented the decision making task on a laptop and gave a short instruction. To ensure that affect manipulation was effective (see below), the experimenter stayed in the office during the course of the experiment to ensure that the entrepreneurs fully concentrated during the affect induction procedure and were not interrupted.

3.3.3 Affect manipulation

We induced excitement in entrepreneurs by presenting pictures from the International Affective Picture System (IAPS, Lang et al., 2005). This database contains about 1000 pictures that are found to induce specific affective states. The affect induction properties of these pictures are well validated and allow researchers to experimentally control affect stimuli. Several clinical and decision making studies have been conducted successfully using the IAPS data base for affect manipulation (e.g., Bradley et al., 1996; Bradley & Lang, 1999; Lang et al., 2005).

To maximize the processing of the pictures and make affect manipulation effective, the participants were instructed to “fully concentrate on the pictures and think [themselves] into them” before the experiment started. They were further told to “imagine the situation as clearly as [they] can, see the people around [them], hear the sounds and experience the event happening to [them]”. The entrepreneurs were also asked to avoid interruptions during the course of the experiment (e.g. switch phones off)

and when possible, the experimenter shaded the room to ensure that the entrepreneur's attention was focused on the computer screen.

The effectiveness of the affect manipulation is supported by the following. First, to confirm that the manipulation indeed caused a change in entrepreneurs' decision policies, we compared the correlations of the profile pair after the manipulation (profile set 3/4) with correlations of all possible, identical profile pairs across manipulation states (i.e., correlations between the identical profiles of sets 1/3, 2/3, 1/4, and 2/4). We found that the mean of correlations after the manipulation ($M = .88$, $SD = .16$) is significantly higher, $t(359) = 5.21$, $p < .001$, than the mean of correlations across manipulation states ($M = .84$, $SD = .20$), suggesting that the decision policies of entrepreneurs change between manipulation states. Second, there is the possibility that the change in entrepreneurs' decision policies before and after the manipulation was simply due to entrepreneurs becoming more exhausted or tired during the course of the experiment. If one expects this fatigue effect, one would assume the reliability of responses to decrease over time. We found, however, that the correlation between the last two sets of profiles (those after the manipulation; $M = .88$, $SD = .02$) was not significantly lower ($t(89) = -3.26$, $p < .01$) than the correlations between the first pair of profile sets (those before the manipulation; $M = .82$, $SD = .02$). This suggests that fatigue is unlikely to cause the change in entrepreneurs' decision policies before and after the manipulation. Finally, in feedback interviews several of the entrepreneurs mentioned that the pictures induced experiences of excitement.

3.3.4 Measures

Dependent variable. We defined opportunity exploitation as the stage in which immediate full-scale operation, i.e. shipping the first product for revenues, is started

(Schoonhoven, Eisenhardt, & Lyman, 1990). Following Choi and Shepherd (2004), we asked entrepreneurs to assess the likelihood of exploitation on a 7-point Likert-type scale anchored by the end points very unlikely (“1”) and very likely (“7”). The dependent variable for this study is an entrepreneur’s mean likelihood of opportunity exploitation controlling for the nature of the opportunity and the resources at hand (as detailed below).

Harmonious and Obsessive Passion. Before the conjoint experiment started, subjects were asked to rate their Harmonious and Obsessive Passion on a 14-item scale developed by Vallerand et al. (2003). We decided to measure entrepreneurs’ passion before the actual experiment to avoid an influence of the induced affective state on this rating. The Harmonious and Obsessive Passion Scale was developed and validated to test individuals’ passion for activities and hobbies and is (to our knowledge) the most commonly used scale to measure passion. With the assistance of an English and a German native speaker, the scale was translated word by word into German, and by another person who is fluent in both languages back-translated into English. This procedure ensures maximum consistency between the translated and original scales (Brislin, 1970).

In the introduction to the scales, entrepreneurs were asked to think about their work as business founders while answering the questions representing the items. A 7-point Likert-type scale anchored by “definitely do not agree” and “definitely agree” was used to measure the entrepreneurs’ assessments. The Harmonious and Obsessive Passion Scale contains 7 items for Harmonious Passion and 7 items for Obsessive Passion. Items for the Harmonious Passion scale included, for example, “This activity allows me to live a variety of experiences”, “This activity reflects the qualities I like about myself”, and “This activity is in harmony with the other activities in my life”.

Items for the Obsessive Passion scale included, for example, “I cannot live without it”, “The urge is so strong. I can’t help myself from doing this activity”, and “I have difficulties imagining my life without this activity”. A confirmatory factor analysis revealed the same two factors for Harmonious and Obsessive Passion as suggested by Vallerand et al. (2003); Cronbach’s alphas are .69 for Harmonious and .87 for Obsessive Passion, respectively. We acknowledge that the value for Harmonious Passion is relatively low, however, it is similar to Vallerand et al. (2003) who reported a value of .71 (for Obsessive Passion they reported a value of .85). Thus, the scales we used are sufficiently reliable (Hair et al., 2006). The overall scores for Harmonious and Obsessive Passion were obtained by averaging the seven items. Both variables were mean-centered before the statistical analysis.

Excitement. During the first two sets of conjoint profiles, participants were shown pictures from the IAPS data base that do not induce any affective state of interest (affectively neutral pictures 2190, 7090, 7130, 7160, see Codispoti, Bradley, & Lang, 2001). During conjoint sets three and four, participants were shown pictures that induce excitement (pictures 8030, 8031, 8370, 8400, see Mikels et al., 2005). The first affectively neutral picture was presented before the first profile for 10 seconds, and the other affectively neutral pictures were presented for 10 seconds after every fourth decision profile. Similarly, during profile sets 3 and 4, the first picture inducing excitement was presented for 10 seconds before the first profile, and then a different picture for 10 seconds after every fourth profile. To maximize the impact of the pictures during the participants’ evaluations of scenarios, the pictures remained visible with reduced intensity as the background scene on which the profiles were presented. A presentation time of 10 seconds ensures that the participants have sufficient time to process the picture (Lang et al., 2005).

Control variables. We used the participants' *Age* and *Work Experience* (both measured in years) as control variables. Both variables were mean-centred and included in the analysis because they are known to influence decision making of entrepreneurs (Bird, 1989).

Decision profiles. We followed Choi and Shepherd (2004) and described the conjoint profiles in terms of decision attributes that are known to influence the opportunity exploitation decision in the scenarios. *Knowledge of Customer Demand* is the level of customer acceptance of the new product and ranges from high (customers have substantial knowledge about the new venture's product and services and you are quite certain that there is substantial future demand) to low (customers have little knowledge about the new venture's products and services and you are uncertain that there is substantial future demand). The *Development of Enabling Technology* is the level of technology uncertainty (Reverse Coded) and ranges from high (the new venture has not yet established the technologies necessary to fully grasp the new opportunity) to low (the new venture has established the new technologies necessary to fully grasp the new opportunity). *Managerial Capabilities* are defined as the managerial capabilities of the new venture and range from high (you and your management team have considerable skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production) to low (you and your management team have limited skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production). *Stakeholder Support* is defined as the level of supporter's commitment to the new venture ranging from high (supporters such as management team, investors, and suppliers are highly supportive for the new venture) to low (supporters such as management team, investors, and suppliers are marginally

supportive for the new venture). In the statistical analysis, these decision-level variables were treated as control variables.

Finally, to control for other factors that potentially influence the decisions of participants, they were instructed that the opportunities described are based on an idea similar to their own business idea, that the time horizon for exploitation is 2 years, the financial market is very attractive for new ventures, and the threat of imitation by competitors is low (consistent with Choi & Shepherd, 2004). Participants were further asked to consider all other factors that may potentially influence their decision policy as constant across profiles.

3.3.5 Post-experiment questionnaire

After the conjoint experiment was completed, the entrepreneurs were asked to fill out a post-experiment questionnaire. We asked them to provide information on demographic characteristics.

3.3.6 Statistical analysis

Our experiment provided reliable answers from 90 participants (see below), yielding $90 \times 32 = 2880$ observations. These data points, however, are not independent of each other because two sets of conjoint profiles (eight original and replication) are nested within a manipulation state (manipulation or no manipulation), and the 32 profiles representing the two manipulation states are nested within an individual decision maker. We therefore used a 3-Level Hierarchical Linear Modeling (HLM3) approach which is appropriate for analysis of nested data (Raudenbush et al., 2004). The basic level of analysis (Level 1) is represented by the entrepreneur's decisions, the second level is represented by the possible 2 manipulation states (Level 2 - neutral and

excitement), and the highest level represents the characteristics of the individual (Level 3 – e.g., harmonious and obsessive passion, age, and work experience).

3.4 Results

3.4.1 Reliability, descriptive statistics, and correlations

We tested for the reliability of responses by calculating the Pearson correlation coefficients between the original and replicated profiles of the conjoint experiment for each participant. Ninety-seven percent of the entrepreneurs were significantly reliable in their responses ($p < .05$) with a mean correlation of .83. This is consistent with other conjoint studies such as Choi and Shepherd (2004), which had 96% of the sample with reliable answers with a mean correlation of .82. Ninety-nine percent of the individual decision models were statistically significant ($p < .01$) with a mean R^2 of .81 (Choi & Shepherd, 2004: mean R^2 of .72). These numbers indicate that participants answered reliably and consistently in the experimental task.

Descriptive statistics of Level 3 variables and their correlations are shown in Table 3. Although the correlation between our variables of interest, *Harmonious Passion* and *Obsessive Passion*, is modest (.33), we wanted to be conservative and calculated Variance Inflation Factors (VIFs) to test for potential multi-collinearity of Level 3 variables. All VIFs were below 10, which is the critical threshold for multivariate analysis (Hair, et al., 2006). Thus, multi-collinearity is unlikely to have confounded the results.

Variables	Mean	S.D.	1	2	3
1. Harmonious Passion	5.57	0.73			
2. Obsessive Passion	3.67	1.36	0.33**		
3. Age	39.47	10.63	-0.16	-0.14	
4. Working Experience	11.01	7.97	-0.05	0.01	0.62***

n= 90; *** p < .001; ** p < .01.

Table 3: Descriptive statistics and Pearson correlations (Level 3 variables)

3.4.2 Results of the HLM analysis

We report our results (coefficients, standard errors and p-values) in Table 4. At the decision level of analysis (Level 1), we entered the decisions and attribute levels (*Knowledge of Customer Demand, Technology Uncertainty, Managerial Capabilities, and Stakeholder Support*). At Level 2 we entered the dummy variable *Excitement* to indicate whether the conjoint task evaluated by the entrepreneurs was associated with a manipulation (*Excitement* = .5) or not (*Excitement* = -.5). At Level 3 we introduced the variables *Harmonious and Obsessive Passion* to investigate the impact of differences in passion across individuals. Additionally, the control variables *Age* and *Work Experience* were entered at Level 3.

Variables	Coefficient	Standard Error	p-value
Intercept	3.8601	0.0531	0.0000
Main Effects			
Level 1 Variables			
Managerial Capabilities	1.8771	0.0802	0.0000
Customer Demand	1.9660	0.0859	0.0000
Enabling Technologies	0.8618	0.0659	0.0000
Stakeholder Support	0.9938	0.0636	0.0000
Level 2 Variable			
Excitement	0.0132	0.0379	0.7280
Level 3 Variables			
Harmonious Passion	0.1412	0.0626	0.0270
Obsessive Passion	0.0372	0.0364	0.3110
Age	-0.0063	0.0086	0.4660
Work Experience	0.0039	0.0099	0.6970
Interaction Effects			
Level 2 Variable x Level 3 Variables			
Excitement x Harmonious Passion	-0.0177	0.0467	0.7040
Excitement x Obsessive Passion	0.0671	0.0323	0.0390
Excitement x Age	-0.0055	0.0055	0.3170
Excitement x Work Experience	0.0023	0.0077	0.7640

n = 2880 decision nested in 90 individuals. All other higher-order interactions between Level 1/Level2 and Level 1/Level 3 variables are part of the model but omitted from the table for reasons of clearness of presentation.

Table 4: Entrepreneurs' likelihood to exploit a new opportunity

Direct effects. As shown in Table 4, all decision criteria at Level 1 have a significant, positive direct influence on entrepreneurs' decisions to exploit opportunities. We therefore confirm the findings of Choi and Shepherd (2004) who found that all decision cues were significantly used by entrepreneurs to assess the likelihood of opportunity exploitation.

At Level 2 we find a small and insignificant, direct influence of the affect manipulation on entrepreneurs' likelihood of opportunity exploitation (coefficient = .013; $p = .728$). This indicates that the affect induction via IAPS pictures had little direct effect on the entrepreneurs' decision policies. Note, however, that our theory did not lead us to expect a direct effect; rather we hypothesized a moderating relationship, which we report on below.

Regarding the direct impact of Level 3 variables *Harmonious Passion* and *Obsessive Passion* on the entrepreneurs' decision to exploit an opportunity, the findings indicate a significantly positive influence of *Harmonious Passion* on the likelihood to exploit an opportunity (coefficient = .141; $p = .027$). Thus, we find support for Hypothesis 1. However, *Obsessive Passion* did not have a significant main-effect relationship with the likelihood of opportunity exploitation (coefficient = .037; $p = .311$), and thus Hypothesis 2 is not supported.

Interaction effects. Our theory led us to hypothesize interactions between Level 2 and Level 3 variables, that is, that *Excitement* will decrease the positive effect of *Harmonious Passion* on entrepreneurs' decisions to exploit opportunities. The coefficient for the *Excitement* and *Harmonious Passion* interaction was not significant (coefficient = -.018; $p = .704$), thus this finding does not provide support for Hypothesis 3. The interaction between *Excitement* and *Obsessive Passion* did significantly explain variance in entrepreneurs' likelihood of deciding to exploit opportunities (coefficient = .067; $p = .039$). To better understand the nature of this significant interaction, we plotted it on a y axis of likelihood to exploit and an x axis of Obsessive Passion and lines representing induction of Excitement and no induction of Excitement. Figure 4 illustrates this relationship and that the positive influence of obsessive passion on

entrepreneurs' opportunity exploitation decisions is more positive when excitement was induced than when it was not induced. This finding supports Hypothesis 4.

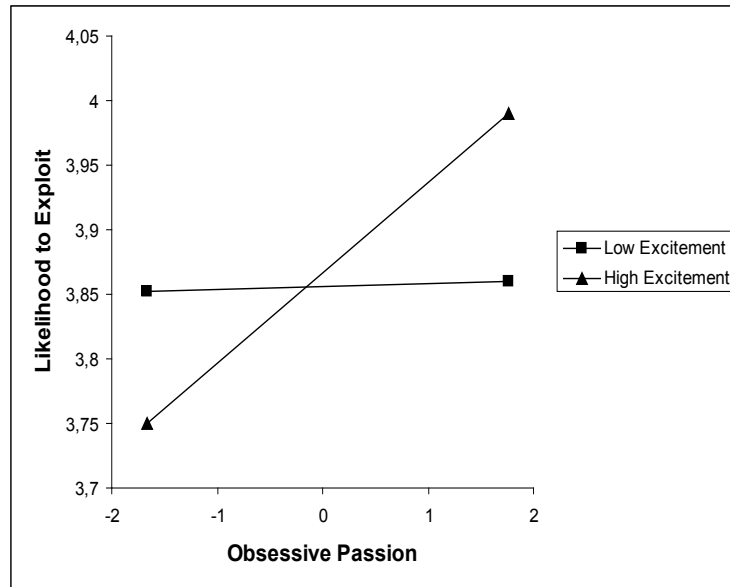


Figure 4: Obsessive passion, excitement and entrepreneurs' decision to exploit opportunities.

Source: Own illustration.

3.5 Discussion and conclusion

Various studies have emphasized the important role of passion in the entrepreneurial process. Passionate entrepreneurs are more likely to attract investors (Chen et al., 2009), and their ventures are more likely to survive (Baron & Hannan, 2002) and grow faster (Baum & Locke, 2004; Baum et al., 2001). In this study we have proposed that entrepreneurs' passion for work influences their decision to exploit new opportunities. Our model has acknowledged that entrepreneurs' passion can be more or less harmonious and more or less obsessive, and we have suggested that the impact of these types of passion on entrepreneurs' exploitation decisions is contingent on the level of non-passion related excitement they experience.

Our study shows that harmonious passion can influence entrepreneurial decisions to exploit new opportunities. Since higher harmonious passion is associated with the experience of more positive affect (Vallerand, et al., 2003), our finding complements research on entrepreneurial affect. For example, Baron (2007: 30) suggested that entrepreneurs who experience positive affect might see “life through rose-colored lenses”. This leads them to use heuristics rather than detail-oriented and analytic thinking, suggesting that they are driven toward opportunity exploitation without thorough consideration of whether their current situation and resources would support such a decision. Further, Cardon and colleagues (2005: 38) noted that passion for work can misguide entrepreneurs in such a way that they “set aside all other relationships or concerns in order to passionately pursue that one goal” such as exploiting a new opportunity. Finally, Baron (2008) suggested that positive affect influences entrepreneurial behavior by enhancing creativity, resource acquisition capabilities, abilities to respond to dynamic environments, and tolerance for stress - - factors that might trigger opportunity exploitation for harmoniously passionate entrepreneurs.

While our data support the expected direct effect of harmonious passion on entrepreneurs’ motivation to exploit opportunities, we did not find that additionally experienced excitement diminishes this effect. Although it is difficult to draw inferences from non-findings, we speculate that harmonious passion provides such a strong source of positive affect and motivation to act (Vallerand, et al., 2003) that it cannot (or only to a very limited extent) be substituted by other non-passion related positive affective experiences such as excitement. Harmonious passion for work may be such a strong source of affective experiences for entrepreneurs that it dominates other sources of (positive) affect in entrepreneurs’ decision policies. An implication for the theory of affect in the entrepreneurial process is that a more fine-grained distinction between the

sources of affect and the strength of affective experiences from different sources may be necessary to understand which affective stimuli trigger cognitive responses in entrepreneurs contingent on other stimuli and the entrepreneurs' current affective state.

In contrast to harmonious passion, we did not find a direct effect of obsessive passion on entrepreneurs' opportunity exploitation decisions, but did find a significant interaction effect suggesting a "magnifying" role for excitement on the relationship between obsessive passion and opportunity exploitation. Since in the presence of a significant interaction the non-significance of main effects conveys little additional information, we limit our discussion to this contingent relationship. We believe that this finding is of particular interest to both the entrepreneurship and psychology literatures.

Studies on entrepreneurial affect have widely neglected potential interactions between affective experiences in entrepreneurial decision making and behavior. For example, the studies mentioned earlier (Baron, 2008; Baum & Locke, 2004; Baum et al., 2001) postulate and find direct effects of affect on the dependent variable of interest, but do not consider contingency relationships between different affective experiences (because it was not their purpose). In fact, to our knowledge, only Wincent, Cardon, Singh, & Drnovsek (2008) argued theoretically that passion can suppress or reaffirm experienced affective states. Our paper finds an interactive effect of non-passion related positive affect (excitement) and (obsessive) passion (a feeling based on conscious reflection on work activities leading to experiences of affect, Cardon, et al., 2009) on entrepreneurs' decision to exploit opportunities. This suggests that the theory on entrepreneurial affect is more complex than often assumed and that scholars need to acknowledge conjoint effects of different affective experiences in explaining entrepreneurial behavior and decision policies. There appear to be considerable future research opportunities for scholars when they both theoretically and empirically address

these more complex contingent relationships between affective states in entrepreneurial decision making.

Second, although scholars have acknowledged that individuals have affective experiences simultaneously (Frijda, Mesquita, Sonnemans, & van Goozen, 1991; Sherer & Tannenbaum, 1986; Weiss & Cropanzano, 1996), many studies in the psychology literature have investigated affective experiences as independently, rather than *conjointly*, influencing judgment and decision making (e.g., Dreman, 2003, 2004; Forgas & Bower, 1987; Forgas et al., 1984; Levy et al., 2008). Our study suggests that this approach is somewhat incomplete and provides a rather simplified model of the role of affect in individuals' decision policies. Specifically, our findings suggest that passion as a feeling involving a change in core affect (Cardon et al., 2009) and non-passion related affective experiences (such as excitement) interdependently impact individuals' judgment and decision policies. These interdependencies are consistent with the observations of others (e.g., David et al., 1997; Feist et al., 1995; Mageau & Vallerand, 2007) advocating a more complex picture of the relationship between affect and decision making. Future theoretical and empirical studies will hopefully consider, and elaborate on, these interdependencies.

Finally, our work offers a methodological contribution to the management and entrepreneurship literatures since it constitutes (to the best of our knowledge) the first empirical study directly manipulating entrepreneurial affect. We have manipulated excitement by exposing entrepreneurs to affect-inducing pictures during a decision making task. Future researchers can use a similar empirical approach as we did and directly manipulate the affect of entrepreneurs in experimental settings, for example by showing pictures or videos (Mackie & Worth, 1989; Park & Banaji, 2000). These

studies can make important contributions to advance our understanding of the role of affect in entrepreneurial decision making and judgment.

Since passion for work is a central characteristic of the majority of practicing entrepreneurs, we hope that our findings will raise the awareness of these entrepreneurs to how their passion and other types of affect influence their decision policies. Specifically, harmonious and obsessive passion can drive them toward exploitation of new opportunities, even if this decision is not sufficiently based on the thorough evaluation of resource availabilities and environmental conditions of their company. In this case, too much passion for work may be a “bad thing” and trigger pre-mature decisions that turn out to be mistakes and lead to the misallocation of resources in the long run. The effect of obsessive passion appears to be particularly strong when entrepreneurs experience excitement arising from non-work related events such as a forthcoming wedding or the birth of a child. Entrepreneurs who face these situations and are aware of the obsessive passion and excitement they experience in such situations may take efforts to actively regulate their affective states (c.f. Carver & Scheier, 2001; Gross, 1999) when facing important decisions such as whether to exploit a new opportunity or not.

The limitations of our study offer opportunities for future research. First, one shortcoming is that our method did not allow us to directly investigate the mechanisms underlying the process of harmonious and obsessive passion on entrepreneurial decision policies. That is, we did not measure the positive affect experienced by entrepreneurs high in harmonious passion entrepreneurs, and the low ability to control impulses typical for those high in obsessive passion (Vallerand, et al., 2003). Future research can more directly focus on these mechanisms and investigate how the positive affect is generated by harmonious passion (e.g., by measuring affect using the PANAS scale, see

Watson, Clark, & Tellegen, 1988) and how obsessive passion (e.g., measured by self-assessments, see Wood, 1998) exerts control over decision and actions.

Second, we limit our attention to the induction of excitement as an example of a positive, short-term affective state often experienced by entrepreneurs. However, there are other, positive and negative transient affective states that entrepreneurs experience. For example, Boyd and Gumpert (1983b) reported that entrepreneurs often feel stressed, Shepherd (2003; 2009) emphasized that grief influences entrepreneurs' information processing, and DuToit (1980) highlighted frustration, and loneliness. These affective states may also enhance or diminish the role of harmonious and/or obsessive passion in opportunity exploitation decisions.

Finally, we do not distinguish between entrepreneurs' passion for different work roles. Recently, Cardon et al. (2009) suggested three different role identities (inventor, founder, and venture developer identity) from which entrepreneurial passion can develop. In our study we emphasize the developer identity since we investigate the influence of passion and excitement on exploiting a new opportunity once the venture is founded. Future research can distinguish between entrepreneurs' (harmonious and obsessive) passion for their role as inventors, founders, or venture developers and investigate whether excitement or other (positive or negative) transient affective state impact the relationship between passion and entrepreneurs' behavior and judgment in these roles.

Passion is one of the most important drivers of entrepreneurial action. Our study suggests that both harmonious and obsessive passion for work can trigger entrepreneurs' decisions to exploit a new opportunity. Even more importantly, we show that the nature of the influence of obsessive passion is not the same for all entrepreneurs or for a particular entrepreneur over time. Specifically, the impact of obsessive passion is

stronger in situations where entrepreneurs experience excitement from non-work related events. This finding suggests that interactions between stable, long-lasting affective states (passion) and more transient affective states (excitement) warrant more attention in both the entrepreneurship and psychology literatures on judgment and decision making. We believe that our study adds to the literature on entrepreneurial passion and affect. We hope that our work inspires further research activities on the role of stable and transient affective states in entrepreneurial decision making and behavior.

4 Work stress, fear of failure, and entrepreneurs' decision to exploit opportunities[◊]

Drawing on affect-as-information theory I can show that work stress influences individuals' decisions to act. High levels of work stress leads to an increased likelihood to exploit an opportunity. However, I find that the relationship between work stress and opportunity exploitation is less positive when entrepreneurs display high levels of fear of failure. My results provide insights into the role of stress and affect in a context of high uncertainty (entrepreneurship). They also help to understand variance in individuals' reactions to stress. Like the previous chapter, this paper provides further insights on how affective states can impact entrepreneurial decision making. In Section 4.1 I give an introduction to the topic. In Section 4.2 I derive two competing hypotheses by reviewing the literature on work stress and decision making and suggest that fear of failure moderates the impact of stress on entrepreneurial decision making. Section 4.3 presents the method and in Section 4.4 I explain my results. In Section 4.5 I discuss these results.

[◊] This section is based on Klaukien, Patzelt and Shepherd (2009) and is currently under revision at the Journal of Applied Psychology. An earlier version of the paper was presented at the Babson College Entrepreneurship Research Conference, June 4-6, 2009, in Babson Park, MA, USA.

4.1 Introduction

Research on work stress attempts to understand how stress influences the decision policies and behaviors of employees. This research stream is important given that stress can diminish individuals' psychological well-being (Constable & Russell, 1986; Rahim, 1996), physical well-being (Cooper & Marshall, 1976; Cooper & Smith, 1985; Jenkins, 1971; Quick, 1984), and work performance (Pflanz & Ogle, 2006; Scott, 2006). While a substantial number of studies shows that stress influences individuals' decisions and actions (e.g., Cannon, 1915; Janis & Mann, 1977), there is less understanding of how individuals differ in their reaction to stress. Entrepreneurship is a context that provides an optimal setting to address this issue.

First, founding and managing an entrepreneurial company is a stressful endeavor and various studies report that entrepreneurs experience more stress at work than managers or employees (e.g., Buttner, 1992; Chay, 1993; Harris, Saltstone, & Fraboni, 1999; Jamal, 1997). These high levels of job stress arise because entrepreneurs face a variety of difficult and demanding tasks such as the screening for, and recognition of, new business opportunities, the acquisition of resources, leading employees, and quick decision making in situations characterized by uncertainty, rapid change, and time pressures (Douglas & Shepherd, 2000; Eisenhardt, 1989). These tasks are often associated with high levels of risk taking, income and job uncertainty, required work effort, decision autonomy, and responsibility (Boyd & Gumpert, 1983a; Covin & Slevin, 1989; Douglas & Shepherd, 2000), which can lead to substantial stress at work (e.g., Buttner, 1992; Chay, 1993; Harris et al., 1999; Jamal, 1997).

Second, entrepreneurship is a highly emotional process and entrepreneurs intensively experience a wide range of different affects beyond stress (Baron, 2008;

Baum & Locke, 2004; Baum et al., 2001; Cardon et al., 2009; Foo, Uy, & Baron, 2009). Since failure rates for new ventures range from 20 to 60% (Timmons, 1994) and entrepreneurs usually try to prevent such failures (McGrath, 1999), one of the most frequent entrepreneurial affects is fear of failure. For example, fear of failure influences whether or not entrepreneurs start a business (Arenius & Minniti, 2005), and how they assess new business opportunities (Mitchell & Shepherd, 2010).

To investigate the role of stress and fear of failure in decision making we investigate entrepreneurs' decisions to exploit new business opportunities - - decisions that are central to entrepreneurial activity (Choi & Shepherd, 2004; Shane & Venkataraman, 2000). Drawing on an affect-as-information perspective (Schwarz, 1990; Schwarz & Clore, 1988) our model acknowledges that individuals differ in their reactions to stress due to different appraisals of stressors (Lazarus, 1993) and proposes that the impact of job stress on entrepreneurs' propensity to exploit opportunities is contingent on their fear of failure. We use an experimental design and data on 1280 opportunity exploitation decisions nested within 80 entrepreneurs to test our model. Our study makes several important contributions to the literature.

First, while the extant literature on work stress has identified moderators of the stress-strain relationship such as personality traits, the environment, and demographic characteristics (Baradell & Klein, 1993; Folkman & Lazarus, 1988; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Rahim, 1996), there is less understanding on how affect influences the extent to which work stress translates into behavioral outcomes. For example, studies have often used a general measure of "negative affectivity" (a disposition to low self-esteem and negative emotionality, Watson & Clark, 1984) as a moderator of the stress-behavior relationship (e.g., Brief, Burke, George, Robinson, & Webster, 1988; Schaubroeck, Ganster, & Fox, 1992; Spielberger,

Gorsuch, & Lushene, 1970) without acknowledging that in some contexts negative affect may be more prevalent than others. Focusing on fear of failure as a specific trait-like affect highly relevant to the entrepreneurial context allowed us to provide a more detailed and specific picture of how affect moderates stress effects. Specifically, we demonstrate that fear of failure diminishes entrepreneurs' stress-induced decision to act. Thus, our research also answers a call by Grant and Ashford (2008) to investigate the role of both affective and trait-like influences on proactive behavior at work.

Second, our study suggests two ways in which the boundaries of affect-as-information theory can be extended. First, in line with recent research showing that stress can trigger positive affect by signaling an important challenge (Lazarus, 1993), which in turn generates future-oriented thinking (Foo et al., 2009; Fredrickson, 2001), our results suggest that entrepreneurs are challenged by work stress in a way that encourages them to be excited about the future by exploiting an additional opportunity. Further, our finding that fear of failure diminishes the extent to which work stress motivates entrepreneurs to act on new, potential opportunities suggests that the informational value of affect is not purely additive, but that individuals interpret the information derived from stress triggers affect contingent on a trait affect.

Third, existing studies have focused on direct effects of affective states on entrepreneurial decision making (Baron, 2008; Baum & Locke, 2004; Baum et al., 2001; Cardon et al., 2009); they have not considered the moderating role of affective states. We demonstrate that the trait-like affective state of fear of failure moderates the influence of (more transient) work stress on entrepreneurs' decision to exploit opportunities suggesting that future research should develop and test theory that investigates the *contingent* as well as the main effects of affective states on entrepreneurs.

Finally, with one exception (Wincent et al., 2008), the literature on entrepreneurial stress has focused on how the experience of stress impacts the psychological (Boyd & Gumpert, 1983a; Jamal, 1997; Rahim, 1996) and physiological (Boyd & Gumpert, 1983a; Buttner, 1992) well-being of entrepreneurs, but the role of stress in entrepreneurial decision making is not well understood. This is surprising given the acknowledged high stress of the entrepreneurial task (Boyd & Gumpert, 1983a) and the importance of the entrepreneurs' decisions to the achievement of personal objectives (Campbell, 1992; Gimeno, Folta, Cooper, & Woo, 1997; McCarthy, Schoorman, & Cooper, 1993) and firm performance (Dess, Lumpkin, & Covin, 1997). We demonstrate that the decision to exploit new business opportunities is influenced by stress and that the nature of this influence depends on the entrepreneur's fear of failure. This finding emphasizes the complexity of the stress-decision making relationship in the entrepreneurial context.

We structure the paper in the following way. First, we theorize how job stress can influence the entrepreneurs' decision to exploit opportunities, and how fear of failure moderates this relationship. Subsequently, we explain our method before we present our results. Finally, we discuss the findings of our study and draw conclusions.

4.2 Theory development

An entrepreneurial opportunity arises when “new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their costs of production” (Shane & Venkataraman, 2000, p. 220). Entrepreneurs who are about to exploit an opportunity face the trade-off between acting early to maximize lead time or acting later after uncertainty is, at least partly, resolved (Wernerfelt & Karnani, 1987). For example, in order to exploit an opportunity successfully entrepreneurs need to

possess certain resources and capabilities including knowledge of customer demand for the new product, a sufficiently developed enabling technology, managerial capabilities, and the support of important stakeholders (Choi & Shepherd, 2004). If these resources and capabilities for a specific opportunity are not sufficiently developed, entrepreneurs are less likely to exploit that opportunity. A more fine-grained view, however, reveals that entrepreneurs' opportunity exploitation decisions are more complex and that additional aspects - - both independently and contingently - - play an important role. For example, Choi and Shepherd (2004) found that a substantial lead time of a new product can increase the likelihood of exploitation, but this effect is contingent on the resources and capabilities available. In this paper, we focus on another factor that potentially influences opportunity exploitation decisions – the entrepreneur's job stress. We refer to job stress as “the feeling of a person who is required to deviate from normal or self-desired functioning in the work place as the result of opportunities, constraints, or demands relating to potential important work-related outcomes” (Parker & Decotiis, 1983, p. 165).

Empirical evidence in the stress literature (e.g., Janis & Mann, 1977; Mano, 1992; Starcke, Wolf, Markowitsch, & Brand, 2008) supports the notion that individuals who experience stress draw to a considerable extent on their affective interpretation of a situation rather than available, objective information. Janis and Mann (1977) and Baradell and Klein (1993) found that stress can cause *hypervigilance*; that is, individuals hastily search for a way out of their current situation and fail to overlook the full implications of their behavior, leading to hasty decisions and increased risk taking. For example, hypervigilance implies that entrepreneurs will decide to act without sufficient evaluation of the information at hand that would inform their exploitation decision (Janis & Mann, 1977).

Anecdotal evidence suggests that entrepreneurs' job stress can lead to both positive and negative outcomes. For example, Boyd and Gumpert (1983a) found that entrepreneurs' work stress can lead to back pain, insomnia, and indigestion, but they nevertheless may perceive high levels of work stress as a signal of an important challenge to take on and conquer. Indeed, entrepreneurs are often seen as "fascinating paradoxes" (Benfari & Knox, 1991, p. 135) who bounce back from failures and display excitement for their work, despite well known stressors that generate negative affective and physical consequences. The experience of a stressful situation as either positive or negative differs between entrepreneurs, leading to different coping strategies and decision outcomes (Lazarus, 1993; Lazarus & Eriksen, 1952). This suggests that stress can have a different impact on entrepreneurs' opportunity exploitation decisions, which leads to two competing hypotheses.

First, entrepreneurs can appraise stressful situations as a challenge, feeling that they are able to overcome these situations (Lazarus, 1993). In order to meet the challenge and achieve success, entrepreneurs must effectively mobilize resources and display an increased action readiness. This motivating effect of a challenge can trigger positive affect as the entrepreneurs anticipate the benefits that can be gained by overcoming obstacles and achieving success. An *affect-as-information* perspective (Schwarz, 1990; Schwarz & Clore, 1988) suggests how these feelings impact entrepreneurs' cognitive processes and decision policies. As individuals are typically unable to consider the whole set of information relevant in a given decision situation, they implicitly ask themselves "[h]ow do I feel about it?" (Schwarz & Clore, 1988) and, in doing so, interpret feelings as information valuable for decision making (Schwarz, 1990). Positive feelings about a challenge signaled by stress indicate to entrepreneurs that in the current situation things are going well, current goals are being met, and that

time and effort can be dedicated to new activities (Carver, 2003; Foo et al., 2009), such as the exploitation of a new business opportunity.

Further, instead of collecting and evaluating extensive information about available resources and capabilities which, if insufficiently developed, may motivate to the decision to postpone exploitation (Choi & Shepherd, 2004), stressed, hypervigilant entrepreneurs may neglect or ignore relevant information and take more risk (Janis & Mann, 1977; Mano, 1992; Starcke et al., 2008) by deciding to exploit a new potential opportunity. For example, they may insufficiently investigate whether stakeholders sufficiently support the exploitation of a new opportunity (e.g., whether customers are willing to purchase the product, investors are willing to finance the business; suppliers are willing to enter long term contracts, and so on). Alternatively, these entrepreneurs may miss important new technological developments that, for example, suggest postponing exploitation and advancing the venture's enabling technology to offer superior products in the future. Instead, they may rely on their feelings of stress, signaling that time and effort can be dedicated to additional activities, to decide to exploit a new opportunity (Carver, 2003; Foo et al., 2009). Thus,

H1a: There is a positive relationship between job stress and the likelihood of exploiting a new, potential opportunity.

Although studies suggest that entrepreneurs often perceive stress as signaling a positive, challenging opportunity (Benfari & Knox, 1991; Boyd & Gumpert, 1983a), entrepreneurs may also appraise a stressful situation as a threat, which will lead to the feeling that they may be unable to successfully navigate the current situation (Lazarus, 1993). For example, in one of the first studies on differences in individuals' reactions to stress, Lazarus and Erikson (1952) showed that individuals who participated in an intelligence test after being induced into a stressed state showed a significantly higher

variance in their performance scores than the control group. The study concluded that individuals react differently to stress, due to different appraisals of the stressful situation (Lazarus, 1993).

In stressful situations that are appraised as threatening, entrepreneurs will likely experience negative affect. For example, entrepreneurs who feel stressed because their business faces bankruptcy are likely to feel a range of negative affect (Shepherd, Wiklund, & Haynie, 2009) including feeling disappointed and angry over their inability to adequately deal with this situation (Lazarus & Eriksen, 1952). According to the affect-as-information perspective, these outcomes of stress signal to entrepreneurs that their current tasks are advancing insufficiently, the achievement of important goals is threatened, and that they need to allocate additional time and effort to current tasks to achieve established goals (Carver, 2003; Foo et al., 2009). As a result, these stressed entrepreneurs will deny, minimize, or directly avoid dealing with additional sources of stress (Cronkite & Moos, 1995; Penley, Tomaka, & Wiebe, 2002) such as exploiting an additional business opportunity. Instead, they focus their efforts and resources on dealing with their current tasks such as more efficiently conducting current operations. Further, when entrepreneurs' work stress generates negative affect from stress, entrepreneurs likely engage in coping mechanisms that attempt to avoid additional sources of stress (Folkman et al., 1986). Thus,

H1b: There is a negative relationship between job stress and the likelihood of exploiting a new, potential opportunity.

Above we propose that there is variance in the likelihood that entrepreneurs will exploit a new, potential opportunity and this variance can be explained, in part, by the level of stress experienced by the entrepreneur at the time the exploitation decision is made. Because an individual can experience more or less stress at different times, the

above hypotheses allow for within individual level variance. However, there are likely also important differences across individuals. According to the interactional paradigm introduced by Magnusson (1985), traits play a crucial role in how individuals respond to stress. The trait-oriented approach suggests that entrepreneurs appraise a given situation based on their personality traits (trait-oriented approach, e.g., Byrne, Steinberg, & Schwartz, 1968) and part of that appraisal involves the downside loss of exploiting a particular possible opportunity (Sarasvathy, 2001), that is, anticipating the consequences of failure (Shepherd et al., 2009). We suggest that entrepreneurs' fear of failure - - their "disposition to avoid failure and/or capacity for experiencing shame or humiliation as a consequence of failure" (Atkinson, 1966, p. 13) - - represents a trait that is likely to influence an entrepreneur's appraisal of potential opportunities to exploit.

Fear of failure is an avoidance motive that engenders unpleasant feelings (Lang, Gilpin, & Gilpin, 1990) and involves a tendency to anticipate failure (Atkinson, 1957). According to Conroy and colleagues (Conroy, 2001; Conroy, Willow, & Metzler, 2002) fear of failure represents fears of experiencing shame and embarrassment, devaluing one's self-estimate, losing social influence, having an uncertain future, and upsetting others. In anticipation of failure, individuals engage in behavior to prevent demonstration of incompetence (Elliot & McGregor, 1999). Fear of failure has also been shown to be an important psychological variable impacting the behavior and decision policies of entrepreneurs. For example, Arenius and Minniti (2005) found that fear of failure has a negative impact on the likelihood of starting a new business.

Fear of failure increases the salience of negative information about the task at hand (Elliot & Church, 1997), which increases their assessment of the likelihood of negative outcomes (Duley, Conroy, Morris, Wiley, & Janelle, 2005). Due to a higher expectation of losses, they will appraise current, stressful situations as more threatening

(Lazarus, 1993) and want to avoid additional sources of stress (Cronkite & Moos, 1995; Penley et al., 2002), such as the exploitation of a new potential opportunity. In contrast, entrepreneurs low in fear of failure are less focused on information related to threats (e.g. insufficient resources, strong competition) but on information about the upside potential of exploitation (e.g. high market growth) and will, in a given situation, experience more positive and less negative affect from stress. Therefore, entrepreneurs low in fear of failure appraise a stressful situation as a challenge that can be met and are more likely to allocate resources to the exploitation of a new potential opportunity. Thus,

H2: The positive (negative) relationship between job stress and the likelihood that entrepreneurs exploit a new, potential opportunity is less positive (more negative) when their fear of failure is high than when their fearful of failure is low.

4.3 Methodology

4.3.1 Sampling and participants

As a sampling frame, we chose independent entrepreneurs involved in new ventures located in business incubators in Germany. This population is particularly appropriate for our purpose because incubators are specifically designed for entrepreneurs to concentrate on the exploitation of new business opportunities (Rice, 2002). From public sources and a list of incubators issued by the German Federal Association of Innovation, Technology, and Start-Up Centers (ADT, 2008), we identified 15 incubators within a geographic distance of less than 300 km from the location of the first author. This geographic proximity was necessary because we planned to visit entrepreneurs personally to conduct the experiment. From the websites of the incubators, we captured a list of all incubator ventures and their founders.

All together, our list contained 446 ventures. Subsidiaries of large firms were excluded from the sample because the decision policies of these entrepreneurs may be influenced by the strategic directions of their parent companies. We also excluded firms that were no longer managed by the initial business founder. One hundred and eighty five entrepreneurs (founder-managers) from this list were randomly selected and then contacted via phone or email. We explained the purpose of the study and asked if they would be willing to participate. Participation was on a voluntary basis and those who participated received a small gift after finishing their task. One hundred and five entrepreneurs denied our request for participation during the time frame of the study. Eighty entrepreneurs agreed to participate, representing a response rate of 43%.

Entrepreneurs' average age was 39 years (standard deviation 10.3 years), and 88.75% of the sample was male. Seventy-seven per cent held a Masters or higher degree. Twenty-six per cent had a background in engineering, 20% in natural sciences and mathematics, 17.5% in business administration, and 15% in computer sciences. On average, participants had worked for 10.8 years in the private sector (std. dev. 7.8 years). The average firm in our sample was 4.7 years old (std. dev. 4.8 years) and had 7.3 employees (std. dev. 10.1). Seventy-two per cent of the firms were technology-based ventures (e.g., biotechnology, information technology, optical devices).

4.3.2 Experimental design and procedure

We used conjoint experiments to investigate entrepreneurs' decisions to exploit opportunities. Following Choi and Shepherd (2004), the conjoint experiment described hypothetical entrepreneurial opportunities in terms of different levels of four decision attributes that constitute important resources influencing entrepreneurs' exploitation decisions (knowledge of customer demand, development of enabling technology,

managerial capabilities, and stakeholder support). For each profile, the entrepreneurs assessed the likelihood that they would exploit the opportunity described.

Since conjoint studies require full replication to provide the error term necessary for analysis at the level of the individual (Louviere, 1988), each entrepreneur assessed two identical sets of conjoint profiles (original and replication). Since all decision attributes were presented at one of two possible levels, a fully crossed factorial design would have required 16 (2^4) scenarios for each set of conjoint profiles. We thus applied a fractional factorial design that limited the number of attribute combinations to eight, resulting in 16 profiles (original and fully replicated). Consistent with most metric conjoint studies, the design was also orthogonal - - there was zero correlation between the attributes. The 16 profiles and the order of attributes within a profile were randomly assigned to four versions of the experiments to test for order effects. An ANOVA revealed no significant differences in means across the four versions ($p > .10$), suggesting that order effects are unlikely to influence the results. We also included a 'practice' profile (which was not part of the statistical analysis) at the beginning of the experiment to familiarize the participants with the decision situation. Thus, the entrepreneurs were presented 17 decision scenarios.

We used a computer-based presentation and answer method that was conducted in the entrepreneurs' offices. The experimenter (first author of this study) presented the decision making task on a laptop and gave a short instruction. To ensure that entrepreneurs concentrated on their experimental task and to be available for potential questions, the experimenter stayed in the office during the course of the experiment.

4.3.3 Measures

Dependent Variable. We defined opportunity exploitation as the stage in which immediate full-scale operation - - shipping the first product for revenues - - is started (Schoonhoven et al., 1990). We asked entrepreneurs to assess the likelihood of exploitation on a 7-point Likert-type scale anchored by the end points very unlikely (“1”) and very likely (“7”). The entrepreneurs made 17 such assessments (one for each conjoint profile). The dependent variable for this study is an entrepreneur’s likelihood of opportunity exploitation controlling for the nature of the opportunity and the resources at hand (as detailed below), which is the constant of an entrepreneur’s decision policy for opportunity exploitation

Job Stress. After the conjoint experiment, subjects were asked to rate their experienced job stress on a 9-item scale developed by Parker and Decotiis (1983). The Job Stress Scale was developed and validated to test individuals’ experienced stress at work and is a commonly used scale to measure average job stress levels of individuals. The scale was translated into German by a German native speaker who is fluent in English and back-translated into English by an English native speaker who is fluent in German. This procedure ensures consistency between the translated and original scales (Brislin, 1970). In the introduction to the scale, entrepreneurs were asked to think about their work as business founders while answering the questions. A 5-point Likert-type scale anchored by “definitely not agree” and “definitely agree” was used to measure the entrepreneurs’ assessments. The Job Stress Scale contains 4 items for Time Stress (e.g., “I have too much work and too little time to do it in.”, “I feel like I never have a day off.”) and 5 items for Anxiety (e.g., “I feel guilty when I take time off from my job.”, “My job gets to me more than it should.”). The Cronbach’s alpha for the Job Stress scale was of .75.

Fear of Failure. We used a 41-item scale described by Conroy (2001) to capture the entrepreneurs' fear of failure. This scale was developed and validated to test individuals' disposition of fear of failure and is a commonly used scale. Again, the scale was translated into German by a German native speaker who is fluent in English and back-translated into English by an English native speaker who is fluent in German (Brislin, 1970). In the introduction to the scales, entrepreneurs were asked to think about their work as business founders while answering the questions representing the items. A 5-point Likert-type scale anchored by "definitely not agree" and "definitely agree" was used to measure the entrepreneurs' assessments. The scale contains 5 subscales: Fear of Shame and Embarrassment, Fear of Devaluing One's Self-Estimate, Fear of Uncertain Future, Fear of Losing Social Influence, Fear of Upsetting Others. The Cronbach's alpha obtained for this scale was .93.

Control variables. We used the participants' *Age* and *Work Experience* (both measured in years) as control variables. Both variables were mean-centred and included in the analysis because they are known to influence decision making of entrepreneurs (Bird, 1989) and individuals' experience of job stress (Folkman & Lazarus, 1980).

Control for resources and nature of opportunity. The following operationalizations of decision attributes were taken from Choi and Shepherd (2004), which found these attributes were significantly used in entrepreneurs' opportunity exploitation decisions. *Knowledge of Customer Demand* is the level of customer acceptance of the new product and ranges from high (customers have substantial knowledge about the new venture's product and services and you are quite certain that there is substantial future demand) to low (customers have little knowledge about the new venture's products and services and you are uncertain that there is substantial future demand). The *Development of Enabling Technology* is the level of technology

uncertainty (Reverse Coded) and ranges from high (the new venture has not yet established the technologies necessary to fully grasp the new opportunity) to low (the new venture has established the new technologies necessary to fully grasp the new opportunity). *Managerial Capabilities* are the managerial capabilities of the new venture and range from high (you and your management team have considerable skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production) to low (you and your management team have limited skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production). *Stakeholder Support* is defined as the level of supporter's commitment to the new venture ranging from high (supporters such as management team, investors, and suppliers are highly supportive for the new venture) to low (supporters such as management team, investors, and suppliers are marginally supportive for the new venture). In the statistical analysis, these decision-level variables were treated as control variables.

Finally, to control for other factors that potentially influence the decisions of participants, they were instructed that the opportunities described are based on an idea similar to their own business idea, that the time horizon for exploitation is 2 years, the financial market is very attractive for new ventures (data was collected before the Global Financial Crisis), and the threat of imitation by competitors is low (consistent with Choi & Shepherd, 2004). Participants were further asked to consider all other factors that may potentially influence their decision policy as constant across profiles.

4.3.4 Post-experiment questionnaire

After completing the conjoint experiment, we asked the entrepreneurs to fill out a post-experiment questionnaire. This questionnaire asked for information on their demographic characteristics which were detailed earlier.

4.3.5 Statistical analysis

Our experiment provided reliable answers from 80 participants (see below), yielding $80 \times 16 = 1280$ observations. These data points, however, are not independent of each other because the 16 profiles are nested within an individual decision maker. We therefore used a 2-Level Hierarchical Linear Modeling (HLM2) approach which is appropriate for analysis of nested data (Raudenbush et al., 2004). The basic level of analysis (Level 1) is represented by the entrepreneur's decisions; the second level represents the characteristics of the individual (i.e., job stress, fear of failure, age, and work experience).

4.4 Results

4.4.1 Reliability and correlations

We tested for the reliability of responses by calculating the Pearson correlation coefficients between the original and replicated profiles of the conjoint experiment for each participant. Ninety-five percent of the entrepreneurs were significantly reliable in their responses ($p < .05$) with a mean correlation of .83. This is consistent with other conjoint studies such as Choi and Shepherd (2004) which had 96% reliable answers with a mean correlation of .82. Ninety-two percent of the individual decision models were statistically significant ($p < .01$) with a mean R^2 of .82 (Choi & Shepherd, 2004: R^2 of .72).

Descriptive statistics of Level 2 variables and their correlations are displayed in Table 5. Since the correlation between our variables of interest, *Job Stress* and *Fear of Failure*, is relatively high (.52), we calculated Variance Inflation Factors (VIFs) to test for potential multi-collinearity. All VIFs were below 10, which is the critical threshold for multivariate analysis (Hair et al., 2006). Thus, multi-collinearity is unlikely to have confounded the results.

Variables	Mean	S.D.	1	2	3
1. Job Stress	2.27	0.63			
2. Fear of Failure	2.49	0.59	0.52**		
3. Age	39.00	10.27	-0.24*	-0.11	
4. Working Experience	10.81	7.85	-0.06	0.17	0.62**

n= 80; ** p < .01, * p < .05.

Table 5: Descriptive statistics and Pearson correlations (Level 2 variables)

4.4.2 Results of the HLM analysis

We report our results (coefficients, standard errors and p-values) in Table 6. At the decision level of analysis (Level 1), we entered the decision cues (*Knowledge of Customer Demand, Technology Uncertainty, Managerial Capabilities, and Stakeholder Support*). The constant at Level 1 represents the likelihood of opportunity exploitation when controlling for the decision criteria related to the nature of the environment. At Level 2 we entered the variables *Job Stress and Fear of Failure* to test whether the decision to exploit by the entrepreneurs is impacted by these variables; specifically, whether the Level 2 variables significantly explained variance in the constant (i.e., variance in the likelihood of opportunity exploitation after controlling for the nature of

the opportunity). Additionally, the control variables *Age* and *Work Experience* were entered at Level 2.

Evaluation criteria	Coefficient	Standard error	t-ratio	p-value
Intercept	3.8148	0.0591	64.536	0.000
Level 1 Variables				
Managerial Capabilities	1.8672	0.0909	20.528	0.000
Customer Demand	2.0328	0.0889	22.864	0.000
Enabling Technologies	0.8359	0.0748	11.171	0.000
Stakeholder Support	0.9609	0.0637	15.076	0.000
Level 2 Variables and Interaction				
Stress	1.0828	0.3820	2.837	0.006
Fear	0.8490	0.3414	2.487	0.015
Stress x Fear	-0.3798	0.1365	-2.783	0.007
Age	-0.0020	0.0121	-0.174	0.863
Work Experience	-0.0016	0.0137	0.114	0.910

n=1280 decisions nested within 80 entrepreneurs. Interactions between control variables at level 1 and level 2 variables were also included in the model but are not displayed in the table to keep it at a manageable size (none of these interactions was significant at the 5 % level).

Table 6: Entrepreneur's likelihood to exploit an opportunity.

As shown in Table 6, all decision criteria at Level 1 have a significant, positive direct influence on entrepreneurs' decisions to exploit opportunities. We therefore replicate the findings of Choi and Shepherd (2004) that found that all decision cues were significantly used by entrepreneurs to assess the likelihood of opportunity exploitation. At Level 2 we find a significantly positive, direct influence of *Job Stress* on entrepreneurs' likelihood of opportunity exploitation (coefficient = 1.117; p = .006). This supports H1a, which hypothesized that job stress increases entrepreneurs'

likelihood to exploit new opportunities, and rejects H1b hypothesizing a negative relationship.

We further hypothesized that *Fear of Failure* will moderate the relationship between *Job Stress* on entrepreneurs' likelihood to exploit opportunities. We find a significantly negative interaction effect for *Fear of Failure* and *Job Stress* (coefficient = $-.3905$; $p = .007$) on likelihood of opportunity exploitation. To better understand the nature of this significant interaction (consistent with Cohen & Cohen, 1983), in Figure 5 we plotted on a y axis of the likelihood to exploit and on a x axis high and low levels of Job Stress and lines representing high and low levels of Fear of Failure (one standard deviation above and below the mean, respectively). Figure 5 illustrates that the relationship between experienced Job Stress and entrepreneurs' opportunity exploitation decisions is less positive for entrepreneurs high in Fear of Failure than for entrepreneurs low in fear of failure. This finding provides support for Hypothesis 2.



Figure 5: Job stress, fear of failure and the entrepreneurs' decisions to exploit opportunities

Source: Own illustration

Finally, we acknowledge that scholars have suggested an inverted U-Shaped relationship between stressors and performance (McGrath, 1976). Hence, in a post-hoc analysis we tested both the linear and the curvilinear relationship between job stress and entrepreneurs' likelihood to exploit an opportunity. However, we only found support for a linear relationship between job stress and likelihood to exploit. This observation is in line with work by Anderson (1976) and Srivastava and Krishna (1991).

4.5 Discussion and conclusion

Entrepreneurship is a stressful endeavor (Boyd & Gumpert, 1983a; Buttner, 1992; Wincent & Örtqvist, 2009), nevertheless entrepreneurs often exploit additional business opportunities they recognize in order to stay ahead of competition and gain market share (Ireland, Hitt, Camp, & Sexton, 2001; Shane & Venkataraman, 2000). Drawing on an affect-as-information perspective, this paper finds that higher levels of job stress increase the likelihood that entrepreneurs will enter full scale exploitation of an opportunity holding constant the nature of the opportunity and the firms' contexts.

Further, there is variance across entrepreneurs in the magnitude of this effect, and entrepreneurs' fear of failure can explain part of this variance.

Our study contributes to understanding the role of trait-like affect in the relationship between stress and behavioral outcomes in work contexts. Consistent with the interactional paradigm (Magnusson, 1985), scholars have acknowledged that general assessments of negative affectivity as a disposition of low self-esteem and negative emotionality (Watson & Clark, 1984) can moderate the stress-behavior relationship (e.g., Brief et al., 1988; Schaubroeck et al., 1992; Spielberger et al., 1970). However, existing studies have not sufficiently considered the specificities of the work environment, and that some affects may be more relevant in some contexts than in others. For example, entrepreneurship is a context characterized by high levels of uncertainty (Knight, 1921; McMullen & Shepherd, 2006) and individuals who choose to become entrepreneurs are usually (over-)optimistic (Busenitz & Barney, 1997), passionate (Cardon et al., 2005; Foo et al., 2009), and (over-)confident (Forbes, 2005; Hayward, Shepherd, & Griffin, 2006), and they display, on average, high levels of self-efficacy (McGee, Peterson, Mueller, & Sequeira, 2009) and self-esteem (Robinson, Stimpson, Huefner, & Hunt, 1991) suggesting that entrepreneurs are likely to experience high levels of positive affect (Baron, 2008). Fear of failure, however, is a trait-like negative affect that is salient to many entrepreneurs due to the uncertainties they face (Arenius & Minniti, 2005; Koellinger, Minniti, & Schade, 2007). Our study shows that fear of failure explains to what extent work stress triggers entrepreneurs' decision to act, suggesting that future theoretical and empirical studies exploring the effect of affect in the stress-behavior relationship should pay particular attention to the work context under investigation and affects that are salient in that specific context.

Drawing on the affect-as-information perspective we proposed that work stress triggers positive affect associated with a challenge that increases the likelihood that entrepreneurs will act on new opportunities because these positive feelings signal that current work tasks are going well and additional tasks can be accomplished. While our empirical data are in line with these arguments, they also push the boundaries of affect-as-information theory. First, our study supports a recently suggested extension of this perspective. Foo et al. (2009) found that although positive affect signals that currently things are going well and no immediate action is required, they can stimulate entrepreneurial action because they heighten entrepreneurs' future orientation motivating them to engage in tasks beyond what is immediately required. Positive affect can trigger future-oriented thinking (Fredrickson, 2001) and entrepreneurs who experience such affect from work stress may be more likely to exploit a new, potential opportunity with future returns. Second, individuals can experience positive and negative affect simultaneously (Larsen, McGraw, & Cacioppo, 2001; Tellegen, Watson, & Clark, 1999), and our finding that fear of failure diminishes the extent to which work stress (and the positive affect generated) motivates entrepreneurs to act emphasizes that the informational value of positive and negative affect is not purely additive. It appears that simply assessing the affective state of individuals as "positive" or "negative" can miss important informational value individuals derive from experiencing affect *conjointly*. Future development of affect-as-information theory may pay particular attention to the interdependencies between informational values of simultaneously experienced affect.

Since proactivity is a core defining feature of entrepreneurial behavior (Grant & Ashford, 2008; Lumpkin & Dess, 1996; McMullen & Shepherd, 2006), our analysis of entrepreneurs' opportunity exploitation decisions also adds to research on proactive

behaviors. Recently, Grant and Ashford (2008) introduced a theoretical model of proactive behavior and accountability, ambiguity, and autonomy as situational antecedents of proactiveness. They also suggest that future research should establish the link between affect and proactive behavior. We provide evidence for such a link in the context of entrepreneurship by showing that experiences of stress can trigger entrepreneurs' opportunity exploitations. Interestingly, Grant and Ashford's model emphasizes the role of trait-like variables such as consciousness, openness to experience, and neuroticism as moderators of the relationships between accountability/ambiguity/autonomy and proactiveness. Our results are consistent with this approach because they show that fear of failure as a trait-like affect serves as a moderator of the stress-proactiveness relationship.

Our findings that higher levels of stress motivate rather than demotivate entrepreneurs to exploit new potential opportunities in line with studies suggesting that entrepreneurs experience stress more often as positive than as negative affect, and that entrepreneurs cope well with stress at work (Jamal, 1997; Rahim, 1996; Teoh & Foo, 1997). Indeed, our work supports Pareek's view (Pareek, 1994, p. 55) that "entrepreneurs seem to look for stress" because stress drives entrepreneurs toward action that may comprise an additional source of stress. Our study also supports Karasek's (1979) stress-management model of job strain. This model suggests that high job demands translate less severely into mental strain symptoms such as exhaustion, depression, and job/life dissatisfaction when individuals have high levels of decision autonomy at work. Karasek argued that "the individual's job decision latitude is the constraint which modulates the release or transformation of "stress" (potential energy) into the energy of action. [...]. If no action can be taken (Zeigarnik, 1927), or if the individual must forego other desires because of low decision latitude (Henry & Cassel,

1969), the unreleased energy may manifest itself as mental strain” (Karasek, 1979, p. 287). Since entrepreneurs generally enjoy high levels of decision autonomy (Boyd & Gumpert, 1983a; Shane et al., 2003), entrepreneurial job stress may more often be associated with perceptions of challenge and positive affect than with experiences of negative affect and mental strain symptoms. Our study even suggests an extension of Karasek’s model toward explaining variance in individuals’ translation of stress into mental strain symptoms. Since fear of failure can (partly) explain entrepreneurs’ reactions to stress, fear of failure may also explain to what extent individuals are generally able to use decision autonomy to channel stress into action rather than mental strain. For example, individuals low in fear of failure may draw on decision latitude provided to engage in proactive behavior with uncertain outcomes (such as exploiting a new opportunity), while those high in fear of failure may not engage in those behaviors even if they had the autonomy to do so. For those high in fear of failure decision autonomy may thus not provide an opportunity to channel stress into action. Future research can empirically test these theoretical extensions.

Interestingly, regarding the direct impact of *Fear of Failure* on entrepreneurs’ decision to exploit an opportunity, our findings indicate a significantly positive influence (Table 6). While this is counterintuitive at first glance, a deeper look into research on achievement and avoidance motives helps to better understand this result. Atkinson and colleagues (1957; 1960) showed that a strong avoidance motive, which goes along with high levels of fear of failure, can lead to an increased perception of the attractiveness of a task when the probability of success is either very low or very high. This is because individuals who fear failure seek opportunities to externalize failures (self-handicapping, see Jones & Berglas, 1978) in order to maintain their own self-esteem. Hence, some entrepreneurs high in fear of failure may choose the risky

alternative to exploit a new opportunity in order to externalize a possible failure of their business. For example, in case of business failure these entrepreneurs may argue that they had little choice than to continue to exploit opportunities to stay ahead of competitors.

Finally, in a more general sense our work supports the trait-oriented approach because it shows that individuals' reactions to stress (and thus their "coping strategies") are, partly, determined by their trait-like affect of fear of failure. This is consistent with the interactional paradigm for individual behavior (Magnusson, 1985), which proposes that both the stressful encounter itself (the entrepreneur's work) as well as the individual's personality traits influence coping strategies. Different personality traits have already been considered as influencing the choice of coping strategies (e.g., Baradell & Klein, 1993; Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982).

This study also offers some practical implications for the stress management of entrepreneurs. Stress can be actively managed (Charlesworth, Murphy, & Beutler, 1981), and several practical approaches can help individuals to reduce stress at work (e.g., Carmody, Baer, Lykins, & Olendzki, 2009; Sears & Kraus, 2009). Our results suggest that the reduction of stress levels does not equally influence the behavior of all entrepreneurs, but that there is a complex relationship between the entrepreneurs' work stress, fear of failure, and behavior (such as the exploitation of a new potential opportunity). Further, since stress stimulates opportunity exploitation, stress management techniques may be more appropriate if the entrepreneurs' ventures operate in benign environments than in hostile environments. In hostile environments, recognizing and exploiting new opportunities is crucial for entrepreneurial success (Zahra & Covin, 1995).

As all studies, this one has some limitations which may be overcome by future research. First, we focus on exploitation of opportunities but neglect opportunity recognition which is necessary to fully understand entrepreneurial action (McMullen & Shepherd, 2006). However, stress may also have a crucial impact on opportunity recognition as it leads to hypervigilance and reduced scanning of the environment (Janis & Mann, 1977), which may lead entrepreneurs to miss out potential opportunities. Further, our study only accounts for some differences in the nature of opportunities, but neglects others. Although we do not find that differences in the parameters used in our experimental design to describe opportunities influence the impact of stress on entrepreneurs' decision policies, there are other characteristics of opportunities, such as its potential value, its knowledge relatedness, the size of the window of opportunity, and the number of potential opportunities available that impact entrepreneurial decisions (Mitchell & Shepherd, 2010). Future research may focus on these other characteristics and their impact on entrepreneurs' judgment and decision policies contingent on the level of stress they experience.

In conclusion, our study draws on an affect-as-information perspective and shows that job stress, on average, has a motivating rather than a demotivating effect on entrepreneurs when it comes to the exploitation of new potential business opportunities. There is, however, variance in entrepreneurs' reaction to stress, and consistent with the trait-oriented approach and the interactional paradigm entrepreneurs' fear of failure can (partly) explain this variance. These findings suggest that an adaptation reaction (stress) and personality traits (fear of failure) interact and conjointly influence entrepreneurial decision making. Our results emphasize the interdependencies between different affects in decision making and suggest that future studies should consider the conjoint rather than independent effects of affect when trying to understand behavior and action.

5 Entrepreneurs' displays of passion and employees' commitment to new ventures*

In this paper, I switch the perspective to employees in new ventures and suggest that they can be influenced by the entrepreneur's affective state. Entrepreneurial passion is proposed to influence the commitment of employees. I find that perceived entrepreneurial passion for inventing, founding, and developing enhance employees' commitment. The effects of inventor passion and developer passion on commitment are moderated by goal similarity. My results show that entrepreneurial passion can also have an impact on the new ventures' employees as it increases their commitment. I also highlight the role of the entrepreneur as a team leader. Section 5.1 introduces the topic. In Section 5.2 I review literature on entrepreneurial passion, goal setting, and emotional transfer and derive my hypotheses. I explain the method used in Section 5.3 and present my results in Section 5.4. In Section 5.5 I discuss the results.

* This section is based on Klaukien, Breugst and Patzelt (2009) and is under revision for a special issue on "Emotions and Entrepreneurship" of *Entrepreneurship: Theory and Practice*. An earlier version of the paper was presented at the Babson College Entrepreneurship Research Conference, June 4-6, 2009, in Babson Park, MA, USA.

5.1 Introduction

Passion is “[p]erhaps the most observed phenomenon of the entrepreneurial process” (Smilor, 1997, p. 342) and a defining characteristic of many successful entrepreneurs (Cardon et al., 2009). Entrepreneurial passion refers to “consciously accessible 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. 517). Passionate entrepreneurs are enthusiastic and excited about their work, and passion is seen as a major motivating and mobilizing factor for entrepreneurial action (Smilor, 1997). Passion inspires entrepreneurs to work hard (Chang, 2001b), persist in the face of obstacles (Cardon et al., 2009; Cardon et al., 2005; Chen et al., 2009), and experience venture success and failure as a personal incident (Baron, 2006; Shepherd, 2003).

While these studies demonstrate that passion is crucial for entrepreneurial action and success, however, we still know little about how entrepreneurs’ displays of passion influence the behaviors of new ventures’ employees (Baron & Hannan, 2002; Cardon, 2008). This is surprising given that numerous studies have shown that affective displays of leaders substantially impact the affective state (Erez, Misangyi, Johnson, LePine, & Halverson, 2008; Lewis, 2000), effort (Sy, Côte, & Saavedra, 2005) and performance (George, 1995; George & Bettenhausen, 1990) of followers. Consistent with Brundin et al. (2008) we refer to entrepreneurs’ displays of entrepreneurial passion as *employees’ perceptions of these displays* since perceptions of the environment rather than objective characteristics influence the behavior of individuals (Das & Teng, 2001; March & Shapira, 1987).

We draw on the literature on leadership (Shamir, House, & Arthur, 1993), goal setting (Locke, Latham, & Erez, 1988), and affective transfer (Barsade, 2002) to

develop a model of how displays of entrepreneurial passion trigger the affective commitment of new venture employees. We define commitment as “*the strength of an individual’s identification with and involvement in a particular organization*” (Porter, Steers, Mowday, & Boulian, 1974, p. 604). Understanding how displays of entrepreneurial passion impact employee commitment is important since highly committed and motivated employees are crucial for the success of new ventures (Baron & Hannan, 2002; Deshpande & Golhar, 1994). Our model takes into account that different kinds of entrepreneurial passion exist (Cardon et al., 2009), and that displaying these types may impact employee behavior and commitment. Further, drawing on research on similarity (Chen, Aryee, Lee, & Hui, 2005; Vancouver, Millsap, & Peters, 1994), we argue that employees’ perception of similarity between their own and the entrepreneurs’ goals can enhance the effects of entrepreneurs’ passionate displays. Taking into account that individuals differ in their extrinsic and intrinsic motivation we distinguish between similarities of financial and non-financial goals. To test our model we conduct a field experiment with 90 employees of German start-up companies. We contribute to existing literature in three ways.

First, our study follows Cardon’s (2008) call for research on the impact of entrepreneurial passion on new venture employees. While existing research shows that entrepreneurial passion contributes to the success of new ventures (e.g., Baum & Locke, 2004; Baum et al., 2001; Brännback, Carsrud, Elfving, & Krueger, 2006), the implicit assumption of many of these studies is that the high levels of energy and effort passionate entrepreneurs invest in their ventures are the “direct” drivers of success. Although we do not challenge this argument (we actually believe in it), we offer a complementary perspective. Since commitment of employees is crucial for organizational success (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), our finding

that entrepreneurial passion triggers employee commitment indicates an additional, rather “indirect” effect of entrepreneurial passion on new venture success.

Second, we provide a better understanding of how affective displays of entrepreneurs can impact employees, an issue that has rarely been investigated so far. Brundin et al. (2008) found that leaders’ displays of confidence, satisfaction, frustration, worry, and bewilderment interdependently impact employees’ entrepreneurial intentions, but they focused on CEOs and did not investigate displays of entrepreneurial passion and employee commitment. Importantly, we identify goal similarity between entrepreneurs and employees as a moderator influencing the extent to which displays of passion enhance employee commitment. Acknowledging this heterogeneity among entrepreneur-employee relationships provides insights into how entrepreneurs’ affective displays influence some employees more than others.

Third, few studies have analyzed how entrepreneurs behave as leaders although leadership is a major task of entrepreneurs (Gupta, MacMillan, & Surie, 2004; Vecchio, 2003). By investigating entrepreneurs’ affective displays and their impact on employee commitment we provide a better understanding of how entrepreneurs’ management and regulation of emotions and their displays can be used to lead employees effectively. Our findings indicate that emotionally intelligent (Salovey & Mayer, 1990) entrepreneurs can significantly enhance the success perspectives of their ventures by increasing employee commitment through displays of passion. This perspective is consistent with existing work on emotional labor (Grandey, 2000; Hochschild, 1983) and emotional leadership (Humphrey, 2002; Pescosolido, 2002).

In the remainder of this article, we first develop our theory and hypotheses. We then describe our sample and methodology before we present our results. We discuss

these results, highlight the contributions and limitations of our work, and draw final conclusions.

5.2 Theory development

Cardon et al. (2009) distinguish three different types of entrepreneurial passion reflecting three different entrepreneurial role identities - the *inventor* identity (entrepreneurs' passion for activities related to identifying, inventing, and exploring new opportunities), the *founder* identity (entrepreneurs' passion for activities involved in establishing a venture for commercializing and exploiting opportunities), and the *developer* identity (entrepreneurs' passion for activities related to nurturing, growing and expanding the venture after it has been founded). Entrepreneurs may be equally passionate for all of these identities; however, for some entrepreneurs one identity may be more meaningful and salient than others. These salient identities mobilize entrepreneurs to engage in activities related to these identities as it allows them to experience intense positive affect during activity engagement (Cardon et al., 2009).

Entrepreneurs display their passion and associated positive affective experiences to others in their environment (Gross, 1998). For example, during work passionate entrepreneurs may display excitement, joy, optimism, confidence, satisfaction, and attachment to the firm (Smilor, 1997). Some entrepreneurs may display excitement while seeking and evaluating new ideas, developing new products, or scanning the market for promising opportunities (passion for inventing), others (or the same ones) may show joy and optimism while creating a new venture and assembling financial, human, and social capital resources (passion for founding), and again others may show enthusiasm about gaining market share or boosting financial growth (passion for developing). Passionate entrepreneurs “who show strong and positive emotions toward

their projects, who cannot stop thinking and talking about their ideas, and who are busy mobilizing resources to turn their ideas into reality” (p. 203) can be clearly distinguished by observers from less passionate entrepreneurs based on their animated facial expression, energetic body movements, and rich body language (Chen et al., 2009).

Anecdotal evidence supports the notion that entrepreneurs’ displays of passion for work-related activities can significantly and sustainably impact employee behavior. For example, the founders of Southwest Airlines were known for their passion to serve every customer in an uncomplicated and friendly way and offer faster and friendlier service than competitors. This passion for serving customers was implemented by allowing employees to take on-the-spot decisions and motivated them to find creative ways to meet the customers’ needs (Chang, 2001b). Further, Walt Disney’s passion to bring happiness to people, to create magic by means of entertainment, and to fulfill childhood dreams today still inspires the company’s employees to work in the job of their dreams and serve for the company built on imagination and wonder (Chang, 2001a; The Walt Disney Company, 2008). Consistent with work on the affective displays of leaders (e.g., Brundin et al., 2008; George, 1995; McColl-Kennedy & Anderson, 2002), it appears that displays of entrepreneurial passion and associated positive affect can substantially influence the behavior of others in the entrepreneurs’ environment such as new venture employees. More specifically, we suggest that displays of entrepreneurial passion can impact the organizational commitment of new venture employees.

Organizational commitment is a work-related attitude of employees which triggers employee attendance, organizational citizenship behavior, and performance at work (see the meta-analysis by Meyer et al., 2002 for a review). In a three-component model of organizational commitment, Allen and Meyer (1990) distinguish affective, continuance, and normative commitment. Whereas normative commitment is associated

with feelings of obligation to stay in an organization and continuance commitment denotes the costs of leaving an organization, affective commitment refers to employees' attachment and affective reaction to the organization (Meyer et al., 2002). In this study, we focus on affective commitment – “*the strength of an individual's identification with and involvement in a particular organization*” (Porter et al., 1974, p. 604) – because (i) it is central to most previous research on organizational commitment (cf. Thoresen, Kaplan, Barsky, Warren, & de Chermont, 2003), (ii) it is the strongest predictor of positive outcomes of commitment (Meyer et al., 2002), and (iii), most importantly, it is affective in nature (Thoresen et al., 2003) and thus can be influenced by entrepreneurs as leaders and supervisors of venture employees. Factors enhancing employees' affective commitment include, for example, job scope (Meyer & Allen, 1997), communication with supervisors (Bruning & Snyder, 1983), supervisor support, and transformational leadership (Meyer & Allen, 1997).

Two different mechanisms can explain how displays of entrepreneurial passion and associated positive affect influence employees' commitment to new ventures. First, displaying passion can help entrepreneurs to better convey their visions for their venture. Second, through affective contagion between passionate entrepreneurs and employees the latter may experience positive affect which in turn influences commitment. Both mechanisms are possible and plausible, and they may work simultaneously. It is not the purpose of this paper to empirically distinguish both mechanisms and their impact, we rather suggest both as a possible theoretical link between the independent variables (displays of entrepreneurial passion) and dependent variable (commitment) of our model (c.f. Sutton & Staw, 1995). Our arguments below apply to the different types of entrepreneurial passion (passion for inventing, founding, and developing) in a similar manner. We, thus, do not explicitly distinguish these types

in our theory, but we will formulate separate hypotheses for entrepreneurs' passion for inventing, founding, and developing. This distinction allows us to capture potential heterogeneity between different types of passion in our analysis, which we will discuss toward the end of this paper.

Communication of visions. Visions refer to a desirable and ideal state to which a firm aspires (House & Shamir, 1993). For example, visions that entrepreneurs pursue may include producing high quality products, developing a life-changing technology, attaining large market shares, or fast venture growth (Baum, Locke, & Kirkpatrick, 1998). Displays of entrepreneurial passion for inventing, founding, and developing can facilitate the communication of these visions to employees thereby triggering their commitment to the new venture.

First, displays of passion can demonstrate to employees that entrepreneurs pursue their goals in a coherent and coordinated way (Cardon et al., 2009). For example, a strong passion for inventing a high quality product will motivate entrepreneurs to focus their activities on achieving this vision and not be distracted by other objectives such as launching the product too early or producing higher quantities instead of high quality. These entrepreneurs will either directly or indirectly through their own actions communicate to employees that inventing a high quality product is their highest priority. These coherently pursued objectives are clearer understandable and interpretable for employees and can be better remembered (Colbert, Kristof-Brown, Bradley, & Barrick, 2008), thus facilitating the employees' identification with these visions and triggering their own efforts to contribute to their achievement (commitment).

Second, displays of entrepreneurial passion can highlight to employees the importance of achieving the entrepreneur's vision. For instance, an entrepreneur who shows passion about founding new ventures can explicitly communicate the importance

of raising new finance for the venture (Cardon, 2008). The more importance employees attribute to achieving the visions communicated by the entrepreneur, the more they will feel that their own contribution to achieving these visions will make an important difference for the venture. This will give meaningfulness to their work and emphasize the significance of their tasks (Piccolo & Colquitt, 2006; Shamir et al., 1993). The more employees perceive their own role in the venture as important, the more likely they will identify with it and strive to become involved.

Finally, displays of passion can demonstrate to employees that entrepreneurs persist when plans are difficult to achieve (Cardon et al., 2005). These entrepreneurs show confidence to overcome the hurdles and challenges faced. For example, entrepreneurs passionate about developing their ventures may demonstrate to employees that, despite a current cash shortage, they are putting effort into attracting new investors and believe that they will succeed in finding these investors. This display of confidence can induce self-confidence in employees (House, 1977) and help them to cope with their own challenging situations at the work place and trigger their commitment to the venture. For example, Lee et al. (1992) find that self-confidence is part of a commitment-propensity composite that predicts the organizational commitment of cadets of the United States Air Force. Barrick and Zimmerman (2005) show that employee self-confidence counteracts employee turnover.

Affective contagion. Displays of entrepreneurial passion can also influence employees' commitment by affective contagion. Positive affect displayed by passionate entrepreneurs can spill over to employees who interact with them (Hatfield, Cacioppo, & Rapson, 1994). Two different processes can explain how this affective contagion occurs (Barsade, 2002). First, the primitive contagion process is a fast, automatic, and non-conscious two-step process. In a first step, employees non-consciously mimic the

affective state of the entrepreneurs (Hatfield, Cacioppo, & Rapson, 1992; Hatfield et al., 1994). This process of mimicking another person's facial expression or behavior is an innate human tendency (Davis, 1985; Levenson, 1996). In a second step, employees tend to experience the exposed emotion themselves (Duclos et al., 1989) as a response to physiological feedback from muscles involved in this mimicking (Hatfield et al., 1994).

Another, more cognitively effortful, contagion mechanism are social comparison processes (Epstude & Mussweiler, 2009; Sullins, 1991). Employees may compare their own affective states with those of the entrepreneurs (Adelman & Zajonc, 1989; Schachter, 1959; Sullins, 1991). In this case, employees see entrepreneurs' affective displays as relevant social information, telling them how they should be feeling (Barsade, 2002). While affective mimicry can induce positive affect in employees, however, it is important to note that it is unlikely to also induce passion. The experience of passion not only demands the experience of positive affect, but also the experience of identity relevance and meaningfulness for the firm which employees may or may not perceive (Cardon, 2008).

In line with previous research (see the meta-analysis by Thoresen et al., 2003) we suggest that the employees' positive affect resulting from affective contagion triggers their commitment to the new venture. According to the *affect-as-information perspective* (Schwarz & Clore, 1983) positive affect signals to employees that everything is going well, that the current situation is not threatening, and that their environment is safe. Employees who experience positive affect can fully focus on the demands of the current work task and build up resources for current or upcoming challenges within or outside their work environment (Fredrickson, 1998, 2001). Under such conditions, employees are likely to proactively approach problems and challenges that arise (Fritz & Sonnentag, 2009), and they are willing to put extra effort into their

work tasks beyond what is immediately required (Foo et al., 2009). These employees will see little need to escape from work. Instead they exhibit higher levels of involvement and identification with the venture and hence are more affectively committed to it. This is consistent with Herrbach (2006) who finds that work environments that entail positive affect can lead to higher levels of affective commitment “because they contribute to the mind-set of desire that characterizes this form of commitment” (p. 633).

In sum, both effectiveness of communicating visions as well as affective contagion suggest that entrepreneurs’ displays of passion for inventing, founding, and developing a new venture can trigger employees’ commitment to the new venture. Thus,

Hypothesis 1: The stronger entrepreneurs’ displays of passion for (a) inventing, (b) founding, and (c) developing, the higher employees’ commitment to new ventures.

In interpersonal relationships perceived similarity between individuals is crucial for the nature of their interaction. Similarity refers to a sense of association between two people. Higher levels of perceived similarity between individuals are usually connected with higher levels of attraction and more favorable evaluations of each other (see Byrne & Griffitt, 1973 for a review). This similarity-attraction effect (Byrne, 1971) plays an important role in the relationship between organizational leaders and employees. For example, when supervisors and subordinates are similar, supervisors assess their subordinates’ performance more positively than in non-similar dyads (see Pulakos & Wexley, 1983 for perceived similarity; and Tsui & O’Reilly, 1989 for demographical similarity). Furthermore, the perceived similarity between leaders and employees (both from the perspective of the leaders and the subordinates) leads to a better relationship

between them (Liden, Wayne, & Stilwell, 1993) and higher levels of employees' job satisfaction (Turban & Jones, 1988).

While research on the similarity-attraction effect among supervisors and employees focuses on several similarity variables, such as demographic similarity (Tsui & O'Reilly, 1989), similarity of values (Brown & Trevino, 2009), and similarity of implicit leadership and performance theories (Engle & Lord, 1997), a particularly important concept is goal similarity. Goals are plans of what individuals want to accomplish and what their object of action is (Locke, Shaw, Saari, & Latham, 1981). Goal similarity is *"the agreement between an individual and members of key constituencies within the individual's organization"* (Vancouver et al., 1994, p. 666). Formulating, communicating, and pursuing goals is central in human resource management (Bateman, O'Neill, & Kenworthy-U'Ren, 2002), and goal similarity between supervisors and subordinates has overall positive effects on employees' performance (Chen et al., 2005), buffers potentially negative effects of organizational politics on employees' commitment (Witt, 1998), and increases employee commitment (Reichers, 1986; Vancouver et al., 1994). Goal similarity appears also important in the relationship between entrepreneurs and employees since entrepreneurs tend to communicate their goals to employees (Bateman et al., 2002).

In contrast to existing studies demonstrating the direct influence of goal similarity on employee commitment, in this article we focus on the moderating effect of goal similarity on the relationship between the entrepreneurs' displays of passion and employee commitment to new ventures. We distinguish between financial and non-financial goals. Research on performance measurement of organizations requires a distinction between financial and non-financial goals (e.g., Ittner & Larcker, 1998; Webb, 2004) and this distinction allows us to capture heterogeneity in entrepreneurs'

extrinsic (financial) and intrinsic (e.g., independence) motivation (Kuratko, Hornsby, & Naffziger, 1997). More specifically, we concentrate on employees' perceptions of similarity in goals between themselves and the entrepreneurs. Two arguments suggest that similarity of financial and non-financial goals between entrepreneurs and employees moderates the relationship between entrepreneurs' displays of passion and the employee commitment to new ventures. First, goal similarity may intensify the effect of visions communicated by passionate entrepreneurs. Second, goal similarity may facilitate the process of affective contagion between entrepreneurs and employees.

Communication of visions. While displays of passion facilitate entrepreneurs' coherent and coordinated communication of their visions to employees, it appears that this effect can be multiplied when employees share the entrepreneurs' goals. In this case, employees will be better able to understand the priorities of the entrepreneurs (Witt, 1998) and their activities in the roles as inventors, founders, or developers as well as the visions related to these roles (innovating new products, spinning off new firms, or expanding the existing firm). With more understanding of these visions employees can better act in concert with them when observing the passionate displays of the entrepreneurs.

Furthermore, higher goal similarity between entrepreneurs and employees facilitates the development of trust (Huang & Iun, 2006), suggesting that employees will perceive displays of entrepreneurial passion as more trustworthy. That is, employees will believe that entrepreneurs wholeheartedly believe in their passionate activities and the success of their ventures. In contrast, when goals are less similar and there is less trust between employees and entrepreneurs, employees may perceive displays of passion only as a hypocritical tool to motivate others. For these employees, displays of passion will have little influence on triggering their commitment. Employees who do not share

the entrepreneurs' goals may even withdraw from their job (Kristof-Brown & Stevens, 2001) thus ignoring the passionate displays of the entrepreneur.

Finally, entrepreneurs who display passion convey the belief that even demanding ambitions and far-reaching visions are attainable (Cardon et al., 2005; Chen et al., 2009). This demonstrates to employees that the goals that they have in common with the entrepreneur can be accomplished. These employees will be more receptive to the entrepreneurs' displays of passion because they perceive higher chances of reaching their own goals (Locke et al., 1988). For instance, if entrepreneurs are passionate inventors their (non-financial) goal may be to develop a technology that is environmentally friendly. An employee pursuing a similar goal – contributing to the health of the natural environment – will be more inspired by displays of passion for inventing than an employee who does not share this goal. Another example is entrepreneurs with a passion for developing their ventures who have the specific (financial) goal to achieve a higher growth in sales in the next year. If employees share these financial goals, they will understand the passion of their supervisors for making money and be elated by it, which will in turn enhance their commitment.

Affective contagion. In general, affective contagion is higher when people believe that their “contagious counterpart” belongs to the same social group (Platow et al., 2005) or that they are in a similar situation (Sullins, 1991). Employees are more likely to assimilate positive affects displayed by passionate entrepreneurs when they perceive that these entrepreneurs are more similar to themselves (Epstude & Mussweiler, 2009). This is because comparison processes are an important determinant of the affective reaction to the affective state of another person. Individuals have a strong drive to feel equal to a member of the “we-group”, a person they feel similar to. When such a person displays a certain affective state, individuals are likely to feel with

them to maintain affective and cognitive balance (Heider, 1958). In contrast, when employees feel that entrepreneurs are dissimilar to them, affective contagion is restrained.

Employees perceive entrepreneurs more similar to themselves when they share the entrepreneurs' goals. For example, when both employees and entrepreneurs perceive the development of a particular technology as an important goal of their activities, employees will view themselves and the entrepreneur as inventors with a common mission to develop that technology. In contrast, when entrepreneurs display more passion about achieving financial growth for their venture, employees will see entrepreneurs more as managers than as inventors and categorizes them into a different social group. In this latter case, employees are less likely to assimilate positive affects from entrepreneurs displaying passion for venture development. These arguments are consistent with Cardon (2008) who suggests that goal congruence between entrepreneurs and employees can enhance the contagion of positive affect associated with entrepreneurial passion. Thus,

Hypothesis 2: A high level of employees' perceived similarity between financial goals of the entrepreneur and their own financial goals will strengthen the relationship between the entrepreneur's displayed passion for (a) inventing, (b) founding, and (c) developing and the employees' commitment to the new venture.

Hypothesis 3: A high level of employees' perceived similarity between non-financial goals of the entrepreneur and their own non-financial goals will strengthen the relationship between the entrepreneur's displayed passion for (a) inventing, (b) founding, and (c) developing and the employees' commitment to the new venture.

5.3 Methodology

5.3.1 Data and sample

Our sample frame is employees in German start-up companies. In order to identify employees in these young firms, we used the online database “deutsche-startups.de” (DS Media GmbH, 2009). “Deutsche-startups.de” was started in 2007 and offers news, interviews, and portraits of young German internet companies and their founders. Additionally, it provides a comprehensive list of internet start-up companies. We consider this database as a useful sampling frame for our analysis, as it enables us to identify employees in young start-up firms who have actual and recent experience working for a young and innovative company and are likely to work closely together with the founder of that firm (Bygrave & Zacharakis, 1994). Additionally, the database contains start-up firms from all regions in Germany and is therefore unlikely to be systematically biased as compared with the overall population of German internet start-ups.

The “deutsche-startups.de”-database was available over the company’s website (<http://www.deutsche-startups.de>, accessed in April 2009) and listed 750 firms, their founder(s), the companies’ websites, and the companies contact data. We trained two research assistants, who contacted all firms by telephone, explained the purpose of our study, and asked for at least one employee who works closely together with the company founder to participate in the study. Of the 750 firms, we were able to make contact with 405 firms; the others either did not exist anymore (157) or were unavailable by telephone (188). Further investigation revealed that most of the unavailable firms had also ceased to exist. Twenty-nine firms did not have any employees and had to be excluded from our sample. Employees in 304 firms out of the remaining 376 agreed to

participate (80.8%). We sent e-mail invitations to these employees, which summarized the purpose of our study and provided them with a link to our online research instrument (see below). If the employees did not participate within ten days, we sent another e-mail which reminded them of the importance of their participation and again provided them with a link to the online study.

We received responses from 95 employees from 78 ventures, representing a 25.3 % response rate in term of firms contacted. Since we had to eliminate 5 of these responses because of missing data, we were left with 90 participants.² When we compared the assessments of early (first 30 of the 90) and late respondents (last 30) there were no significant differences ($p > .10$), indicating that it is unlikely that our data are substantially affected by non-response bias.

On average, participants were 28.1 years old (standard deviation 5.4 years), and 43.3 % of them were female. Sixty-four % had a university degree, 22 % had a high school degree, and 10 % had finished vocational education. On average, the participants had 4.2 years of working experience (std. dev. 4.4 years). The participants worked in average for 12.9 months (std. dev. 12.0) for their current employer. Eighty-one % are in daily contact with the entrepreneur, 14 % have weekly contact with the entrepreneur, and only 4 % have less frequent contact with the entrepreneur.

5.3.2 Conjoint analysis

To collect data we used a conjoint experiment. In a conjoint experiment participants make assessments based on a number of decision attributes representing the research variables. The attributes are described by different levels (high and low) and

² These employees came from 75 ventures. Since our results did not change when we used only one randomly drawn employee per firm, below we report the findings for the whole sample (for a similar procedure see Patzelt, Shepherd, Deeds, & Bradley, 2008).

are combined into a hypothetical profile to which the decision makers assign their judgment. Conjoint analysis is an established method used in marketing, psychology, and many other disciplines including management and entrepreneurship research (Shepherd & Zacharakis, 1999).

Several advantages suggest that conjoint analysis is an appropriate method to address our research questions. First, as a real time method conjoint analysis is preferred to other post-hoc methods such as questionnaire surveys because it overcomes potential research biases including self-reporting biases or retrospective reporting biases (Shepherd & Zacharakis, 1999). Second, the form of conjoint analysis we use (metric conjoint) is particularly suitable to investigate contingent relationships between decision variables (Hitt & Barr, 1989). Since Hypotheses 2 and 3 propose interactions between passion and similarity variables, metric conjoint analysis appears the appropriate methodology to test our model. Finally and most importantly, metric conjoint analysis has been used successfully before to study how emotional displays of leaders impact employee behavior. In a recent study, Brundin et al. (2008) used metric conjoint to show that leaders' displays of confidence, satisfaction, frustration, worry, and bewilderment conjointly influence employees' motivation to act entrepreneurially in an organizational setting. This suggests that metric conjoint is a suitable method for studying how entrepreneurs' displays of passion impact employee commitment.

Despite these advantages, we would like to mention some possible limitations of conjoint analysis. We tried to minimize these limitations by the design of our study, but we want to emphasize them here. One limitation refers to the external validity of the study, that is, the degree to which participants can connect the hypothetical situations to their real world (Shepherd & Zacharakis, 1997). Scholars have been concerned about this issue already in the early days of conjoint analysis, and various studies have shown

that conjoint analyses reflect to a large decision policies employed by individuals (Brown, 1972; Hammond & Adelman, 1976). Moreover, face validity of conjoint experiments is usually high when judgement attributes are derived from theory as it is the case in our study (Shepherd & Zacharakis, 1997). To confirm the relevance of the decision cues we checked the self-reported importance of the attributes. On a scale from 1 to 7, participants rated the importance of the attributes with an average of 5.3, which is clearly above the scale mean of 3.5.

5.3.3 Research instrument

On the first pages of the online experiment employees were provided with a short description of the purpose of the experiment, a description of the experimental task, and a detailed description of the attributes and their levels (see below). Furthermore, we provided participants with three little profiles describing typical behaviors of entrepreneurs passionate for inventing, founding, and developing, consistent with Cardon et al. (2009). These profiles were intended to illustrate to employees how displays of passion may become manifest in the actions and behaviors of entrepreneurs. Participants were further instructed to base their judgments on the information given and to consider all other factors potentially influencing their assessments as constant across all profiles. They were then asked to judge their commitment when facing the subsequently described hypothetical working situation. After completing the conjoint part, participants filled out a post-experimental questionnaire where they were asked to give demographic information including the variables described above.

Dependent variable. The dependent variable of our study is the employees' assessment of their identification with and involvement in their new venture given the

description of the entrepreneurs' passionate displays. Specifically, we asked: "Based on the description of your work environment, how do you assess your identification and your involvement with the company?" We used this definition of affective commitment by Porter et al. (1974) as it is central in the commitment literature. Employees assessed their commitment on a 7-point Likert-type scale anchored by the end-points "very low identification and involvement" and "very high identification and involvement".

Independent variables. Each profile consisted of five attributes, used as independent variables in the study. Each variable is assigned one of two possible levels in a profile (strong vs. weak; high vs. low). *Passion for inventing* is the entrepreneur's displays of passion to identify, invent, and test new business opportunities and ranges from strong (the entrepreneur displays a strong passion for activities that deal with identifying, inventing, and testing new business opportunities) to weak (the entrepreneur barely displays passion for activities that deal with identifying, inventing, and testing new business opportunities). *Passion for founding* is the entrepreneur's displays of passion to establish a venture for commercializing and exploiting opportunities and ranges from strong (the entrepreneur displays a strong passion for activities that deal with establishing a venture to commercialize and exploit opportunities) to weak (the entrepreneur barely displays passion for activities that deal with establishing a venture to commercialize and exploit opportunities). *Passion for developing* is the entrepreneur's displays of passion to nurture, grow, and expand the existing venture and ranges from strong (the entrepreneur displays a strong passion for activities that deal with nurturing, growing, and expanding the venture once it has been established) to weak (the entrepreneur barely displays passion for activities that deal with nurturing, growing, and expanding the venture once it has been established). These three operationalizations are taken from Cardon et al. (2009). We defined *similarity in monetary goals* as the degree

to which the employee agrees with the entrepreneur regarding the importance of financial goals for the venture. This variable ranges from high (you agree with the entrepreneur in the importance of financial goals for the venture) to low (you do not agree with the entrepreneur in the importance of financial goals for the venture). *Similarity in non-monetary goals* is the degree to which the employee agrees with the entrepreneur regarding the importance of non-financial goals for the venture and ranges from high (you agree with the entrepreneur in the importance of non-financial goals for the venture) to low (you do not agree with the entrepreneur in the importance of non-financial goals for the venture). These operationalizations are based on studies on perceived subordinate-leader similarity (Liden et al., 1993; Turban & Jones, 1988).

5.3.4 Experimental design

With five attributes, represented by two levels each, the study yields $2^5 = 32$ possible attribute combinations (profiles). Since all profiles need to be replicated in order to perform test-retest checks for reliability (Shepherd & Zacharakis, 1997), our final design would have consisted of 64 profiles. To maintain a manageable length of the survey, we chose an orthogonal fractional factorial design which allowed us to test all main effects and all hypothesized two-way interactions. That way we reduced the attribute combinations to 16. Including retests and one practice profile to familiarize respondents with the task, the assessment task consisted of 33 profiles. The practice profile was excluded from analysis. Because of the orthogonal design, the correlation between all attributes is zero and issues of multicollinearity are eliminated (Huber, 1987). Both the decision profiles and the decision attributes constituting the profiles were randomly assigned in two ways each to control for ordering effects. This yields

four different versions of our experiment. The four versions were randomly distributed among the participants. We did not find significant differences across the versions.

5.3.5 Statistical method

Each of the 90 participants made 32 assessments, which resulted in 2880 data points. These data points are not independent of each other because 32 judgments are nested within each individual and the judgments of individuals are likely to differ according to their mental models, which are a function of their experiences and values as well as the organizational contexts in which they operate (Hambrick & Mason, 1984). We therefore used a Hierarchical Linear Modeling (HLM) approach to account for the nested structure of the data (Raudenbush et al., 2004). HLM allows us to focus exclusively on the effect of the decision attributes while controlling for all factors that are different across employees and their environment/ventures.

5.4 Results

In order to test the reliability of the responses, we calculated Pearson correlations between the original and the repeated profiles. 13 of the 90 participants who provided full information (14.4%) did not provide reliable answers ($p > .05$). The mean test-retest correlation was .69. This is consistent with existing conjoint studies (Shepherd, 1999: .69), The mean R^2 of the individual models was .65, again similar to previous studies (Shepherd, 1999: 78).

Table 7 shows the results of our analysis. Our data reveal that the coefficients of displayed passion for inventing ($b = 1.056, p < .001$), passion for founding ($b = 0.678, p < .001$) and passion for developing ($b = 0.932, p < .001$) are positive and highly significant. Thus, Hypotheses 1a-c are supported.

Evaluation criteria	Coefficient	SD	t-ratio	p-value
Intercept	3.870	0.057	67.382	0.000
Main effects				
Perceived passion for Inventing	1.056	0.066	15.937	0.000
Perceived passion for Founding	0.678	0.047	14.454	0.000
Perceived passion for Developing	0.932	0.065	14.410	0.000
Similarity in financial goals	0.975	0.076	12.885	0.000
Similarity in non-financial goals	1.000	0.078	12.894	0.000
Interaction effects				
Inventor passion x fin. goals	0.092	0.057	1.601	0.113
Inventor passion x non-fin. goals	0.192	0.064	3.014	0.004
Founder passion x fin. goals	0.069	0.064	1.086	0.281
Founder passion x non-fin. goals	0.092	0.074	1.231	0.222
Developer passion x fin. goals	0.067	0.068	0.974	0.333
Developer passion x non-fin. goals	0.183	0.069	2.664	0.010

n = 2880 decisions nested within 90 employees.

Table 7: Employees' affective commitment

In Hypotheses 2a-c we focus on interaction effects between displays of passion for inventing, founding, and developing and similarity in financial goals. Hypotheses 3a-c focus on interaction effects between displayed passion for inventing, founding and developing and similarity in non-financial goals. We find a significant interaction between displays of passion for invention and non-financial goal similarity ($b = 0.192$, $p < .01$), and another significant interaction between displayed passion for developing and similarity in non-financial goals ($b = 0.183$, $p < .05$). Significant interaction effects of

financial goal similarity with passion variables were not found. We also did not find significant interaction effects between non-financial goal similarity and entrepreneurs' displays of passion for founding. Thus, Hypotheses 2a-c and Hypothesis 3b are not supported.

In order to understand the interaction between entrepreneurs' displayed passion for inventing and similarity in non-financial goals, and between passion for developing and non-financial goal similarity, we provide graphs for each interaction. In Figure 6A we plot displayed passion for inventing on the x-axis and employee commitment on the y-axis. We plot separate lines for low and high levels of similarity in non-financial goals. Figure 6A shows that the positive relationship between entrepreneurs' displayed passion for inventing and employee commitment is more positive when there is a high level of non-financial goal congruence than when there is a low level of non-financial goal congruence. In Figure 6B we plot displayed passion for developing on the x-axis, commitment on the y-axis, and separate lines for low and high levels of similarity in non-financial goals. The graph demonstrates that the positive relationship between entrepreneurs' displayed passion for developing and employee commitment is more positive when the level of similarity in non-financial goals is high than when it is low. The nature of these significant interactions supports Hypotheses 3a and c.

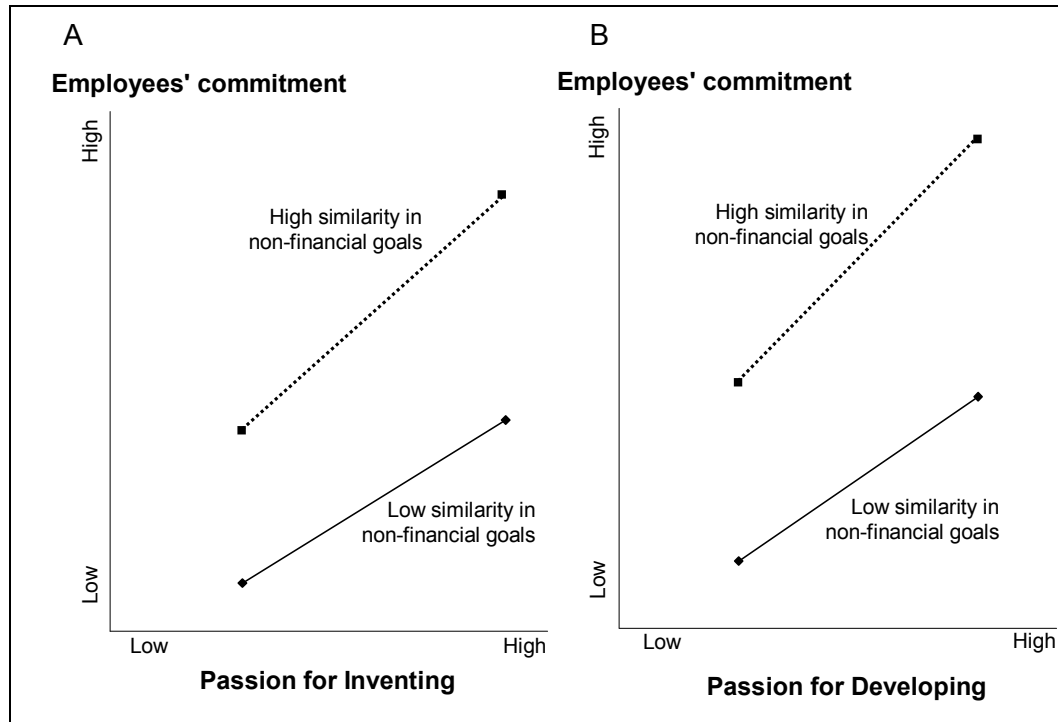


Figure 6: Interaction effects (A) between perceived passion for inventing and similarity in non-financial goals, and (B) between perceived passion for developing and similarity in non-financial goals.

Source: Own illustration.

5.5 Discussion and conclusion

Although entrepreneurial passion and its importance in the entrepreneurial process have been widely recognized in the entrepreneurship literature (e.g., Baum & Locke, 2004; Cardon, 2008; Cardon et al., 2009; Smilor, 1997), research on the impact of entrepreneurial passion on others is still limited (see Baron & Hannan, 2002; Cardon, 2008; Chen et al., 2009). We proposed that employees' perception of their supervisor's passion for inventing, founding or developing a venture can affect their affective commitment to new ventures. We further proposed that similarity in financial and non-financial goals increases the positive relationship between displays of entrepreneurial passion and employee commitment. Our experimental data support most of these hypotheses.

Our paper answers a call by Cardon (2008) who argues that an examination of how entrepreneurial passion impacts others in the entrepreneurs' environment can advance our understanding of the affective contagion process in entrepreneurship. Cardon (2008) suggests that displays of entrepreneurial passion may impact employees of a new venture although passion is not easily transferrable from entrepreneurs to employees. Experiencing passion involves the perception of identity relevance for the firm which is not caused by affective contagion processes. Therefore in this study we suggest two mechanisms how displays of passion can impact employees commitment. First, displays of passion may facilitate entrepreneurs' communication of visions for their venture. Second, displayed affective states that accompany the experience of entrepreneurial passion may lead to emotional contagion. Although we can not explicitly test these two mechanisms, in line with previous research (Barsade, 2002; Cardon, 2008) they provide a theoretical explanation for our finding that displays of entrepreneurial passion for inventing, founding, and growing a new venture can trigger affective commitment of employees.

Importantly, we proposed that goal-similarity moderates the relationship between displayed passion and commitment. We find support for two out of six hypothesized interaction effects. Similarity in non-financial goals increases the positive relationship between both entrepreneurial passion for inventing and commitment, and between passion for developing a venture and commitment. We do not find significant interaction effects for any kind of displays of entrepreneurial passion with similarity in financial goals. Thus, non-financial goals (such as environmental protection, developing a life-simplifying product, making a contribution to the development of a new technology) appear to play a more important in the perceived passion–commitment relationship than shared financial goals. One possible explanation for this finding is that

non-financial goals more than financial objectives reflect employees' fundamental values, which provide strong guidelines for human behavior (Senger, 1971). In organizations values are reflected in the organizational culture and offer rules for acceptable employee behavior (Westerman & Cyr, 2004). When employees' own behavioral guidelines are in line with the guidelines of their organizational environment, they may be more open and receptive for their supervisors' affective displays than if the values of employees and the organizational culture differ (Platow et al., 2005; Sullins, 1991). In contrast, financial goals are usually more adjustable than, and not as stable as, values, and they may not provide such a strong guideline for employee behavior in new ventures. That is, financial goals – and their similarity to the financial goals of the entrepreneur – may generally have less influence on how employees react to organizational environments including affective displays of leaders.

Interestingly, while perceived passion for founding a business triggers employee commitment to work for the new venture, contrary to our expectations this effect is not enhanced by similarity in non-financial goals. One possible explanation might be that employees typically do not work as closely together with the entrepreneur when she or he founds a new venture. For example, acquiring financial resources for establishing another firm is a task that entrepreneurs pursue without the help and involvement of employees of their current firm. Hence, employees might not bring common non-financial goals in tight connection with the entrepreneur's activities related to founding new ventures. In contrast, employees may even fear that the entrepreneur invests less time, money, and effort into the existing venture, making it less likely for the employees to achieve their non-financial goals while working for this venture.

Our study extends the entrepreneurship literature in various ways. First, existing research shows that passion results in high levels of energy and effort that entrepreneurs

invest in new ventures, and that entrepreneurial passion thus nurtures the venture (Cardon et al., 2005) and contributes to its success (e.g., Baum & Locke, 2004; Baum et al., 2001; Brännback et al., 2006). However, this literature stream widely neglected the importance of employees for new ventures and the impact of (displays of) entrepreneurial passion may have on employees. Following Cardon's (2008) call for research on the impact of entrepreneurial passion on new ventures' employees we present the first study focusing on employee commitment in start-up companies based on their perception of entrepreneurs' displays of passion. Since employee commitment is crucial for organizational success (Baron & Hannan, 2002; Deshpande & Golhar, 1994) our results indicate that there might be a rather "indirect" path how entrepreneurial passion contributes to new venture success – specifically, via triggering employee commitment. We would like to encourage future research on this issue. For example, scholars might use Structural Equation Modeling techniques or mediated regression analysis to investigate the "direct" impact of entrepreneurial passion on new ventures success and the "indirect" path via employee commitment simultaneously, and how much variance of new venture performance each path explains.

Second, we add to the literature on affective displays of entrepreneurs and their impact on employees. While it is well researched that expressed affect can have a contagious effect on others (e.g., Barsade, 2002), this issue has rarely been discussed in the entrepreneurship literature. This is surprising given that entrepreneurship is a highly emotional process (e.g., Baron, 2008; Cardon et al., 2009; Cardon et al., 2005; Smilor, 1997) suggesting that entrepreneurs display a variety of different affects to their employees. For example, in a recent study Brundin et al. (2008) find that leaders' displays of confidence, satisfaction, frustration, worry, and bewilderment interdependently impact employees' willingness to act entrepreneurially. In comparison

to this study, our work makes the important contribution of not only focusing on the influence of affective displays on employee behavior but on identifying moderators describing the nature of the supervisor-employee relationship. That is, we acknowledge that affective displays of entrepreneurs are more influential on some employees than on others contingent on the nature of the interpersonal relationship. Our findings show that goal similarity between entrepreneurs and employees influences the extent to which displays of passion enhance employee commitment. That is, goal similarity can explain part of the heterogeneity in how entrepreneurs' affective displays influence new venture employees. It appears that scholars can make important contributions to the literature on entrepreneurial affect by theorizing and empirically investigating under what conditions entrepreneurs' affective displays are more or less influential on others in the entrepreneurs' environment.

Finally, our study adds to the underdeveloped literature on entrepreneurial leadership. Leadership is a major task of entrepreneurs (Gupta et al., 2004; Vecchio, 2003), however, this aspect has been rarely investigated in the entrepreneurship literature so far. Leadership has a crucial influence on employees' behavior, and employees are permanently influenced by their leader's behavior (see Avolio, Walumbwa, & Weber, 2009 for a review) and by their leader's affective displays (e.g., George, 2000; Lewis, 2000; Sy et al., 2005). We show that variance in employees' commitment to work can be explained by the level of passion displayed by entrepreneurs. Our findings highlight the role of entrepreneurs' management and regulation of affects and their displays in leading employees effectively. This important role of entrepreneurs' affective displays is consistent with research on emotional labor which has shown that individuals can use affective displays to influence others (e.g., customers, patients, clients) in their environment (Grandey, 2000; Hochschild, 1983),

and the literature on emotional leadership which suggests that leaders' affective displays can significantly impact the behavior of employees (Humphrey, 2002; Pescosolido, 2002). Future models of entrepreneurial leadership should acknowledge the role of affective displays as a way to influence employee behavior beyond power (French & Raven, 1959), the structuring of work tasks, and supporting employees (House, 1971). Further, while our findings suggest that affective displays can facilitate entrepreneurial leadership, not all entrepreneurs are equally aware of, and able to regulate, their affective states and displays. For example, emotional intelligence is an important prerequisite for affect regulation and displays (Salovey & Mayer, 1990). Future research can make important contributions when it investigates what individual-level factors influence entrepreneurs' displays of passion for inventing, founding, and developing in their roles as leaders.

Our study is subject to limitations which offer opportunities for future research. First, we used an experimental design and conjoint analysis to investigate the impact of entrepreneurial passion on employees' commitment. That is, we manipulated entrepreneurs' passionate displays in a "pencil-and-paper" survey. While this approach is consistent with past research on how leaders' affective displays influence employee behavior (Brundin et al., 2008) future research might further validate our findings with data from real-world employee-supervisor dyads. For example, in such a setting one could directly observe (e.g., video tape) how employees react to entrepreneurs' affective displays. Though this approach also has its limitation with respect to internal validity because it is difficult to empirically measure, code, and quantify affective displays (Parrott & Hertel, 1999), it could be useful to substantiate the findings presented here.

Second, our data and experimental design do not allow for the investigation of the "mechanism" how entrepreneurs' displays of passion influence employee

commitment. We suggested a clearer communication of visions and emotional contagion as two mechanisms explaining the link between the independent variables (displays of entrepreneurial passion) and dependent variable (commitment) (c.f. Sutton & Staw, 1995). Disentangling both mechanisms empirically appears challenging, but not impossible. For example, in a longitudinal real world study one could repeatedly survey employees about their perceptions of entrepreneurs' passionate and other affective displays and their own affective state, which might indicate the degree of affective contagion. Experience sampling methodology (ESM), which Foo et al. (2009) used recently to investigate the effect of entrepreneurs' affect on the effort they invest in new ventures, could serve as an appropriate tool for such a study.

Finally, we would like to acknowledge that our findings could to some extent be sector-specific. We conducted our study in the context of information technology ventures, a sector where entrepreneurs and employees often work closely together on inventing new technologies and products (e.g., new software). This might explain why employees in our sample are particularly receptive to entrepreneurs' passion for inventing as indicated by the size of the coefficient in Table 7 which exceeds the coefficients for passion for founding and passion for developing. In less innovation-driven industries, employees might be more receptive for other passions of the entrepreneur. Future studies should investigate how stable our results – and, more generally, the displays of entrepreneurial passion and their impact on employees – are across different industries.

Entrepreneurial passion is a key ingredient for new venture success. Our study suggests that entrepreneurs' passionate displays enhance employees' affective commitment to new ventures. More importantly, perceived similarity in non-financial goals between employees and entrepreneurs enhances the positive effect that displays of

entrepreneurial passion for inventing and for developing have on commitment. These findings extend the literature on entrepreneurial passion by highlighting how entrepreneurs' displays of passion influence the behavior of others, and they suggest that affective displays are a powerful tool for entrepreneurs in their role as leaders. We hope to inspire further research on the role of entrepreneurs' affective displays and their effects on new venture employees.

6 Networks and innovation managers' decision to persist with underperforming R&D projects*

Basic research plays a crucial role in knowledge supply and is an important source of corporate patents and local innovation and R&D spending (Audretsch & Stephan, 1996; Jaffe, 1989). In this chapter I examine innovation project managers' decisions on whether to persist with or terminate an underperforming research project. I draw on aspiration level theory and the networks literature to develop a model toward decision makers' persistence with underperforming R&D projects based on the perceived properties of their personal network. Section 6.1 introduces the topic of this paper and stresses the importance of this study. In Section 6.2 I review the theory and derive my hypotheses. The method is explained in Section 6.3 and in Section 6.4 the results of my studies are presented. Section 6.5 discusses the results and concludes by pointing out limitations of the study as well as practical implication of the results.

* This section is based on Patzelt, Lechner and Klaukien (Forthcoming) and was presented at the 2009 Academy of Management Annual Meeting, August 7-11, 2009, in Chicago, IL, USA.

6.1 Introduction

A difficult situation for decision makers arises when they have to decide whether to persist with or terminate underperforming R&D projects. If they persist and the project fails in the end, substantial losses can occur because innovative product development projects are often characterized by long time horizons and substantial financial costs (e.g., DiMasi et al., 2003). On the other hand, discontinuing a project that has required considerable time and financial resources in the past is difficult for the decision maker, for example because she or he needs to justify these sunk costs to herself and others (Boulding, Ruskin, & Staelin, 1997; Schmidt & Calantone, 2002; Staw & Ross, 1987). Indeed, some decision makers persist with underperforming courses of action much longer than the objective performance of that course would suggest, leading to considerable financial losses (e.g., Balachandra, 1984; Boulding et al., 1997). Following others (Patzelt & Shepherd, 2008), this article views a project as underperforming if it performs below expectations of the responsible project manager. This is consistent with research emphasizing that perceptions rather than the objective characteristics of the environment explain strategic decision making (Das & Teng, 2001) and persistence with underperforming courses of action (Gimeno et al., 1997).

According to aspiration level theory, decision makers persist with underperforming projects as long as current project performance does not fall below their performance aspirations (Gimeno et al., 1997; Greve, 1998, 2002). Factors that influence aspiration levels of decision makers include role models (Gimeno et al., 1997), historic aspiration levels of organizations (Greve, 1998), and competitive environments (Greve, 2002). Another factor that has been relatively neglected so far in empirical studies is decision makers' social environment, that is, their personal networks.

Consistent with Dubini and Aldrich (1991), a personal network of a decision maker is composed of all formal and informal links she or he has (either directly or indirectly) with other individuals and organizations.

An important function of networks is that they provide information and feedback on projects (Granovetter, 1974; Hansen, 1999; Ibarra & Andrews, 1993). This article argues that feedback received from network partners will influence the aspiration levels of decision makers and the likelihood that they will persist with underperforming R&D projects. The effect of feedback on individuals' persistence decisions, however, likely varies between networks. Networks differ in size and density, the strength of the network ties, and communication frequency between network partners, which impacts the behaviour of network actors (Burt, 1992; Granovetter, 1974). This article suggests that these parameters influence the effect of feedback received from network partners on the decisions of individuals to persist with underperforming R&D projects. The model is tested by an experimental design and 1632 persistence decisions nested within 51 scientists responsible for R&D projects.

This article offers the following important contributions to the literature. First, the project management literature has found that the persistence of underperforming projects can partly be explained by the characteristics of those projects (Arkes & Ayton, 1999; Balachandra, 1980, 1984; Ross & Staw, 1993; Soman, 2001), predetermined stopping rules (Boulding et al., 1997), or the decision maker's psychology (e.g., Garland, 1990; Hsee, Zhang, Yu, & Xi, 2003), but empirical studies have mainly neglected the social environment of the decision maker (Sabherwal, Sein, & Marakas, 2003). This literature is extended by showing that the personal network impacts an individual's decision to persist with an underperforming R&D project. Second, while scholars have shown that feedback received from network partners (Cross & Spoull,

2004), network structure (Burt, 1992; Granovetter, 1973), and communication within networks (Cross & Spoull, 2004) impact the behaviour of actors within the network, there has been little investigation of contingent relationships between these parameters. This article finds that the effect of feedback on the decisions of network actors is moderated by the structure of the network and partner communication. Third, most studies in the network literature have examined the benefits individuals (Perry-Smith & Shalley, 2003) and organizations (Dyer & Singh, 1998) receive from their networks. This study focuses on a potential dark side of networks by investigating how these networks encourage individuals to continue their investment in an underperforming – and potentially failing – project. Finally, in drawing on a field experiment this article follows a recent call in the project management literature to pursue less common methodological approaches and develop “broader theoretical schema” in order to enhance our understanding of project management (Guo, 2008).

This study also has implications for practitioners. First, decision biases are frequent in managerial project persistence decisions (Staw, 1981; Staw & Ross, 1987), and analyzing how the composition of decision makers’ networks influences decision outcomes can help managers to understand their own decision policies and draw more accurate and better decisions. Second, the study provides insights into how organizational strategy with respect to dissemination of R&D results and involvement of the organization’s R&D managers in the scientific community influences the persistence of underperforming R&D projects, and thereby the organization’s R&D expenditures. This can help top managers to design financial controls and allocate financial resources to managers of underperforming R&D projects in line with the organization’s networking strategy.

6.2 Theory development

Researchers have identified a variety of factors that explain why underperforming projects persist beyond their useful lifetime (Staw & Ross, 1987). For example, the perhaps most important driver of persistence is referred to as the sunk cost effect – “a maladaptive economic behaviour that is manifested in a greater tendency to continue an endeavour once an investment in money, effort, or time has been made” (Arkes & Ayton, 1999: 591). Soman (2001) showed that the sunk cost effect is particularly prominent if decision makers cognitively convert time invested in underperforming projects into monetary quantities. While some empirical studies failed to find the sunk cost effect (e.g., Armstrong, Coviello, & Safranek, 1993), the general assumption is that the “Don’t waste” rule, typical for human behaviour, motivates decision makers to persist with projects when sunk costs have occurred (Arkes & Ayton, 1999). This article therefore assumes that sunk costs in the underperforming project have occurred, and that the focal decision maker is responsible for their occurrence.

Aspiration level theory suggests that if the current performance of a project does not meet decision makers’ aspirations, they are likely to terminate that project, but to persist otherwise (Greve, 2002). Particularly if no pre-commitment to a predetermined decision rule exists (which may be imposed by the top management, Boulding et al., 1997), it appears that decision makers’ performance aspirations can explain project persistence. Thus, a second assumption that this article makes is that no organizational and environmental factors (such as decision rules or strict budget limitations, Balachandra, 1984; Boulding et al., 1997) pre-determine the go/no-go decision of the project.

In the context of underperforming R&D projects, the social environment – a decision maker’s personal network – appears to have a particularly profound impact on

her or his aspirations. Decision makers responsible for R&D projects often rely on a social network to learn and gather information about recent scientific discoveries which they can use to advance their own research projects (Deeds, 2001). Membership in the scientific community requires that scientists not only absorb knowledge from others, but also that they discuss and share experiences with their own projects and disclose the outcomes of these projects through presentation at conferences and meetings to others (Dasgupta & David, 1994; Dittrich & Duysters, 2007). Therefore, the scientific network – defined here as all individuals with whom the decision makers discusses a current underperforming project – externally evaluates the decision maker’s project.

Decision makers are likely to adjust their performance aspirations for projects based on the feedback received from their network partners. Feedback on a project refers to information about the performance of that project (Herold & Greller, 1977; Veryzer 1998). Decision makers will pay particular attention to feedback from network partners when they perceive the information received as accurate and credible (Ilgen, Fisher, & Taylor, 1979; Schmidt & Calantone, 2002) as judged by comparison to credible criteria or standards (Weick, 1979a). Feedback from network partners indicates whether “future performance will meet, exceed, or not meet, the outcome standards in the future” (Bowen, 1987: 56). Thus, feedback can be classified into negative or positive feedback. For negative feedback, the information received indicates that the project will likely fail to meet its goals in the future, whereas positive feedback indicates that those goals will likely be met or even exceeded (Bowen, 1987).

Decision makers will more likely believe that project underperformance can be overcome in the future when network partners provide positive feedback than when they provide negative feedback. Although the current performance of the project may not meet the decision makers’ aspirations formed when the project was started, the decision

makers can adjust their aspiration level to accommodate current underperformance (Greve, 2002), and this motivation to temporarily lower performance aspirations will increase with more positive feedback received from network partners (Bandura, 1997). Given the decision maker considers this feedback as accurate and credible (Ilgen et al., 1979; Schmidt & Calantone, 2002), he or she will likely decide to “ride out” current underperformance and (perhaps temporarily) lower their aspiration levels, encouraging persistence with the project.³ Thus,

H1: The more positive the feedback decision makers receive from their network partners about an underperforming R&D project, the higher the likelihood that they will persist with this project.

The network literature distinguishes between factors describing the structure of individuals’ networks and their communication with network partners. The structure of a network is often characterized by its size and density, and the strength of ties (Wassermann & Faust, 1994). Moreover, the frequency of communication influences the decisions of network actors (Westphal, 1999). This study investigates how the three parameters related to network structure (size, density, strength of ties) and communication frequency influence the effect of feedback received on persistence decisions. The conceptual model is depicted in Figure 7.

³ It is important to note that if negative information is perceived as being not credible, decision makers tend to ignore or bias negative feedback, thereby encouraging them to persist despite that feedback (Schmidt & Calantone, 2002). That is, the “objectively” negative feedback received may not (or only to a minor extent) be perceived as negative by the decision maker. In contrast, if feedback is received from a credible source, it is more difficult to bias negative information (Schmidt & Calantone, 2002). Since our study (and empirical approach) refers to decision makers’ perceptions of feedback, the objective characteristics of the feedback (whether it is more or less positive or negative) are external to our model.

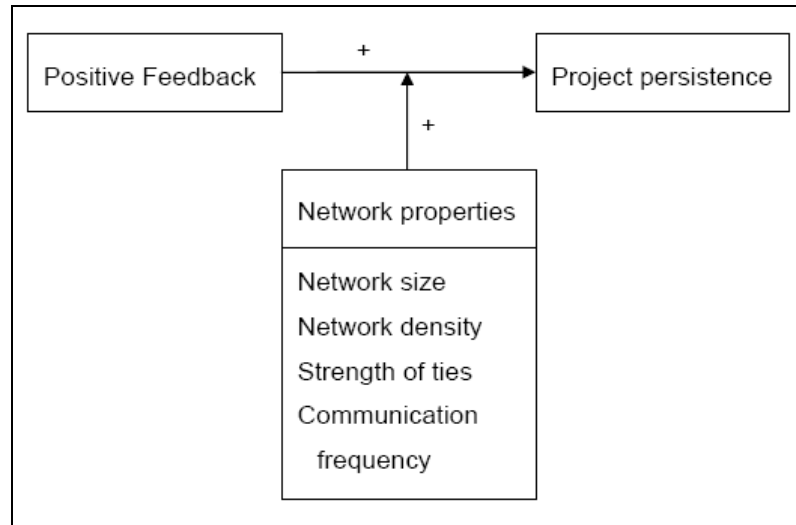


Figure 7: Conceptual model

Source: Own illustration

Network size. Much research on network structure has focused on egocentric networks, i.e., the relationships of one focal actor with other actors, and described the size of an individual's network by counting the number of direct network ties of that individual to others (Johannisson, 1998; Wassermann & Faust, 1994).

When the decision maker receives information from a larger number of network actors, this may enhance her or his perceptions of accurateness and credibility of that information and thus their attention to that feedback (Ilgen et al., 1979; Schmidt & Calantone, 2002). Whereas one or two network partners may be wrong in their assessments of future project perspectives, the likelihood that more network partners provide wrong or ambiguous feedback on the project appears lower. Empirical research supports the notion that individuals pay more attention to information received from a larger number of network partners (Weenig & Midden, 1991), and that they tend to view information received from more sources as more reliable (Baruch & Harel, 1993; Hanser & Muchinsky, 1978).

Further, the more direct network contacts, the better decision makers are able to access additional information beyond the feedback on the performance of their underperforming project (Mehra, Dixon, Brass, & Robertson, 2006). This additional information may help them to validate performance feedback and perceive it as more accurate and credible. For example, network partners may tell the decision makers about similar projects they know that succeeded in the end without giving direct feedback on the decision maker's underperforming project. The larger the network, the more such additional information the decision maker can access, and the more this information informs their judgement of the accuracy of the feedback received.

Third, the larger the decision maker's network, the higher her or his need to justify the decision to persist with or stop an underperforming project to other network partners. Decision makers are prone to evaluation by their network partners and will decide in a way that these network partners view them (and their decision) as competent and rational (Fox & Staw, 1979; Hsee et al., 2003). This evaluation likely strengthens decision makers' attention to the partners' feedback and their motivation to adjust performance aspirations. In a larger network, decision makers will be more motivated to lower their current performance aspirations for an underperforming R&D project based on positive feedback received, encouraging persistence. Thus,

H2: The relationship between more positive feedback received from network partners and the likelihood that decision makers persist with an underperforming R&D project is stronger when the network is large than when it is small.

Network density. Network density refers to the interconnectivity or structural closure of network members (Coleman, 1988). The lower the network density, the less actors are connected with each other, and the more structural holes exist within the network.

The higher the network density, the higher the information flow between all network members (Burt, 1992; Granovetter, 1985). When all (or most) members of a network have direct ties with all other members, information can flow directly between those members who want to share that information without involving a third or fourth actor. Thus, to the extent that decision makers perceive their network as dense, they will assume that feedback from network partners is likely more up-to-date, accurate and reliable than information acquired in less dense networks would be. More feedback accuracy and reliability will enhance the impact of more positive feedback on decision makers' willingness to adjust aspiration levels and persist with the project.

Second, in a more dense social network, trust between actors is more likely to develop because they can more easily access information of the behavior of other actors in the past (Burt, 2005; Granovetter, 1985). Decision makers who trust their network partners believe that these partners will behave in a way that is beneficial or at least not detrimental to the decision makers' interests (Gambetta, 1988). In a higher density network with more trust between partners, decision makers will rely more on feedback received on a project.

Finally, mutual surveillance and sanctioning increase with network density (Granovetter, 1985), which will enhance the decision maker's need for justification (Fox & Staw, 1979; Hsee et al., 2003). Thus, network density reduces the action autonomy of an individual (Burt, 1992). For example, if a decision maker receives positive feedback from a particular person on an underperforming project but nevertheless decides to terminate the project other actors may get notice of this decision and ask the decision maker why she or he discontinued the project although there has been positive feedback on it. The higher the network density, the larger the number of actors who get notice,

and stronger the need for justification and potential harm to the reputation of the decision maker will be, encouraging persistence. Thus,

H3: The relationship between more positive feedback received from network partners and the likelihood that decision makers persist with an underperforming R&D project is stronger when the perceived network density is high than when it is low.

Strength of ties. The stronger a network tie between actors, the more time, emotional intensity, trust, reciprocity, and friendship are involved in the relationship (Coleman, 1988; Granovetter, 1973; Krackhardt, 1992). While weak ties allow acquiring new information by bridging areas of an actor's network (Granovetter, 1973), strong ties can provide an individual with emotional support (Brüderl & Preisendörfer, 1998).

Strong ties can provide richer information than weak ties (Coleman, 1990; Coleman, 1988). "Friendship ties are particularly important because people may only be motivated to share information and discuss ideas with those people with whom they have established bonds of friendship" (Mehra et al., 2006: 66). That is, when a decision maker receives feedback about an underperforming project from a network partner with whom she or he has a strong relationship, this network partner will be more motivated to share information and help the decision maker to come to a judgement about an underperforming project. For example, a friend may provide the decision maker with more complete (and perhaps confidential) information on the performance of other projects that are similar to the one of the decision maker than a person who the decision maker hardly knows (a weak tie). Therefore, the decision maker will more likely adjust her or his performance aspirations based on the feedback received from someone perceived as a "strong tie" (a friend) rather than from someone perceived as a "weak tie" (someone hardly known).

Second, with increasing tie strength, trust between partners increases (Burt, 2005; Coleman, 1988). Decision makers are more likely to trust friends and family members that represent strong network ties than relatively unknown people representing weak ties. As mentioned earlier, trust in a network partner will increase the decision maker's perceptions that this partner provides honest and reliable feedback which likely increases the decision maker's reliance on that feedback in adjusting performance aspirations.

Third, strong ties are usually established on the basis of liking and therefore similarity, and being member of a strong tie network means sharing similar values, beliefs and objectives, which can result in increased peer pressure (Krackhardt, 1992). This peer pressure increases the need for external justification for behaviours that deviate from the shared beliefs and objectives. That is, when a decision maker receives feedback on an underperforming project from network partners with whom she or he shares beliefs and objectives, it is less likely that he or she decides against the feedback received because (i) the opinion of the network partner is likely similar to the opinion of the decision maker themselves, and (ii) even if the opinion differs, the decision maker will feel obligations and pressure to perform in line with the network partners' opinions. Thus,

H4: The relationship between more positive feedback received from network partners and the likelihood that decision makers persist with an underperforming R&D project is stronger when the network ties are predominantly strong than when they are weak.

Although the frequency of partner communication has been used as a proxy for tie strength by some authors (e.g., Granovetter, 1973), a strong tie develops over time and therefore is not directly dependent on the current frequency of communication between network partners (Burt, 2005; Kramer, 1999; Lin, 2002). In this sense,

communication frequency within a network is a general behaviour pattern, which likely influences a decision maker's tendency to persist with underperforming projects based on feedback from network partners.

Persuasiveness of information decision makers receive from network partners increases when this information is communicated to them more frequently (up to a certain extent) (Cacioppo & Petty, 1979). Repetition of communication “results in a greater realization of the meaning, interconnections, and implications of the message arguments – that is, greater message elaboration” (Cacioppo & Petty, 1989: 4). Moreover, the more frequently the decision maker receives feedback about an underperforming project, the more her or his attention is drawn to that feedback (Brock, Albert, & Becker, 1970), and the stronger her or his belief system will be influenced (Swann, 1996). That is, when decision makers receive feedback from their network partners on an underperforming project more frequently, their attention and cognitive response to that feedback will be stronger, increasing the impact of more positive feedback on the decision maker's tendency to persist.

Second, the frequency of communication with network partners enhances the decision maker's perceptions of surveillance and thus their need for justification of acting not in line with the received feedback (Hsee et al., 2003). Frequent communication increases the decision maker's attention (Brock et al., 1970) to other network actors knowing about the underperforming project and perhaps their interest in project development in the future. For example, if the decision maker communicates with network partners on a daily basis, she or he is continuously reminded that others closely observe whether the project is (in line or contrary to the feedback provided) continued or terminated. When terminating an underperforming project despite positive feedback, the decision maker will have to justify this decision the very next day and

each of the days following to network partners, and he or she is more likely to persist in order to escape these unpleasant situations. Thus,

H5: The relationship between more positive feedback received from network partners and the likelihood that decision makers persist with an underperforming R&D project is stronger when the communication frequency is high than when it is low.

6.3 Methodology

6.3.1 Sample and data collection

The sample of this study consists of scientists who were responsible for R&D projects at public research institutes in Jena, Germany. The region around Jena in Eastern Germany is characterized by a high density of research institutes, large technology-based companies (e.g., Schott Jenaer Glass, Zeiss Optical Instruments), two universities, and a high start-up rate of technology ventures, and there exist tight networks between individuals belonging to these institutions (Cantner & Graf, 2006) making the area an appropriate setting for this study.

Scientists working at the Friedrich Schiller University, two Max Planck institutes, one institute of the Fraunhofer society, and the Hans Knöll Institute were contacted. All together, the scientific staff of these institutions amounts to more than 2000 people. 189 of those doing life science research were randomly selected and personally visited. After explaining the purpose of the study and asking for participation, survey booklets were handed out to participants. If the person was not met, the booklet was left with another researcher or the secretary of the research group. Two weeks later, these individuals were again visited, filled-out booklets collected, and those who had not completed the survey so far reminded to do so within the next week. One week later, these individuals were again visited and completed survey booklets collected. All

together, 51 usable questionnaires representing a response rate of 27 % were returned, which is encouraging given the high time pressure and work load reported by most of the scientists in our sample. Although a sample size of 51 appears small for survey-based research, 32 persistence decisions are nested within each of these 51 individuals, yielding a total of 1632 data points (see below).

In a post-experiment questionnaire, data on the characteristics of participating scientists and their respective research institutes were collected. The participants were on average 31 (standard deviation 7.4) years old, and 41.2 % were female, 68.6 % had a university degree, 31.4 % held a PhD. 33.3 % of the participants had received an education in the field biology, 21.6 % in physics, 17.6 % in biochemistry, 9.8 % in computer sciences, and the remaining 17.8 % in various fields including geography, chemistry and medicine. On average participants had worked for 5.8 (std. dev. 7.6) years in research and for 4.1 (std. dev. 6.0) years in their current research group.

6.3.2 Conjoint analysis

One methodological challenge of this study was that decisions leading to persistence of underperforming courses of action can be subject to a variety of biases (Staw & Ross, 1987). Thus, data based on retrospective methods such as interviews or classical questionnaire surveys could not be used because these data are often characterized by self-report and introspection biases of the participants, which can significantly influence the results obtained. Therefore, many studies in the persistence literature are based on an experimental design which allows for observation of real-time decisions of individuals with fewer introspection and self-report biases (Shepherd & Zacharakis, 1997).

A metric conjoint experiment was used to collect data on the decisions of scientists to persist with underperforming R&D projects. In the experimental tasks, participants made assessments of specific decision profiles which are described by a number of attributes representing the research variables. Metric conjoint analysis is well established in research on strategic decision making of individuals and allows for the analysis of contingent relationships (two-way interactions) between decision attributes. This is in contrast to non-metric or rank-order techniques which are most appropriate to investigate the order of decision attributes. In this article, however, the order of decision attributes is not investigated, but two-way interactions between network structure and communication frequency with feedback obtained via the network (Hypotheses 2-5). This makes metric conjoint the preferred method.

6.3.3 Decision situation and research variables

The survey booklet first described to participants the general decision situation. Specifically, they were told they were responsible for a research project, the value and success prospects of which they had been advocating when the project was started in the past. Moreover, participants should assume that they had discussed this project with their personal network partners including colleagues, other scientists at conferences, and friends and family members. However, the project had been underperforming for quite some time and they were thinking about allocating further resources (time, money, personnel) or stopping the project. This indicated to participants that sunk costs (time, money, effort) had occurred in the past, which is an important prerequisite for persistence decisions toward failing projects (Arkes & Ayton, 1999; Soman, 2001). Also, participants were asked to assume that they were acting in their current environment and that the project was similar to the projects they were responsible for in

the past (with the exception of the description of their personal network contacts). They were further instructed that the attributes and environmental variables not specified in the decision profiles but possibly influencing their judgment should be considered as constant across all profiles. A detailed version of the instructions and an example of a decision profile is provided in the appendix.

After this introduction, the survey booklet contained the experimental task. Participants were presented decision profiles representing hypothetical network constellations. The attributes that describe the hypothetical networks were described by two different predetermined levels. In the analysis, these attributes represent the independent variables, whereas the scientists' assessments constitute the dependent variable.

Dependent variable. The dependent variable is the scientists' likelihood to allocate further resources to an underperforming R&D project. Participants were asked to assess the likelihood of allocating further resources on a seven-point Likert-type scale anchored by the end points "very likely" and "very unlikely".

Independent variables. The profiles of the conjoint experiment consisted of five attributes, each described by two levels. One of these attributes described the feedback received from the network partners, three the structure of the scientist's network (network size, network density, strength of ties), and one the communication with network partners (communication frequency). *Feedback* refers to the network partners' evaluations of the project and ranged from *positive* (in the past you received positive feedback and support for the underperforming project from your network partners) to *negative* (in the past you received negative feedback and criticism for the underperforming project from your network partners). *Network size* refers to the number of network partners and ranged from *large* (your network consists of many partners with

whom you discuss the underperforming project) to *small* (your network consists of few partners with whom you discuss the underperforming project). *Network density* denotes the ties between other network partners and ranged from *high* (your network partners know each other and you believe that they discuss about your project) to *low* (your network partners do not know each other and you believe that they do not discuss about your project). *Strength of ties* describes the nature of ties to network partners and ranged from *strong* (you mainly have strong ties to network partners which are based on emotions, trust and reciprocity [e.g., family and friends]) to *weak* (you mainly have weak ties to network partners which are only to a limited extent based on emotions, trust, and reciprocity, but are mainly based on exchange of information [e.g., colleagues who are no friends]). Finally, *communication frequency* denotes how often the scientist communicates with network partners and ranged from *high* (you frequently discuss the underperforming project with network partners) to *low* (you rarely discuss the underperforming project with network partners).

6.3.4 Reliability

Reliability in conjoint experiments is accounted for by replication of profiles and test-retest checks (Shepherd & Zacharakis, 1997). Therefore each profile was included twice in the experiment and separated the two copies by a number of other profiles. Pearson correlations between the original and replication profiles were computed. The mean correlation was 0.80, which is in a similar range as reported previously by Shepherd (Shepherd, 1999: 0.69). Only three (5.9 %) of the participants did not respond reliably ($p > 0.05$), consistent with other studies (Shepherd, 1999: 8%). All of the individual assessments were statistically significant ($p < 0.05$), and the mean R^2 of these

models was 0.84 (Shepherd, 1999: 0.78). Thus participants performed their task consistently and their assessments had high explanatory ability, respectively.

6.3.5 Experimental design

Since the profiles of the experimental design consisted of five attributes and each of these attributes was described by two levels, full replication of profiles would yielded $2*2^5 = 64$ possible combinations. In order to reduce the time participants spend on the study and thus enhance their willingness to participate and concentration during the experimental task, an orthogonal fractional factorial design was used. This reduced the number of attribute combinations to 16, resulting in 32 profiles (fully replicated). A 'practice' profile at the beginning of the experiment (which was not included into the statistical analysis) which familiarized participants with the decision situation before starting the experiment was also included (Shepherd & Zacharakis, 1997).

In order to rule out that order effects of attributes and profiles bias our results, four different versions of the experiment were created. Two different orders of profiles within the experiment and two different orders of attributes within the profiles were designed yielding a 2x2 matrix. No statistically significant differences between versions were found.

6.3.6 Potential methodological limitations

It is important to note that, besides its advantages, the methodological approach of this study also has some limitations. First, experimenter biases exist nearly everywhere in science, and to the extent such a bias is present, the interpretation of experimental results may be limited (Rosenthal, 1966; Venkatesan, 1967). The experimenter bias refers to an undesigned and unconscious source of influence of the experimenter on the subjects (Rosenthal, 1966) which can arise, for example, from the

experimenter's attributes, expectations, status, or his or her awareness about underlying hypotheses. This information is subtly transmitted via instruction reading behaviour, physical appearance, etc. (Venkatesan, 1967). Potential experimenter biases were minimized by avoiding extensive direct contact between experimenter and participants. Specifically, questionnaires were handed out to participants, and completed surveys were collected later with the experimenter not being present while the participants filled out the survey. In many cases the survey booklets were left with one researcher or the secretary of the respective research group so that participants were not contacted personally. In case the participant was met in person, the instruction provided was limited to telling the general purpose of the study (understanding the scientists' decision making behaviour). Thus, one can assume that an experimenter effect does not significantly bias the results.

Second, consistent with other conjoint (Patzelt & Shepherd, 2008; Shepherd, 1999) and policy capturing (Hitt, Ahlstrom, Dacin, Levitas, & Svobodina, 2004) studies, a single-item measures to describe independent variables in the decision profiles was used. While some of the decision variables are clearly and unambiguously defined in the literature as single item constructs (e.g., network size is referred to as the number of network partners), other variables may also be described as consisting of two or more items (e.g., feedback may be negative along several dimensions such as rescue value and success probability of the project). Due to the limited number of decision cues that could be included in the profiles, single item variables were used at the expense of measuring the same variable along different dimensions.

Third, two levels of each variable were used instead of multiple levels and fewer variables. For example, feedback could be described by three levels such as very positive, mixed, and very negative. This would allow for sensitivity analysis and the

investigation of non-linear relationships between feedback and persistence, however, at the expense of including more profiles in the experiment (and thus reducing participants' motivation to take part or complete their task), or including fewer independent variables.

Fourth, in experimental research it is critical to ensure that participants use the attributes presented (i) in their real life decision making (external validity) and (ii) in the experiment (manipulations are effective). For example, Armstrong (1979) stated that advocacy (hypothesizing) significantly improves efficiency in providing a structure of data collection but is at the same time a major source for biases. Several measures were employed to address these issues. First, all decision attributes were derived from a strong theoretical background supporting their relevance in practice (Shepherd & Zacharakis, 1997). Second, on a Likert-type scale ranging from 1 (very rarely) and 5 (very often) participant answered on average with 4.1 when asked how frequently they discuss their research projects with colleagues, and on average 4.6 when asked how frequently they get valuable suggestion for their research projects from others. This indicates some self-reported importance of networking activities for the scientists' project decisions. Moreover, in pre-test and feedback interviews the importance of feedback and networks in scientists' decisions was confirmed. Comments included: "If my family wasn't there it would simply be more difficult", "I always talk to people, within or outside the group. [...] Of course I feel better if I get confirmation", and "One needs to find a balance between the opinions of people who have more experience [...] but on the other hand, if you are convinced that it works, you can also continue". All interviewees stated that it is very important for them to speak about research ideas and important project decisions with colleagues, and that support from family and friends (strong ties) is also important, particularly when research was marked by setbacks.

These quotes indicate that feedback and network parameters are crucial decision cues for scientists. The effectiveness of the manipulations in the experiment is further supported by the fact that highly significant (direct and/or interaction) effects for all decision parameters presented on the scientists' persistence decisions were found (see below).

Finally, one may argue that the scientist of the sample do not draw persistence decision in their real lives but that these decision are drawn by higher level managers. Interview data ensured that the scientists had considerable discretion over the decision to persist with or stop an underperforming project, and that these decisions were not drawn by others such as the head of the research group. For example, one scientist commented: "My boss suggested that I focus on another project. [...]. But then I wanted to show that this project will work out and that I had not wanted to start it without good reasons". Another one stated: "More than half of the time I had spent on these syntheses and then found out that it simply does not work. My boss wanted to motivate me to try further but I then told him that I know that he thinks it should work, but that it does not in my opinion. And that I do not want to try it further. And he accepted that."

6.4 Results

As previously published experimental studies had done (Hitt et al., 2004; Hitt, Dacin, Levitas, Arregle, & Borza, 2000) Hierarchical Linear Modelling (HLM) was used for data analysis. HLM takes into account that data points may not be independent of each other because each participant in our study performed 32 decision tasks, and decision models of individuals likely differ. HLM accommodates autocorrelation ("individual-level variance") and potential heteroskedasticity of data (Bryk & Raudenbush, 1992) and is therefore the state-of-the-art method to evaluate conjoint data

(e.g., Patzelt et al., 2008). In the data of this study, only 10.6 % of the total decision variance is due to differences between individuals, but 89.4 % is at the level of decisions.

The HLM results are presented in Table 8. For each attribute the standardized coefficient, the corresponding standard error, the t-ratio as well as the level of significance, indicated by the asterisks, is reported.

Evaluation criteria	Coefficient	Standard error	t-ratio
Intercept	3.796	0.090	42.395***
Main effects			
Feedback	1.957	0.140	13.947***
Network size	-0.026	0.069	-0.371
Network density	0.683	0.092	7.428***
Strength of ties	0.423	0.092	4.572***
Communication frequency	1.038	0.126	8.236***
Interaction effects			
Feedback x Network size	0.179	0.083	2.148**
Feedback x Network density	0.233	0.066	3.516***
Feedback x Strength of ties	-0.061	0.099	-0.616
Feedback x Communication frequency	0.571	0.132	4.334***

*p<.05; **p<.01; ***p<.001; n=1632 decisions nested within 51 scientists

Table 8: Scientists' decisions to persist with underperforming R&D projects

Table 8 shows that all attributes are significantly different from zero and thus used by managers to assess the likelihood of allocating further resources to an underperforming R&D project with the exception of network size. That is, scientists' likelihood of persisting with underperforming R&D projects increases with (i) more positive feedback received, (ii) higher network density, (iii) stronger network ties, and (iv) more frequent communication with network partners. Thus, Hypotheses 1 which

predicted a positive relationship between more positive feedback and persistence is supported.

However, the theory of this article predicted that scientists' persistence decisions are more complex and that the effect of feedback is moderated by network size, network density, tie strength, and communication frequency. Table 8 shows that three out of four hypothesized interactions are significant. Since there is no significant interaction between feedback and strength of ties, Hypothesis 4 is not supported. To fully understand the significant interactions of feedback with network size, network density, and communication frequency, they were plotted on a y axis of likelihood of persistence and an x axis of feedback and plots representing high and low network size/network density/communication frequency (Cohen & Cohen, 1983). Figure 8 A-C illustrate these interactions.

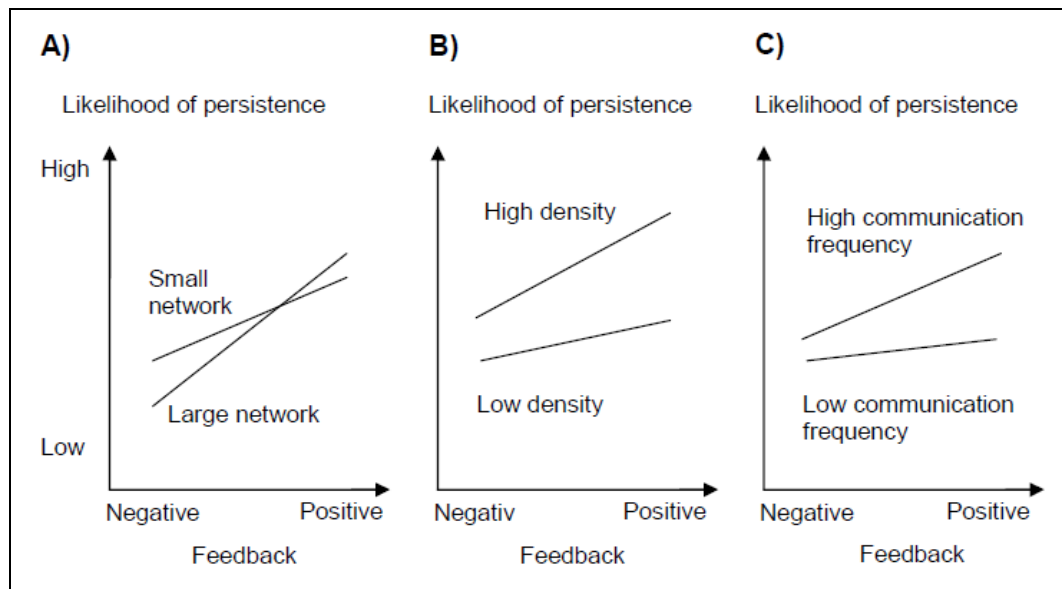


Figure 8: Interactions of feedback with (A) network Size, (B) network density, and (C) communication frequency

Source: Own illustration

Figure 8A demonstrates that the likelihood that scientists persist with an underperforming R&D project increases with more positive feedback received from network partners, and this relationship is stronger when the network is large than when it is small. Figure 8B demonstrates that the likelihood that scientists persist with an underperforming R&D project increases with more positive feedback received from network partners, and this relationship is stronger when the network density is high than when it is low. Finally, Figure 8C shows that the likelihood that scientists persist with an underperforming R&D projects increases with more positive feedback received from network partners, and this relationship is stronger when communication frequency is high than when it is low. The nature of these significant interactions provides support for Hypotheses 2, 3, and 5.

6.5 Discussion and conclusion

The purpose of this article was to analyze how personal networks can lead decision makers to persist with underperforming R&D projects. Drawing on aspiration level theory and the network literature the article suggested that more positive feedback from network partners motivates decision makers to persist, and that this effect is contingent on network structure and communication. By drawing on an experimental design and conjoint analysis decision makers were found to more likely persist with underperforming projects when they receive more positive feedback, and that this effect is stronger in larger and denser networks, and in networks with higher communication frequency.

These results extend the literature on the persistence of underperforming projects by focusing on the social environment as so far empirically under-explored factor

(Sabherwal et al., 2003) which, partly, explains why some decision makers persist with underperforming projects while others do not. Scholars have identified four categories of factors influencing persistence with a failing course of action (Staw & Ross, 1987) which have been further investigated in the project management literature. First, project factors describe the properties of the project and include its innovativeness, life cycle stage, success probability, outcome potential, and sunk costs (Arkes & Ayton, 1999; Balachandra, 1980, 1984; Hsee et al., 2003; Schmidt & Calantone, 2002). Second, psychological factors result from the decision makers' unwillingness to admit that previous decisions have been wrong (Garland, 1990) and responsibility for the project (Schmidt & Calantone, 2002). Third, structural factors refer to the context of the project and include top management support, predetermined decision rules, and the development of the organization (Balachandra, 1980, 1984; Boulding et al., 1997). Finally, social factors denote the social environment of the decision maker. While research has described norms for consistency of actions (Staw, 1981), public identification with the project (Ross & Staw, 1993), and information source credibility (Schmidt & Calantone, 2002) as social factors encouraging project persistence, it has not yet examined how characteristics of the feedback received and the structure of the network impact persistence. This study shows that decision makers' perceptions of their social network structure determine, in part, their reactions to feedback from network partners and their decisions to persist with underperforming R&D projects.

The finding that the impact of feedback on the managers' decision policies is contingent on network structure and communication frequency within the network emphasizes moderating relationships rather than direct relationships of factors for explaining the behaviour of network actors. Most existing studies have focused on direct relationships. For instance, two recent studies found that feedback from network

partners and communication with those partners (Cross & Spoull, 2004), as well as network size and density (Mehra et al., 2006) impact actors' behaviours, but contingent relationships have not been investigated by these authors. It appears that going forward researchers make important contributions to the literature and enhance our understanding of networking effects when they investigate how feedback and/or network parameters *conjointly*, rather than independently, explain variance in the decisions and behaviours of network actors.

In contrast to many network studies that have emphasized the beneficial effects of networking activities such as fast and efficient access to complementary resources (Dubini & Aldrich, 1991; Starr & MacMillan, 1990; Uzzi, 1997; van Burg, Romme, Gilsing, & Reymen, 2008) and information (Granovetter, 1974; Hansen, 1999; Ibarra & Andrews, 1993), this work has also implications for the potential downside of networking activities. Existing studies have identified downside effects of extensive networking activities such as high coordination and governance costs (see Gulati, 1998; Lechner, Dowling, & Welpel, 2006) but not investigated how networking activities influence persistence of underperforming projects. Research on persistence has emphasized that underperforming projects can lead to substantial financial losses for organizations without yielding the desired benefits (Ross & Staw, 1986, 1993). In organizations pursuing R&D activities, the danger of huge losses is substantial because (i) R&D expenses can amount to many millions of \$US, and (ii) the failure rates of innovative projects are often high (DiMasi et al., 2003; Evans & Varaiya, 2003). Thus, it is important that decision makers terminate underperforming R&D projects timely. This article suggests that the danger of over-commitment and potential financial loss is high for decision makers who are embedded in a social network through which they receive feedback on their projects (Dasgupta & David, 1994; Dittrich & Duysters, 2007;

McMillan & Narin, 2000). Increasing network size and density and high communication frequency further enhance the impact of feedback on the manager's decision policies which can be dangerous when the project underperforms.

While three of the hypothesized moderating relationships were found in the data, contrary to expectation that data did not reveal that stronger ties enhance the impact of feedback on persistence. Although there was a positive direct effect of tie strength on the decision maker's tendency to persist with an underperforming project (see Table 8), this effect appears independent of the nature of feedback the decision maker receives. That is, decision makers are similarly likely to persist if they receive feedback in a strong or weak tie network. One explanation may be that on the one hand (as our theory suggested) richer information (Coleman, 1990; Coleman, 1988), increased trust (Burt, 2005; Coleman, 1988), and more peer pressure (Krackhardt, 1992) associated with stronger ties enhance the impact of feedback on persistence, but that on the other hand decision makers can better deal with the consequences of not paying attention to feedback from strong tie partners. For example, if the decision maker persists but fails in the end although a friend recommended discontinuing the project, this close relationship may give the decision maker the opportunity to explain her or his decision to the friend afterwards and perhaps give the friend insight into personal motivations and emotions that triggered the decision. To a less well known person (a weak tie), the decision maker may have fewer opportunities and be less willing to explain her or his behaviour and deviance from the recommendation received.

This study has implications for practice. First, with respect to R&D managers, the results of the study can help them to better understand their own decision policies and therefore make better and more accurate decision. Decision biases are frequent when managers have to decide whether to persist with or discontinue an

underperforming project (Staw & Ross, 1987), and due to these biases the managers often do not understand their own decisions. Specifically, this study demonstrates to managers engaging in large and dense networks and communicating frequently with their network partners that they are strongly influenced by the feedback they receive. These managers should be aware about the network effects and consciously pay attention to other, non-network related factors (e.g., project characteristics) that are important for project persistence decisions.

Second, the results are also insightful for top managers because they demonstrate how the strategy of the firm with respect to dissemination of R&D results and involvement in the scientific community influences the firm's R&D expenditures. Some firms keep scientific results secret and only a limited scientific network is entertained to avoid expropriation of knowledge, while scientists of other firms frequently publish in journals and are involved in the scientific community. This study indicates that the latter are more likely to persist with projects that are underperforming, and top management may impose stricter controls on the usage of financial resources in this case in order to counteract the scientists' and R&D managers' tendency to persist with and perhaps over-commit to underperforming projects.

Implications for future research arise from the limitations of the study. First, the study was conducted in a specific setting, namely public research institutions. While, as mentioned earlier, it appears that this setting provides interesting insights also for private corporations, future research must show whether the findings are generalizable to the private sector. For example, in firms budget management is likely more restrictive and performance-based than in public research institutes, and this may decrease the likelihood that R&D managers persist with underperforming projects.

Second, the purpose of this research was to analyze how differences in the decision makers' scientific networks impact their persistence decisions ("decision-level variance"), but not to analyze how decision makers differ in their assessments of decision situations ("individual-level variance"). However, 10.6 % of the total variance in persistence decisions in the data was at the level of the individual. Future research could analyze this variance by describing hypothetical projects in absolute terms of (financial or strategic) performance, or in comparison to some benchmark projects.

Finally, this article assumed that persistence decisions are based on the performance aspirations of the decision maker, but other factors external to the model presented are also known to influence go/no-go decisions of organizational projects. For example, Boulding, et al. (1997) found that predetermined decision rules for go/no go decisions as well as the integration of a new decision maker at the time of the decision can influence persistence decisions and counteract commitment. Further, research has identified success probability, budget limitations, degree of innovation, top management support, the decision maker's need to appear rational, and other factors as influencing persistence (Balachandra, 1980, 1984; Staw & Ross, 1987). Moreover, various studies have demonstrated that the level of sunk costs is critical for persistence decisions (Arkes & Ayton, 1999; Soman, 2001). Researchers can make important contributions by investigating how these factors and their interactions affect decision makers' tendency to persist.

In conclusion, this study suggests that decision makers' likelihood to persist with underperforming R&D projects is influenced by their social networks. Drawing on aspiration level theory and field experiment data this article showed that more positive feedback from network partners encourages persistence, and that this effect is even stronger when the network size, network density, and communication frequency

increase. These findings help decision makers to draw more accurate decisions by better understanding their decision policies, and they extend the literatures on project management and networks.

7 Conclusions and new avenues of research on affect and cognition in innovation and entrepreneurship

In this thesis I introduced five empirical studies which investigated important and cutting-edge issues of research on cognition and affect in innovation and entrepreneurship. I took into account perspectives of various actors in this field, such as entrepreneurs, employees of young start-up firms, and innovation project managers. As a method I employed conjoint analyses in order to investigate the actors' decision making. In the following section 7.1, I conclude this thesis by summarizing the results of the five studies and the contributions I made to the scientific literature. In section 7.2, I will suggest new avenues for research on affect and cognition in the innovation and entrepreneurship context.

7.1 Summary of results and contributions

The goal of this thesis is to gain insight into decision making of actors in uncertain environments, such as in entrepreneurship and innovation. I employ conjoint analysis in order to investigate the actual decision making process of various actors in the entrepreneurship and innovation context.

In chapter 2, 3, and 4, I focus on different cognitive factors and their impact on the entrepreneurial decision to exploit new business opportunities. These three chapters build the core of this thesis. In chapter 2, I investigate how the experience to found a business impacts the firm environment-exploitation relationship. I can show that in a heterogeneous environment experienced entrepreneurs tend to focus on the nature of the opportunity (customer demand and technology development) and on the flexibility (stakeholder support) to exploit the opportunity. Contrarily, less experienced entrepreneurs focus on the efficiency in exploitation (managerial capabilities) when

facing a heterogeneous environment. Most existing studies employ broader measures when investigating the environment's impact on the new venture, such as the organization's structure (Katz & Kahn, 1966; Pennings, 1975; Thompson, 1967), innovative activities (Miller, 1983), export activities (Zahra et al., 1997), and firm performance (Wiklund & Shepherd, 2005). Our knowledge on the firm environment's impact on entrepreneurs' actual decision making process is still limited. I fill this gap by looking at the entrepreneurs' decision to exploit an opportunity, the perceived external heterogeneity and the entrepreneurs' founder experience. I show that the experience in founding a business, and thus the development of expert scripts (Mitchell et al., 2000) and prototypes (Baron & Ensley, 2006), plays a crucial role in the environment-exploitation relationship. Furthermore, I add to existing literature by investigating three-way-interactions between firm environment, founder experience, and emphasis placed on the availability of resources. This way, I provide a finer-grained picture of decision policies of entrepreneurs.

In chapter 3, I focus on the impact of affective states on entrepreneurial decision making (Baron, 2004). My model acknowledges that entrepreneurs' passion can be more or less harmonious and more or less obsessive (Vallerand et al., 2003). I can show that the impact of these types of passion on entrepreneurs' exploitation decisions is contingent on the level of experienced, non-passion related excitement. The study adds to existing literature on entrepreneurial affect. It is widely acknowledged that passion plays an important role in entrepreneurship and the behavior of entrepreneurs (e.g., Cardon et al., 2009; Cardon et al., 2005; Chang, 2001b; Smilor, 1997). I present the first empirical study to investigate how entrepreneurs' passion for work influences their decision making. Further, I distinguish between harmonious and obsessive passion according to Vallerand et al. (2003) and find that both kinds of passion have different

impacts on the entrepreneurial decision to exploit an opportunity. Additionally, studies on entrepreneurial affect have widely neglected potential interactions between affective experiences in entrepreneurial decision making. I am able to show that an interactive effect of non-passion related positive affect (excitement) and obsessive passion on entrepreneurs' decision to exploit opportunities exists. Doing so, I take into account that individuals can have affective experiences simultaneously (Frijda et al., 1991; Sherer & Tannenbaum, 1986; Weiss & Cropanzano, 1996) and acknowledge that the relationship between experienced affect and entrepreneurial decision making is more complex as previously assumed. Additionally, my study methodologically contributes to the management and entrepreneurship literatures since it, to the best of my knowledge, presents the first empirical study directly manipulating entrepreneurial affect by exposing entrepreneurs to affect-inducing pictures (Lang et al., 2005) during a decision making task.

Chapter 4 investigates another possible affective state impacting the entrepreneurs' decision making. Entrepreneurs are known to experience substantial levels of stress (Boyd & Gumpert, 1983a; Boyd & Webb, 1982; Buttner, 1992). I draw on the affect-as-information perspective and find that higher levels of job stress increase the likelihood that entrepreneurs will enter full scale exploitation of an opportunity. I support findings by Jamal (1997), Rahim (1996), and Theo and Foo (1997) and show that entrepreneurs can cope well with stress and that stress motivates rather than demotivates entrepreneurs to exploit opportunities. However, in line with Karasek (1979), I also propose that stress can cause exhaustion, depression, and job / life dissatisfaction and can lead to withdrawal from action. I add to the existing literature in extending Karasek's model and showing that the entrepreneurs' fear of failure moderates the job stress-exploitation relationship. Further, I emphasize that a trait-like

affect, such as fear of failure, and a transient affective state, such as stress at work, conjointly impact decision making.

In chapter 5, I switch the perspective from entrepreneurs that experience a certain affective state, namely entrepreneurial passion, to the employees of new ventures who perceive the passion of entrepreneurs they work with. I find that perceived entrepreneurial passion (Cardon et al., 2009) increases the commitment of employees to the new venture. Further, the study indicates that this relationship between entrepreneurs' displays of passion and employees' commitment can be enhanced when goals of the entrepreneur and employees align. I add to the literature on entrepreneurial passion as I show that entrepreneurial passion can impact not only the entrepreneur him- or herself but also the employees of the new venture. Further, I highlight the entrepreneur's role as a leader of new venture employees and the role of affective displays at the work place.

In the final study, presented in chapter 6, I analyze how personal networks can lead project managers to persist with underperforming R&D projects. I find that decision makers more likely persist with underperforming projects when they receive positive feedback than when they receive negative feedback from network partners. This effect is stronger in larger and denser networks, and in networks with higher communication frequency. The study adds to literature on persistence in underperforming projects as I focus on one, so far neglected, factor: the characteristics of the personal network (Sabherwal et al., 2003), which partly explains why some individuals persist with underperforming projects while others do not. Furthermore, while previous studies focus on direct impacts of feedback or network characteristics on individuals' behaviors (Cross & Spoull, 2004; Mehra et al., 2006), I focus on contingent relationships of these two factors. Additionally, I highlight a potential dark side of social

networks as research on persistence has demonstrated that over-commitment to underperforming projects can lead to substantial financial losses for organizations without yielding the desired benefits (Ross & Staw, 1986, 1993).

7.2 New research avenues

As I argued in the beginning of this thesis, innovation and entrepreneurship are important motors of economic growth. Innovators and entrepreneurs introduce new ideas to the market and thereby ‘creatively destroy’ existing patterns of the industry (Schumpeter, 1942). In this thesis I concentrate on the decision making of entrepreneurs, employees in new ventures and project managers. It is important to investigate their decision making to increase understanding in the decision making process and to provide practical implications.

This thesis contributes to existing knowledge on decision making and judgment in the entrepreneurship and innovation context. Each of the empirical studies presented in this thesis has its own limitations and the respective suggestions for further research are described in each chapter. However, there are other fields for scholars to explore. I will conclude my thesis by suggesting new research avenues in the field of entrepreneurship, innovation and cognition.

Innovation and entrepreneurship represent a highly uncertain and complex world (Knight, 1921) and hence an appropriate field to investigate how heuristics and decision making biases impact decision making. In a next step, scholars could concentrate on long-term effects of entrepreneurs’ affective states and its impact on the success of their ventures. For example, the existing data presented in chapter 3 and 4 could be extended by a follow-up survey after a certain amount of time to investigate whether increased harmonious passion or increased job stress still persists and whether these affective

states influence the likelihood of venture success. This could answer the question whether an increased likelihood to exploit an opportunity due to increased positive affect or stress appears to be a successful strategy or whether it is likely to lead to venture failure due to hasty decision making. Another interesting topic within this research stream could be the differences among entrepreneurs in the ability to control their affective states. It may be that entrepreneurs who are more likely influenced by their affective state face venture failures more often than entrepreneurs that are better able to control their affective states and are thus less likely to be influenced by their affect (Grandey, 2000; Hochschild, 1983).

Further, it is well known that entrepreneurs often found new ventures in a team. Entrepreneurship research on affect could concentrate on this phenomenon and investigate the impact of affective states on decision making or behavior in a team of entrepreneurs (e.g., George, 1990). Similarly to the study presented in chapter 5, researchers could investigate how displayed entrepreneurial passion of one entrepreneur affects the commitment of other members of the team. Also, the process of emotional contagion among the team members deserves close examination. Does emotional contagion in an entrepreneurial team take place? And which factors increase emotional contagion in a team of entrepreneurs? Another interesting research question could be whether prosocial behavior and team cohesion is impacted by displayed positive affective states (e.g., George, 1990, 1991, 1995) of one or more members of the team.

Finally, other methods of mood induction (such as for example by showing movies, playing music, medication, and hypnosis, Gerrards-Hesse, Spies, & Hesse, 1994) can be used to investigate further affective states and their impact on entrepreneurial decision making. For example, entrepreneurs experience grief about a loss of a business (Shepherd, 2003, 2009). Shepherd (2009) examines the recovery

process after the loss of a family business. But what if entrepreneurs start a new venture to soon, before they could recover from this grief? Will it affect their decisions regarding the new venture? Also, depression can be a consequence of experienced stress. How does this negative affective state affect entrepreneurs' and project managers' decisions? Both affective states, grief and depression, could be experimentally induced by the method of imagination or by the Velten method (Gerrards-Hesse et al., 1994). This research would shed more light on decision making and helps entrepreneurs and project managers to better understand the decision making process.

In summary, the discussion above suggests that the literature on entrepreneurial and innovation decision making gains from applying findings from cognitive and social psychology. Interdisciplinary research, as demonstrated in this thesis, offers new research avenues in a still underexplored field with plenty of opportunities for researchers. This thesis attempts to enhance our understanding of decision making in the entrepreneurship and innovation context. To investigate further issues, scholars should combine findings from the management literature with other research fields, in order to further explore this exciting road ahead.

8 References

- Acs, Z. J., & Audretsch, D. B. (1988). Innovation in large and small firms: An empirical analysis. *American Economic Review*, 78(4), 678-690.
- Acs, Z. J., & Audretsch, D. B. (1990). *Innovation in small firms*. Cambridge: MIT Press.
- Adelman, P. K., & Zajonc, R. B. (1989). Facial efference and the experience of emotion. *Annual Review of Psychology*, 40, 249-280.
- ADT. (2008). Netzwerk deutscher Innovationszentren. Retrieved March, 2008, from <http://www.adt-online.de/homepage.html>
- Aldrich, H. E. (1979). *Organization and environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Aldrich, H. E., & Auster, E. R. (1986). Even dwarfs started small: Liabilities of age and size and their strategic implications. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior* (Vol. 8, pp. 165-198). Greenwich, CT: JAI Press.
- Aldrich, H. E., & Fiol, C. M. (1994). Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19(4), 645-670.
- Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63, 1-18.
- Alloy, L. B., & Abramson, L. Y. (1979). Judgment of contingency in depressed and non-depressed students: Sadder but wiser? *Journal of Experimental Psychology: General*, 108(4), 441-485.
- Alloy, L. B., Abramson, L. Y., & Viscusi, D. (1981). Induced mood and the illusion of control. *Journal of Personality and Social Psychology*, 41(6), 1129-1140.
- Anderson, C. R. (1976). Coping behaviors as intervening mechanisms in the inverted-U stress-performance relationship. *Journal of Applied Psychology*, 61(1), 30-34.
- Ansoff, H. I. (1965). *Corporate Strategy*. New York: McGraw Hill, Inc.
- Arenius, P., & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics*, 24(3), 233-247.
- Arkes, H. R., & Ayton, P. (1999). The sunk cost and concorde effects: Are humans less rational than lower animals. *Psychological Bulletin*, 125(5), 591-600.
- Armstrong, S. J. (1979). Advocacy and objectivity in science. *Management Science*, 25(5), 423-428.
- Armstrong, S. J., Coviello, N., & Safranek, B. (1993). Escalation bias: Does it extend to marketing. *Journal of the Academy of Marketing Science*, 21(3), 247-253.
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self-scale and structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63(4), 596-612.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, 64(6), 359-372.
- Atkinson, J. W. (1966). Motivational determinants of risk-taking behavior. In J. W. Atkinson & N. T. Feather (Eds.), *A theory of achievement motivation* (pp. 11-30). New York: John Wiley and Sons.

- Atkinson, J. W., Bastian, J. R., Earl, R. W., & Litwin, G. H. (1960). The achievement avoidance motive, goal setting, and probability preferences. *Journal of Abnormal and Social Psychology, 60*(1), 27-36.
- Audretsch, D. B., Keilbach, M. C., & Lehmann, E. (2006). *Entrepreneurship and economic growth*. New York: Oxford University Press.
- Audretsch, D. B., & Stephan, P. E. (1996). Company-scientist locational links: The case of biotechnology. *The American Economic Review, 86*(3), 641-652.
- Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology, 60*, 421-449.
- Balachandra, R. (1980). How to decide when to abandon a project. *Research Management, 23*, 24-29.
- Balachandra, R. (1984). Critical signals for making Go/NoGo decisions in new product development. *Journal of Product Innovation Management, 2*, 92-100.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Baradell, J. G., & Klein, K. (1993). Relationship of life stress and body consciousness to hypervigilant decision making. *Journal of Personality and Social Psychology, 64*(2), 267-273.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120.
- Baron, J. N., & Hannan, M. T. (2002). The economic sociology of organizational entrepreneurship: Lessons from the Stanford Project on emerging companies. In V. Nee & R. Swedberg (Eds.), *The Economic Sociology of Capitalism*. New York: Russell Sage.
- Baron, R. A. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship's basic "Why" questions. *Journal of Business Venturing, 19*(2), 221-239.
- Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. *Academy of Management Perspectives, 20*(1), 104-119.
- Baron, R. A. (2007). Cognition and affect - Invaluable tools for answering "Why," "How," and "What" questions about entrepreneurs and the entrepreneurial process. In M. Minniti (Ed.), *Entrepreneurship - The Engine of Growth* (pp. 20-40). Westport, London: Praeger Perspectives.
- Baron, R. A. (2008). The role of affect in the entrepreneurial process. *Academy of Management Review, 33*(2), 328-340.
- Baron, R. A., & Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. *Management Science, 52*(9), 1331-1344.
- Barrick, M. R., & Zimmerman, R. D. (2005). Reducing Voluntary, Avoidable Turnover Through Selection. *Journal of Applied Psychology, 90*(1), 159-166.
- Barsade, S. G. (2002). The Ripple Effect: Emotional Contagion and Its Influence on Group Behavior. *Administrative Science Quarterly, 47*(4), 644-675.
- Baruch, Y., & Harel, G. (1993). Multi-source performance appraisal: An empirical and methodological note. *Public Administration Quarterly, 17*(1), 96-111.
- Bateman, T. S., O'Neill, H., & Kenworthy-U'Ren, A. (2002). A hierarchical taxonomy of top managers' goals. *Journal of Applied Psychology, 87*(6), 1134-1148.

- Baum, J. R., & Locke, E. A. (2004). The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of Applied Psychology, 89*(4), 587-598.
- Baum, J. R., Locke, E. A., & Kirkpatrick, S. A. (1998). A longitudinal study of the relation of vision and vision communication to venture growth in entrepreneurial firms. *Journal of Applied Psychology, 83*(1), 43-54.
- Baum, J. R., Locke, E. A., & Smith, K. G. (2001). A multidimensional model of venture growth. *Academy of Management Journal, 44*(2), 292-303.
- Baumol, W. J. (2002). *Free Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. Princeton, NJ: Princeton University Press.
- Benfari, R., & Knox, J. (1991). *Understanding your management style: Beyond the Myers-Briggs type indicators*. Lexington, Mass.: D.C. Heath.
- Berman, S. L., Wicks, A. C., Kotha, S., & Jones, T. M. (1999). Does stakeholder orientation matter? The relationship between stakeholder management models and firm financial performance. *Academy of Management Journal, 42*, 488-506.
- Berryman, J. (1983). Small business failure and bankruptcy: A survey of the literature. *International Small Business Journal, 1*, 47-59.
- Birch, D. (1979). *The Job Generation Process*. Cambridge, MA: MIT Program on Neighborhood and Regional Change.
- Bird, B. J. (1989). *Entrepreneurial Behavior*. Glenview, Illinois: Scott, Foresman and Company.
- Booth, R. J., & Pennebaker, J. W. (2000). Emotions and immunity. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (2nd ed.). New York: Guilford Press.
- Boulding, W., Ruskin, M., & Staelin, R. (1997). Pulling the plug to stop the new product drain. *Journal of Marketing Research, 34*, 164-176.
- Bowen, M. G. (1987). The escalation phenomenon reconsidered: Decision dilemmas or decision errors? *Academy of Management Review, 12*(1), 52-65.
- Boyd, B. K., Dess, G. G., & Rasheed, A. M. A. (1993). Divergence between archival and perceptual measures of the environment: Causes and consequences. *Academy of Management Review, 18*(2), 204-226.
- Boyd, D. P., & Gumpert, D. E. (1983a). Coping with entrepreneurial stress. *Harvard Business Review, 61*(2), 44-64.
- Boyd, D. P., & Gumpert, D. E. (1983b). *The effects of stress on early-stage entrepreneurs*. Paper presented at the Frontiers of Entrepreneurship Research - Proceedings of the Twenty-Sixth Annual Entrepreneurship Research Conference.
- Boyd, D. P., & Webb, R. J. (1982). The Coronary Costs of Choosing A Small Business Career. *American Journal of Small Business, 6*(4), 3-9.
- Bradley, M. M., Cuthbert, B. N., & Lang, P. J. (1996). Picture media and emotion: Effects of a sustained affective context. *Psychophysiology, 33*, 662-670.
- Bradley, M. M., & Lang, P. J. (1999). Fearfulness and affective evaluations of pictures. *Motivation And Emotion, 23*(1), 1-13.
- Brännback, M., Carsrud, A., Elfving, J., & Krueger, N. K. (2006). *Sex, drugs, and Entrepreneurial Passion (Abstract)*. Paper presented at the Frontiers of Entrepreneurship Research - Proceedings of the Twenty-Sixth Annual Entrepreneurship Research Conference.

- Brief, A. P., Burke, M. J., George, J. M., Robinson, B. S., & Webster, J. (1988). Should negative affectivity remain an unmeasured variable in the study of job stress? *Journal of Applied Psychology, 73*(2), 193-198.
- Brislin, R. W. (1970). Back translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 185-216.
- Broadbent, D. E. (1958). *Perception and Communication*. London: Pergamon Press.
- Brock, T. C., Albert, S. M., & Becker, L. A. (1970). Familiarity, utility, and supportiveness as determinants of information receptivity. *Journal of Personality and Social Psychology, 14*, 292-301.
- Brown, M. E., & Trevino, L. K. (2009). Leader-Follower Values Congruence: Are Socialized Charismatic Leaders Better Able to Achieve It? *Journal of Applied Psychology, 94*(2), 478-490.
- Brown, T. R. (1972). A comparison of judgmental policy equations obtained from human judges under natural and contrived conditions. *Mathematics Bioscience, 15*(3/4), 205-230.
- Brüderl, J., & Preisendörfer, P. (1998). Network support and the success of newly founded businesses. *Small Business Economics, 10*, 213-225.
- Brundin, E., Patzelt, H., & Shepherd, D. A. (2008). Manager's emotional display and employees' willingness to act entrepreneurially. *Journal of Business Venturing, 23*(2), 221-243.
- Bruning, N. S., & Snyder, R. A. (1983). Sex and position as predictors of organizational commitment. *Academy of Management Journal, 26*, 485-491.
- Brunswik, E. (1952). *The conceptual framework of psychology*. Chicago: University of Chicago Press.
- Bryk, A., & Raudenbush, S. W. (1992). *Hierarchical linear models for social and behavioral research: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Buehler, R., Griffin, D., & Ross, M. (2002). Inside the planning fallacy: The causes and consequences of optimistic time predictions. In T. Gilovich, D. Griffin & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 250-270). Cambridge: Cambridge University Press.
- Burmeister, K., & Schade, C. (2007). Are entrepreneurs' decisions more biased? An experimental investigation of the susceptibility to status quo bias. *Journal of Business Venturing, 22*(3), 340-362.
- Burt, R. (1992). *Structural Holes*. Cambridge, MA: Harvard University Press.
- Burt, R. (2005). *Brokerage & Closure*. Oxford Oxford University Press.
- Busenitz, L. W., & Barney, J. B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing, 12*(1), 9-30.
- Buttner, E. H. (1992). Entrepreneurial Stress: Is it hazardous to your health? *Journal of Managerial Issues, 4*(2), 223-240.
- Bygrave, W. D., & Zacharakis, A. (1994). *The portable MBA. in entrepreneurship*. New York: John Wiley and Sons.
- Byrne, D. (1971). *The Attraction Paradigm*. New York: Academic Press.
- Byrne, D., & Griffitt, W. (1973). Interpersonal Attraction. *Annual Review of Psychology, 24*(317-336).

- Byrne, D., Steinberg, M. A., & Schwartz, M. S. (1968). Relationship between repression-sensitization and physical illness. *Journal of Abnormal Psychology*, 73(2), 154-155.
- Cacioppo, J. T., & Petty, R. E. (1979). Effects of message repetition and position on cognitive response, recall, and persuasion. *Journal of Personality & Social Psychology*, 37(1), 97-109.
- Cacioppo, J. T., & Petty, R. E. (1989). Effects of message repetition on argument processing, recall, and persuasion. *Basic & Applied Social Psychology*, 10(1), 3-12.
- Campbell, C. A. (1992). A decision theory model for entrepreneurial acts. *Entrepreneurship: Theory & Practice*, 17(1), 21-27.
- Cannon, W. B. (1915). *Bodily changes in pain, hunger, fear and rage*. New York: Appelton-Century.
- Cantner, U., & Graf, H. (2006). The network of innovators in Jena: An application of social network analysis. *Research Policy*, 35(4), 463-480.
- Cardon, M. S. (2008). Is passion contagious? The transference of entrepreneurial passion to employees. *Human Resource Management Review*, 18(2), 77-86.
- Cardon, M. S., Wincent, J., Singh, J., & Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. *Academy of Management Review*, 34(3), 511-532.
- Cardon, M. S., Zietsma, C., Saparito, P., Matherne, B. P., & Davis, C. (2005). A tale of passion: New insights into entrepreneurship from a parenthood metaphor. *Journal of Business Venturing*, 20(1), 23-45.
- Carmody, J., Baer, R. A., Lykins, E. L. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal of Clinical Psychology*, 65(6), 613-626.
- Carver, C. S. (2003). Pleasure as a sign you can attend something else: Placing positive feelings within a general model of affect. *Cognition and Emotion*, 17, 241-261.
- Carver, C. S., & Scheier, M. F. (2001). *On the Self-regulation of Behavior*. Cambridge, UK: Cambridge University Press.
- Caves, R. E. (1998). Industrial organization and new findings on the turnover and mobility of firms. *Journal of Economic Literature*, 36, 1974-1982.
- Chandler, A. D. (1962). *Strategy and Culture*. Cambridge, MA: MIT Press.
- Chang, R. (2001a). *The Passion Plan at Work*. San Francisco: Josey-Bass.
- Chang, R. (2001b). Turning passion into organizational performance. *Training & Development*, 55(5), 104-111.
- Charlesworth, E. A., Murphy, S., & Beutler, L. E. (1981). Stress management skill for nursing students. *Journal of Clinical Psychology*, 37(2), 284-290.
- Chay, Y. W. (1993). Social support, individual differences and well-being: A study of small business entrepreneurs and employees. *Journal of Occupational and Organizational Psychology*, 66(4), 285-302.
- Chen, X.-P., Yao, X., & Kotha, S. (2009). Entrepreneur passion and preparedness in business plan presentations: A persuasion analysis of venture capitalists' funding decisions. *Academy of Management Journal*, 52(1), 199-214.

- Chen, Z. X., Aryee, S., Lee, C., & Hui, C. (2005). Processes linking perceived leader-subordinate goal similarity to subordinate performance. *Academy of Management Best Conference Paper 2005 OB*, F1-F6.
- Child, J. (1972). Organizational structure, environment and performance: The role of strategic choice. *Sociology*, 6(1), 2-22.
- Cho, T. S., & Hambrick, D. C. (2006). Attention as the mediator between top management team characteristics and strategic change: The case of airline deregulation. *Organization science*, 17(4), 453-469.
- Choi, Y. R., & Shepherd, D. A. (2004). Entrepreneurs' decisions to exploit opportunities. *Journal of Management*, 30(3), 377.
- Clarkson, M. B. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review*, 20(1), 92-117.
- Codispoti, M., Bradley, M. M., & Lang, P. J. (2001). Affective reactions to briefly presented pictures. *Psychophysiology*, 38(3), 474-478.
- Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Colbert, A. E., Kristof-Brown, A. L., Bradley, B. H., & Barrick, M. R. (2008). CEO transformational leadership: The role of goal importance congruence in top management teams. *Academy of Management Journal*, 51(1), 81-96.
- Coleman, J. (1990). *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, 95-120.
- Collis, D. J. (1994). How valuable are organizational capabilities? *Strategic Management Journal*, 15(Special Issue: Competitive Organizational Behavior (Winter, 1994)), 143-152.
- Conroy, D. E. (2001). Progress in the development of a multidimensional measure of fear of failure: The performance failure appraisal inventory (PFAI). *Anxiety, Stress & Coping*, 14(4), 431-455.
- Conroy, D. E., Willow, J. P., & Metzler, J. N. (2002). Multidimensional fear of failure measurement: The performance failure appraisal inventory. *Journal of Applied Sport Psychology*, 14(2), 76 - 90.
- Constable, J. F., & Russell, D. W. (1986). The effect of social support and the work environment upon burnout among nurses. *Journal of Human Stress*, 12(1), 20-26.
- Cooper, C. L., & Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental ill health. *Journal of Occupational Psychology*, 49(1), 11-28.
- Cooper, C. L., & Smith, M. (1985). *Job stress and blue collar work*. Chichester, England: Wiley.
- Cosmides, L., & Tooby, J. (1992). Cognitive adaptations for social exchange. In J. Barkow, L. Cosmides & J. Tooby (Eds.), *The Adapted Mind* (pp. 163-228). New York: Oxford University Press.
- Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10(1), 75-87.

- Cronkite, R. C., & Moos, R. H. (1995). Life context, coping processes, and depression. In E. E. Beckham & W. R. Leber (Eds.), *Handbook of depression* (2nd ed., pp. 569-587). New York: Guilford Press.
- Cross, R., & Spoull, L. (2004). More than an answer: Information relationships for actionable knowledge. *Organization Science*, *15*(4), 446-462.
- Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Das, T. K., & Teng, B.-S. (2001). A risk perception model of alliance structuring. *Journal of International Management*, *7*(1), 1-29.
- Dasgupta, P., & David, P. A. (1994). Toward a new economics of science. *Research Policy*, *23*(5), 487-521.
- David, J. P., Green, P. J., Martin, R., & Suls, J. (1997). Differential Roles of Neuroticism, Extraversion, and Event Desirability for Mood in Daily Life: An Integrative Model of Top-Down and Bottom-Up Influences. *Journal of Personality and Social Psychology*, *73*(1), 149-159.
- Davis, M. H. (1985). Perceptual and affective reverberation components. In A. B. Goldstein & G. Y. Michaels (Eds.), *Empathy: Development, training, and consequences* (pp. 62-108). Hillsdale, NJ: Erlbaum.
- Deeds, D. L. (2001). The role of R&D intensity, technical development and absorptive capacity in creating entrepreneurial wealth in high technology start-ups. *Journal of Engineering and Technology Management*, *18*(1), 29-47.
- Deshpande, S. P., & Golhar, D. Y. (1994). HRM practices in large and small manufacturing firms: A comparative study. *Journal of Small Business Management*, *32*(2), 49-56.
- Dess, G. G., & Beard, D., W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly*, *29*, 52-73.
- Dess, G. G., Lumpkin, G. T., & Covin, J. G. (1997). Entrepreneurial strategy making and firm performance: Tests of contingency and configurational models. *Strategic Management Journal*, *18*(9), 677-695.
- DiMasi, J. A., Hansen, R. W., & Grabowski, H. G. (2003). The price of innovation: New estimates of drug development costs. *Journal of Health Economics*, *22*(2), 151-185.
- Dittrich, K., & Duysters, G. (2007). Networking as a means to strategy change: The case of open innovation in mobile telephony. *Journal of Product Innovation Management*, *24*(6), 510-521.
- Dixit, A. K., & Pindyck, R. S. (1994). *Investment under uncertainty*. Princeton, NJ: Princeton University Press.
- Douglas, E. J., & Shepherd, D. A. (2000). Entrepreneurship as a utility maximizing response *Journal of Business Venturing*, *15*(3), 231-251.
- Downey, H. K., & Slocum, J. W. (1982). Managerial uncertainty and performance. *Social Science Quarterly*, *63*, 195-207.
- Dreman, D. (2003). Editorial Comentary: Bubble Jr. *Journal of Behavioral Finance*, *4*(4), 188-190.
- Dreman, D. (2004). The influence of affect on investor decision-making. *Journal of Behavioral Finance*, *5*(2), 70-74.

- DS Media GmbH. (2009). Deutsche startups. Retrieved March 12, 2009, from www.deutsche-startups.de
- Dubini, P., & Aldrich, H. E. (1991). Personal and extended networks are central to the entrepreneurial process. *Journal of Business Venturing*, 6, 305-313.
- Duclos, S. E., Laird, J. D., Schneider, E., Sexter, M., Stern, L., & Van Lighten, O. (1989). Emotion-specific effects of facial expressions and postures on emotional experiences. *Journal of Personality and Social Psychology*, 57, 100-108.
- Duley, A. R., Conroy, D. E., Morris, K., Wiley, J., & Janelle, C. M. (2005). Fear of failure biases affective and attentional responses to lexical and pictorial stimuli. *Motivation & Emotion*, 29(1), 1-17.
- Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17, 313-327.
- Dunne, T., Roberts, M., & Samuelson, L. (1988). Patterns of firm entry and exit in US manufacturing industries. *Rand Journal of Economics*, 19, 495-515.
- DuToit, D. F. (1980). Confessions of a successful entrepreneur. *Harvard Business Review*, Nov-Dec, 44-48.
- Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*, 23(4), 660-679.
- Eisenhardt, K. M. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 32(3), 543-576.
- Eisenhardt, K. M., & Bourgeois, I., L.J. (1988). Politics of strategic decision making in high-velocity environments: Towards a midrange theory. *Academy of Management Journal*, 31(4), 737-770.
- Eisenhardt, K. M., Kahwajy, J. L., & Bourgeois, I., L. J. (1997). How management teams can have a good fight. *Harvard Business Review*, 75(4), 77-85.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 72(1), 218-232.
- Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 76(4), 628-644.
- Engle, E. M., & Lord, R. G. (1997). Implicit theories, self-schemas, and leader-member exchange. *Academy of Management Journal*, 40(4), 988-1010.
- Epstude, K., & Mussweiler, T. (2009). What you feel is how you compare: How comparisons influence the social induction of affect. *Emotion*, 9(1), 1-14.
- Erez, A., Misangyi, V. F., Johnson, D. E., LePine, M. A., & Halverson, K. C. (2008). Stiring the hearts of followers: Charismatic leadership as the transferal of affect. *Journal of Applied Psychology*, 93(3), 602-615.
- Evan, W. M. (1966). The organization set: Toward a theory of organizational relations. In J. D. Thompson (Ed.), *Approaches to Organizational Design* (pp. 175-190). Pittsburgh, PA: University of Pittsburgh Press.
- Evans, A. G., & Varaiya, N. P. (2003). Assessment of a biotech market opportunity. *Entrepreneurship Theory and Practice*, 28(1), 87-105.

- Feist, G. J., Bodner, T. E., Jacobs, J. F., Miles, M., & Tan, V. (1995). Integrating top-down and bottom-up structural models of subjective well-being: A longitudinal investigation. *Journal of Personality and Social Psychology, 68*(1), 138-150.
- Fiol, C. M. (1991). Managing culture as a competitive resource: An identity-based view of sustainable competitive advantage. *Journal of Management, 17*(1), 191-211.
- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health & Social Behavior, 21*(3), 219-239.
- Folkman, S., & Lazarus, R. S. (1988). Coping as mediator of emotion. *Journal of Personality and Social Psychology, 54*(3), 466-475.
- Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology, 50*(5), 992-1003.
- Foo, M.-D., Uy, M. A., & Baron, R. A. (2009). How do feelings influence effort? An empirical study of entrepreneurs' affect and venture effort. *Journal of Applied Psychology, 94*(4), 1086-1094.
- Forbes, D. P. (2005). Are some entrepreneurs more overconfident than others? *Journal of Business Venturing, 20*(5), 623-640.
- Forgas, J. P. (1995). Mood and judgment: The affect-infusion-model (AIM). *Psychological Bulletin, 117*(1), 39-66.
- Forgas, J. P., & Bower, G. H. (1987). Mood effects on person-perception judgments. *Journal of Personality and Social Psychology, 53*(1), 53-60.
- Forgas, J. P., Bower, G. H., & Krantz, S. E. (1984). The influence of mood on perceptions of social interactions. *Journal of Experimental Social Psychology, 20*(6), 497-513.
- Forgas, J. P., Bower, G. H., & Moylan, S. J. (1990). Praise or blame? Affective influences on attributions for achievement. *Journal of Personality and Social Psychology, 59*(4), 809-819.
- Fox, F., & Staw, B. M. (1979). The trapped administrator: The effects of job insecurity and policy resistance upon commitment to a course of action. *Administrative Science Quarterly, 24*(3), 449-471.
- Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology, 2*(3), 300-319.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology - The broaden-and-built theory of positive emotions. *American Psychologist, 56*(3), 218-226.
- Fredrickson, J. W. (1985). Effects of decision motive and organizational performance level on strategic decision processes. *Academy of Management Journal, 28*(4), 821-843.
- Freeman, R. E. (1984). *Strategic managment: A stakeholder perspective*. Englewood Cliffs, NJ: Prentice-Hall.
- French, J. R. P., & Raven, B. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in Social Power*. Ann Arbor, MI: University of Michigan Press.
- Frijda, N. H., Mesquita, B., Sonnemans, J., & van Goozen, S. (1991). The duration of affective phenomena or emotions, sentiment and passions. In K. T. Strongman (Ed.), *International Review of Studies on Emotions* (Vol. 1, pp. 187-225). Chichester: John Wiley and Sons.

- Fritz, C., & Sonnentag, S. (2009). Antecedents of day-level proactive behavior: A look at job stressors and positive affect during the workday. *Journal of Management*, 35(1), 94-111.
- Galbraith, J. (1973). *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Gambetta, D. (1988). Can we trust trust? In D. Gambetta (Ed.), *Making and breaking cooperative relations*. New York: Blackwell.
- Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology*, 75(6), 728-732.
- George, J. M. (1990). Personality, affect, and behavior in groups. *Journal of Applied Psychology*, 75(2), 107-116.
- George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology*, 76(2), 299-307.
- George, J. M. (1995). Leader positive mood and group performance: The case of customer service. *Journal of Applied Social Psychology*, 25(9), 778-794.
- George, J. M. (2000). Emotions and leadership: The role of emotional intelligence. *Human Relations*, 53(8), 1027-1055.
- George, J. M., & Bettenhausen, K. (1990). Understanding prosocial behavior, sales performance, and turnover: A group-level analysis in a service context. *Journal of Applied Psychology*, 75(6), 698-709.
- Geroski, P. A. (1995). What do we know about entry? *International Journal of Industrial Organization*, 13(4), 421-440.
- Gerrards-Hesse, A., Spies, K., & Hesse, F. W. (1994). Experimental inductions of emotional states and their effectiveness: A review. *British Journal of Psychology*, 85, 55-78.
- Gigerenzer, G. (1996a). On narrow norms and vague heuristics: A reply to Kahneman and Tversky (1996). *Psychological Review*, 103(3), 592-596.
- Gigerenzer, G. (1996b). Rationality: Why social context matters. In P. B. Baltes & U. Staudinger (Eds.), *Interactive minds: Life-span perspectives on the social foundation of cognition* (pp. 319-346). Cambridge: Cambridge University Press.
- Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the fast and frugal way: Models of bounded rationality. *Psychological Review*, 103(4), 650-669.
- Gimeno, J., Folta, T. B., Cooper, A. C., & Woo, C. Y. (1997). Survival of the fittest? Entrepreneurial human capital and the persistence of underperforming firms. *Administrative Science Quarterly*, 42(4), 750-783.
- Grandey, A. A. (2000). Emotion Regulation in the Workplace: A New Way to Conceptualize Emotional Labor. *Journal of Occupational Health Psychology*, 5(1), 95-110.
- Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360-1380.
- Granovetter, M. (1974). *Getting a Job: A Study of Contacts and Careers*. Boston, MA: Harvard University Press.
- Granovetter, M. S. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91, 481-510.
- Grant, A. M., & Ashford, S. J. (2008). The dynamics of proactivity at work. *Research in Organizational Behavior*, 28, 3-34.

- Greve, H. R. (1998). Performance, aspirations, and risky organizational change. *Administrative Science Quarterly*, 43, 58-86.
- Greve, H. R. (2002). Sticky aspirations: Organizational time perspective and competitiveness. *Organization Science*, 13(1), 1-17.
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74(1), 224-237.
- Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition and Emotion*, 13(5), 551-573.
- Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, 19(4), 293-317.
- Guo, L. (2008). Perspective: An analysis of 22 years of research in JPIM. *Journal of Product Innovation Management*, 25, 249-260.
- Gupta, V., MacMillan, I. C., & Surie, G. (2004). Entrepreneurial leadership: developing and measuring a cross-cultural construct. *Journal of Business Venturing*, 19, 241-260.
- Hair, J. F. J., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis* (Sixth Edition ed.). Upper Saddle River, New Jersey: Pearson, Prentice Hall.
- Hambrick, D. C. (1995). Fragmentation and the other problems CEOs have with their top management teams. *California Management Review*, 37(3), 110-145.
- Hambrick, D. C., & Finkelstein, S. (1987). Managerial discretion: Bridge between polar views of organizational outcomes. *Research in Organizational Behavior*, 9, 369-406.
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193-206.
- Hammond, K. R., & Adelman, L. (1976). Science, values, and human judgment. *Science*, 194(4263), 389-397.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44, 82-111.
- Hanser, L. M., & Muchinsky, P. M. (1978). Work as an information environment. *Organizational Behavior and Human Performance*, 21(1), 47-60.
- Harris, J. A., Saltstone, R., & Fraboni, M. (1999). An evaluation of the job stress questionnaire with a sample of entrepreneurs. *Journal of Business and Psychology*, 13(3), 447-455.
- Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1992). Primitive emotional contagion. In M. S. Clark (Ed.), *Emotion and Social Behavior: Review of Personality and Social Psychology* (Vol. 14, pp. 151-177). Newbury Park, CA: Sage.
- Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1994). *Emotional contagion*. New York: Cambridge University.
- Hayward, M. L. A., Shepherd, D. A., & Griffin, D. (2006). A hybris theory of entrepreneurship. *Management Science*, 52(2), 160-172.
- Heider, F. (1958). *The psychology of interpersonal relations*. New York: John Wiley.

- Henry, J., & Cassel, J. (1969). Psychological factors in essential hypertension, recent epidemiological and animal evidence. *American Journal of Epidemiology*, 90, 171-200.
- Herold, D. M., & Greller, M. M. (1977). Feedback: The definition of a construct. *Academy of Management Review*, 20(1), 142-147.
- Herrbach, O. (2006). A Matter of Feeling? The Affective Tone of Organizational Commitment and Identification. *Journal of Organizational Behavior*, 27(5), 629-643.
- Hitt, M. A., Ahlstrom, D., Dacin, M. T., Levitas, E., & Svobodina, L. (2004). The institutional effects on strategic alliance partner selection in transition economies: China vs. Russia. *Organization Science*, 15(2), 173-185.
- Hitt, M. A., & Barr, S. H. (1989). Managerial Selection Decision Models: Examination of Configural Cue Processing. *Journal of Applied Psychology*, 74(1), 53-61.
- Hitt, M. A., Dacin, M. T., Levitas, E., Arregle, J.-L., & Borza, A. (2000). Partner selection in emerging and developed market contexts: Resource-based and organizational learning perspectives. *Academy of Management Journal*, 43(3), 449-467.
- Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2002). *Strategic entrepreneurship: Integrating entrepreneurial and strategic management perspectives*. Oxford, UK: Blackwell Publishing.
- Hitt, M. A., & Tyler, B. B. (1991). Strategic decision models: Integrating different perspectives. *Strategic Management Journal*, 12(5), 327-351.
- Hochschild, A. R. (1983). *The managed heart: Commercialization of human feeling*. Berkeley, CA: University of California Press.
- House, R. J. (1971). A path-goal theory of leader effectiveness. *Administrative Science Quarterly*, 16(3), 321-338.
- House, R. J. (1977). A 1976 theory of charismatic leadership. In J. G. Hunt & L. L. Larson (Eds.), *Leadership: The cutting edge* (pp. 189-207). Carbondale, IL: Southern Illinois University Press.
- House, R. J., & Shamir, B. (1993). Toward the integration of transformational, charismatic and visionary theories of leadership. In M. Chemers & R. Ayman (Eds.), *Leadership theory and research: Perspectives and directions* (pp. 81-107). San Diego, CA: Academic Press.
- Hsee, C. K., Zhang, J., Yu, F., & Xi, Y. (2003). Lay rationalism and inconsistency between predicted experience and decisions. *Journal of Behavioral Decision Making*, 16, 257-272.
- Huang, X., & Iun, J. (2006). The impact of subordinate-supervisor similarity in growth-need strength on work outcomes: The mediating role of perceived similarity. *Journal of Organizational Behavior*, 27(8), 1121-1148.
- Huber, J. (1987). Conjoint analysis: How we got here and where we are. Sequim, WA, mimeo.
- Humphrey, R. H. (2002). The many faces of emotional leadership. *Leadership Quarterly*, 13, 493-504.
- Iansiti, M. (1995). Shooting the rapids: Managing product development in turbulent environments. *California Management Review*, 38(1), 37-58.

- Ibarra, H., & Andrews, S. B. (1993). Power, social influence, and sense making: Effects of network centrality and proximity on employee perceptions. *Administrative Science Quarterly*, 38, 277-303.
- Ilggen, D. R., Fisher, C. D., & Taylor, M. S. (1979). Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology*, 64, 349-371.
- Innes, J. M., & Ahrens, C. R. (1991). Positive mood, processing goals and the effects of information on evaluative judgment. In J. P. Forgas (Ed.), *Emotion and Social Judgements* (pp. 221-239). Elmsford, NY: Pergamon Press.
- Ireland, R. D., Hitt, M. A., Camp, S. M., & Sexton, D. L. (2001). Integrating entrepreneurship and strategic management actions to create firm wealth. *Academy of Management Executive*, 15(1), 49-63.
- Isen, A. M. (1987). Positive affect, cognitive processes and social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 20, pp. 203-253). San Diego, CA: Academic Press.
- Isen, A. M. (1999). Positive affect and creativity. In S. Russ (Ed.), *Affect, creative experience, and psychological adjustment*. Philadelphia: Brunner/Mazel.
- Isen, A. M., & Daubman, K. A. (1984). The influence of affect on categorization. *Journal of Personality and Social Psychology*, 47(6), 1206-1217.
- Isen, A. M., Niedenthal, P. M., & Cantor, N. (1992). An influence of positive affect on social categorization. *Motivation and Emotion*, 16(1), 65-78.
- Ittner, C. D., & Larcker, D. F. (1998). Innovations in Performance Measurement: Trends and Research Implications. *Journal of Management Accounting Research*, 10, 205-238.
- Jaffe, A. B. (1989). Real effects of academic research. *The American Economic Review*, 79(5), 957-970.
- Jaffe, A. B., & Lerner, J. (2001). Reinventing public R&D: Patent policy and the commercialization of national laboratory technologies. *Rand Journal of Economics*, 32(1), 167-198.
- Jamal, M. (1997). Job stress, satisfaction, and mental health: An empirical examination of self-employed and non-self-employed Canadians. *Journal of Small Business Management*, 35(4), 48-57.
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment*. New York: The Free Press.
- Jenkins, D. C. (1971). Psychological and social precursors of coronary disease. *New England Journal of Medicine*, 284(5), 244-255.
- Johannisson, B. (1998). Personal networks in emerging knowledge-based firms: Spatial and functional patterns. *Entrepreneurship & Regional Development*, 10, 297-312.
- Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45(1), 20-31.
- Johnston, W. A., & Heinz, S. P. (1978). Flexibility and capacity demands of attention. *Journal of Experimental Psychology: General*, 107(4), 420-435.
- Jones, E. E., & Berglas, S. (1978). Control of attributions about the self through self-handicapping strategies: The appeal of alcohol and the role of underachievement. *Personality and Social Psychology Bulletin*, 4(2), 200-206.

- Jurkovich, R. (1974). A core typology of organizational environments. *Administrative Science Quarterly*, 19(3), 380-394.
- Kahn, B. E., & Isen, A. M. (1993). The influence of positive affect on variety-seeking among safe, enjoyable products. *Journal of Customer Research*, 20, 257-270.
- Karasek, R. A. (1979). Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign. *Administrative Science Quarterly*, 24(2), 285-308.
- Katz, D., & Kahn, R. L. (1966). *The Social Psychology of Organizations*. New York: Wiley.
- Kerka, F., Kriegesmann, B., Schwering, M. G., & Happich, J. (2006). "Big Ideas" erkennen und Flops vermeiden - Dreistufige Bewertung von Innovationsideen. Bochum: Institut für angewandte Innovationsforschung e.V.
- Kim, W. C., & Mauborgne, R. (2004). Blue ocean strategy. *Harvard Business Review*, 82(10), 76-84.
- Klaukien, A. (2009). Entrepreneurs' decision policies for opportunity exploitation: The role of environmental heterogeneity. Max Planck Institute of Economics, Jena, Germany, mimeo.
- Klaukien, A., Breugst, N., & Patzelt, H. (2009). Entrepreneurs' displays of passion and employees' commitment to new ventures. Max Planck Institute of Economics, Jena, Germany, mimeo.
- Klaukien, A., Patzelt, H., & Shepherd, D. A. (2009). Work stress, fear of failure, and to the decision to exploit opportunities. Max Planck Institute of Economics, Jena, Germany, mimeo.
- Klaukien, A., Shepherd, D. A., & Patzelt, H. (2009). Entrepreneurial passion for work, excitement, and the decision to exploit opportunities. Max Planck Institute of Economics, Jena, Germany, mimeo.
- Knight, F. H. (1921). *Risk, Uncertainty, and Profit*. Chicago: University of Chicago Press.
- Kobasa, S. C., Maddi, S. R., & Courington, S. (1981). Personality and constitution as mediators in the stress-illness relationship. *Journal of Health & Social Behavior*, 22(4), 368-378.
- Kobasa, S. C., Maddi, S. R., & Kahn, S. (1982). Hardiness and health: A prospective study. *Journal of Personality and Social Psychology*, 42(1), 168-177.
- Koellinger, P., Minniti, M., & Schade, C. (2007). "I think I can, I think I can": Overconfidence and entrepreneurial behavior. *Journal of Economic Psychology*, 28(4), 502-527.
- Krackhardt, D. (1992). The strength of strong ties: The importance of philos in organization. In N. Nohria & R. C. Eccles (Eds.), *Networks and Organizations: Structure, Form, and Action* (pp. 216-239). Boston, MA: Harvard Business School Press.
- Kramer, R. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology*, 50, 569-598.
- Kristof-Brown, A. L., & Stevens, C. K. (2001). Goal congruence in project teams: Does the fit between members' personal mastery and performance goals matter? *Journal of Applied Psychology*, 86(6), 1083-1095.

- Krueger, N. F. (1993). The impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability. *Entrepreneurship: Theory & Practice*, 18(1), 5-21.
- Krueger, N. F. (2000). The cognitive infrastructure of opportunity emergence. *Entrepreneurship: Theory & Practice*, 24(3), 185-206.
- Kuratko, D. F., Hornsby, J. S., & Naffziger, D. W. (1997). An examination of owner's goals in sustaining entrepreneurship. *Journal of Small Business Management*, 35(1), 24-34.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (2005). *International affective picture system (IAPS): Affective ratings of pictures and instruction manual*. Gainesville, FL: University of Florida.
- Lang, R. J., Gilpin, J. L., & Gilpin, A. R. (1990). Stress-related symptoms among dental hygienists. *Psychological Reports*, 66(3), 715-722.
- Larsen, J. T., McGraw, P. A., & Cacioppo, J. T. (2001). Can people feel happy and sad at the same time? *Journal of Personality and Social Psychology*, 81(4), 684-696.
- Lawrence, P. R., & Lorsch, J. W. (1967). *Organization and Environment*. Boston: Harvard Business School.
- Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, 44(1), 1.
- Lazarus, R. S., & Eriksen, C. W. (1952). Effects of failure stress upon skilled performance. *Journal of Experimental Psychology*, 43(2), 100-105.
- Lazear, E. P. (2002). Entrepreneurship. National Bureau of Economic Research, Cambridge, MA, mimeo.
- Lechner, C., Dowling, M., & Welpe, I. (2006). Firm networks and firm development: The role of the relational mix. *Journal of Business Venturing*, 21(4), 514-540.
- Lee, T. W., Ashford, S. J., Walsh, J. P., & Mowday, R. T. (1992). Commitment Propensity, Organizational Commitment, and Voluntary Turnover: A Longitudinal Study of Organizational Entry Processes. *Journal of Management*, 18(1), 15-32.
- Levenson, R. W. (1996). Biological substrates of empathy and facial modulation of emotion: Two facets of the scientific legacy of John Lanzetta. *Motivation and Emotion*, 20, 185-204.
- Levy, D., Murphy, L., & Lee, C. K. C. (2008). Influences and emotions: Exploring family decision-making processes when buying a house. *Housing Studies*, 23(2), 271-289.
- Lewis, K. M. (2000). When leaders display emotion: How followers respond to negative emotional expression of male and female leaders. *Journal of Organizational Behavior*, 21(2), 221-234.
- Liden, R. C., Wayne, S. J., & Stilwell, D. (1993). A longitudinal study on the early development of leader-member exchanges. *Journal of Applied Psychology*, 78(4), 662-674.
- Lin, N. (2002). *Social Capital*. New York: Cambridge University Press.
- Locke, E. A., Latham, G. P., & Erez, M. (1988). The Determinants of Goal Commitment. *Academy of Management Review*, 13(1), 23-39.
- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. (1981). Goal Setting and Task Performance: 1969-1980. *Psychological Bulletin*, 90(1), 125-152.

- Louviere, J. J. (1988). *Analyzing decision making - Metric conjoint analysis*. Newbury Park, CA: Sage Publications, Inc.
- Lowe, R. A., & Ziedonis, A. A. (2006). Overoptimism and the performance of entrepreneurial firms. *Management Science*, 52(2), 173-186.
- Luecke, R., & Katz, R. (2003). *Managing creativity and innovation*. Boston, MA: Harvard Business School Press.
- Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Executive*, 21(1), 135-173.
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success. *Psychological Bulletin*, 131(6), 803-855.
- Mackie, D. M., & Worth, L. T. (1989). Processing deficits and the mediation of positive affect in persuasion. *Journal of Personality and Social Psychology*, 57(1), 27-40.
- Mackie, D. M., & Worth, L. T. (1991). Feeling good but not thinking straight: The effect of positive mood on persuasion. In J. P. Forgas (Ed.), *Emotion and Social Judgment* (pp. 201-220). Oxford: Pergamon Press.
- Mageau, G. A., & Vallerand, R. J. (2007). The moderating effect of passion on the relationship between activity engagement and positive effect. *Motivation and Emotion*, 31(4), 312-321.
- Magnusson, D. (1985). Implications of an interactional paradigm for research on human development. *International Journal of Behavioral Development*, 8, 115-137.
- Mahoney, J. T. (1995). The management of resources and the resource management. *Journal of Business Research*, 33(2), 91-101.
- Mano, H. (1992). Judgments under distress: Assessing the role of unpleasantness and arousal in judgment formation. *Organizational Behavior and Human Decision Processes*, 52(2), 216-245.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organizational Science*, 2(1), 71-87.
- March, J. G., & Shapira, Z. (1987). Managerial perspectives on risk and risk-taking. *Management Science*, 33, 1404-1418.
- McCarthy, A. M., Schoorman, F. D., & Cooper, A. C. (1993). Reinvestment decisions by entrepreneurs: Rational decision-making or escalation of commitment? *Journal of Business Venturing*, 8(1), 9-24.
- McCull-Kennedy, J. R., & Anderson, R. D. (2002). Impact of leadership style and emotions on subordinate performances. *The Leadership Quarterly*, 13(5), 545-559.
- McGee, J. E., Peterson, M., Mueller, S. L., & Sequeira, J. M. (2009). Entrepreneurial self-efficacy: Refining the measure. *Entrepreneurship: Theory & Practice*, 33(4), 965-988.
- McGrath, J. E. (1976). Stress and behavior in organizations. In M. D. Dunnettes (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally.
- McGrath, R. G. (1999). Falling forward: Real options reasoning and entrepreneurial failure. *Academy of Management Review*, 24(1), 13-30.
- McMillan, G. S., & Narin, F. (2000). An analysis of the critical role of public science in innovation: The case of biotechnology. *Research Policy*, 29(1), 1-8.

- McMullen, J. S., & Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31(1), 132-152.
- Mehra, A., Dixon, A., Brass, D., & Robertson, B. (2006). The social network ties of leaders: Implications for group performance and leader reputation. *Organization Science*, 17(1), 132-152.
- Metcalfe, J., & Mischel, W. (1999). A hot/cool-system analysis of delay of gratification: dynamics of willpower. *Psychological Review*, 106(1), 3-19.
- Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research and application*. Thousand Oaks, CA: Sage Publication.
- Meyer, J. P., Stanley, D. J., Herscovitch, L., & Topolnytsky, L. (2002). Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior*, 61(1), 20-52.
- Meyer, M. H., & Utterback, J. M. (1995). Product development cycle time and commercial success. *IEEE Transactions on Engineering Management*, 42(4), 297-304.
- Mikels, J. A., Fredrickson, B. L., Larkin, G. R., Lindberg, C. M., Maglio, S. J., & Reuter-Lorenz, P. A. (2005). Emotional category data on images from the international affective picture system. *Behavior Research Methods*, 37(4), 626-630.
- Miles, R. E., Snow, C. C., & Pfeffer, J. (1974). Organization-environment: Concepts and issues. *Industrial Relations*, 13(3), 244-264.
- Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29(7), 770-791.
- Miller, D. (1987). The structural and environmental correlates of business strategy. *Strategic Management Journal*, 8(1), 55-76.
- Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, 31(1), 1-25.
- Mischel, W. (1974). Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 7, pp. 249-292). New York: Academic Press.
- Mischel, W., & Ayduk, O. (2002). Self-regulation in a cognitive-affective personality system: Attentional control in the service of the self. *Self and Identity*, 1, 113-120.
- Mischel, W., & Ayduk, O. (2004). Willpower in a cognitive-affective processing system - The dynamics of delay of gratification. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of Self-Regulation: Research, Theory, and Applications* (pp. 99-129). New York: Guilford.
- Mischel, W., Cantor, N., & Feldman, S. (1996). Principles of self-regulation: The nature of willpower and self-control. In E. T. Higgins & K. A.W. (Eds.), *Social Psychology: Handbook of Basic Principles*. New York: Guilford.
- Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science*, 244(4907), 933-938.

- Mitchell, J. R., & Shepherd, D. A. (2010). To thine own self be true: Images of self, images of opportunity, and entrepreneurial action. *Journal of Business Venturing*, 25(1), 138-154.
- Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., & Smith, B. J. (2002). Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. *Entrepreneurship: Theory & Practice*, 27, 93-104.
- Mitchell, R. K., Smith, B. J., Seawright, K. W., & Morse, E. A. (2000). Cross-cultural cognitions and the venture creation decision. *Academy of Management Journal*, 43(5), 974-993.
- Muzyka, D., Birley, S., & Leleuy, B. (1996). Trade-offs in the investment decisions of European venture capitalists. *Journal of Business Venturing*, 11(4), 237-288.
- Noble, C. H., & Mokwa, M. P. (1999). Implementing marketing strategies: Developing and testing a managerial theory. *Journal of Marketing*, 63(4), 57-73.
- Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*, 18, 187-206.
- Pareek, U. (1994). Entrepreneurial role stress. *Journal of Entrepreneurship*, 3(1), 55-67.
- Park, J., & Banaji, M. R. (2000). Mood and heuristics: The influence of happy and sad states on sensitivity and bias in stereotyping. *Journal of Personality and Social Psychology*, 78(6), 1005-1023.
- Parker, D. F., & Decotiis, T. A. (1983). Organizational determinants of job stress. *Organizational Behavior and Human Performance*, 32(2), 160-177.
- Parrott, W. G., & Hertel, P. (1999). Research methods in cognition and emotion. In T. Dalgleish & M. Power (Eds.), *Handbook of Cognition and Emotion* (pp. 61-81). New York: John Wiley & Sons Ltd.
- Patzelt, H., Lechner, C., & Klaukien, A. (Forthcoming). Networks and the decision to persist with underperforming R&D projects. *Journal of Product Innovation Management*.
- Patzelt, H., & Shepherd, D. A. (2008). The decision to persist with underperforming alliances: The role of trust and control. *Journal of Management Studies*, 45(7), 1217-1243.
- Patzelt, H., Shepherd, D. A., Deeds, D., & Bradley, S. M. (2008). Financial slack and venture managers' decisions to seek new alliances. *Journal of Business Venturing*, 23(4), 465-481.
- Penley, J. A., Tomaka, J., & Wiebe, J. S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioral Medicine*, 25(6), 551.
- Pennings, J. M. (1975). The relevance of structural-contingency model of organizational effectiveness. *Administrative Science Quarterly*, 27(3), 393-410.
- Penrose, E. (1995). *The Theory of the Growth of the Firm* (3rd Edition ed.). New York: Oxford University Press.
- Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *Academy of Management Review*, 28, 89-106.
- Pescosolido, A. T. (2002). Emergent leaders as managers of group emotion. *Leadership Quarterly*, 13(5), 583.

- Pflanz, S. E., & Ogle, A. D. (2006). Job stress, depression, work performance, and perceptions of supervisors in military personnel. *Military Medicine*, 171(9), 861-865.
- Piccolo, R. F., & Colquitt, J. A. (2006). Transformational Leadership and Job Behaviors: The Mediating Role of Core Job Characteristics. *Academy of Management Journal*, 49(2), 327-340.
- Platow, M. J., Haslam, S. A., Both, A., Chew, I., Cudon, M., Goharpey, N., et al. (2005). "It's not funny if they're laughing": Self-categorization, social influence, and responses to canned laughter. *Journal of Experimental Social Psychology*, 41(5), 542-550.
- Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. (1974). Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology*, 59, 603-609.
- Porter, M. E. (1980). *Competitive Strategy*. New York: Free Press.
- Pulakos, E. D., & Wexley, K. N. (1983). The Relationship Among Perceptual Similarity, Sex, and Performance Ratings in Manager-Subordinate Dyads. *Academy of Management Journal*, 26(1), 129-139.
- Quick, J. C. (1984). *Organizational stress and preventive management*. New York: McGraw-Hill.
- Rachman, S., & de Silva, P. (1978). Abnormal and normal obsession. *Behavior Research and Therapy*, 16(4), 233-248.
- Rahim, A. (1996). Stress, strain, and their moderators: An empirical comparison of entrepreneurs and managers. *Journal of Small Business Management*, 34, 46-58.
- Rasmussen, S. A., & Eisen, J. L. (1992). The epidemiology and clinical features of obsessive compulsive disorder. *Psychiatric Clinics of North America*, 15(4), 743-758.
- Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. T. J. (2004). *HLM 6: Hierarchical Linear and Nonlinear Modeling*. Lincolnwood, IL: Scientific Software International, Inc.
- Reichers, A. E. (1986). Conflict and organizational commitments. *Journal of Applied Psychology*, 71(3), 508-514.
- Rice, M. P. (2002). Co-production of business assistance in business incubators - An exploratory study. *Journal of Business Venturing*, 17(2), 163-187.
- Robinson, P. B., Stimpson, D. V., Huefner, J. C., & Hunt, H. K. (1991). An attitude approach to the prediction of entrepreneurship. *Entrepreneurship: Theory & Practice*, 15(4), 13-31.
- Rosenthal, R. (1966). *Experimenter Effects in Behavioral Research*. New York: Appleton-Century-Crofts.
- Ross, J., & Staw, B. M. (1986). Expo 86: An escalation prototype. *Administrative Science Quarterly*, 31(2), 274-297.
- Ross, J., & Staw, B. M. (1993). Organizational escalation and exit: lessons from the Shoreham Nuclear Power Plant. *Academy of Management Journal*, 36(4), 701-732.
- Russel, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39(6), 1161-1178.

- Sabherwal, R., Sein, M. K., & Marakas, G. M. (2003). Escalating commitment to information system projects: findings from two simulated experiments. *Information & Management, 40*(8), 781-798.
- Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*(3), 185-211.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency *Academy of Management Review, 26*(2), 243-263.
- Schachter, S. (1959). *The psychology of affiliation*. Stanford, CA: Stanford University Press.
- Schaubroeck, J., Ganster, D. C., & Fox, M. L. (1992). Dispositional affect and work-related stress. *Journal of Applied Psychology, 77*(3), 322-335.
- Schmidt, J. B., & Calantone, R. J. (2002). Escalation of commitment during new product development. *Journal of the Academy of Marketing Science, 30*(2), 103-155.
- Schoonhoven, C. B., Eisenhardt, K. M., & Lyman, K. (1990). Speeding products to market: Waiting time to first product introduction in new firms. *Administrative Science Quarterly, 35*(1), 177-207.
- Schumpeter, J. A. (1934). *The Theory of Economic Development*. Boston, MA: Harvard University Press.
- Schumpeter, J. A. (1942). *Socialism, Capitalism and Democracy* (Reprint ed.). New York: Harper.
- Schwarz, N. (1990). Feelings as information - Informational and motivational functions of affective states. In E. T. Higgins & R. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (Vol. 2, pp. 527-561). New York: Guilford Press.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45*(3), 513-523.
- Schwarz, N., & Clore, G. L. (1988). How Do I Feel About It? Information Functions of Affective States. In K. Fiedler & J. Forgas (Eds.), *Affect, cognition, and social behavior*. Toronto: Hogrefe.
- Scott, L., D. (2006). The impact of multiple care giving roles on fatigue, stress, and work performance among hospital staff nurses. *Journal of Nursing Administration, 36*(2), 86-95.
- Sears, S., & Kraus, S. (2009). I think therefore I am: Cognitive distortions and coping style as mediators for the effects of mindfulness meditation on anxiety, positive and negative affect, and hope. *Journal of Clinical Psychology, 65*(6), 561-573.
- Séguin-Levesque, C., Laliberté, M. L. N., Pelletier, L. G., & Vallerand, R. J. (2003). Harmonious and obsessive passion for the internet: Their associations with the couple's relationship. *Journal of Applied Social Psychology, 33*(1), 197-221.
- Senger, J. (1971). Managers' Perceptions of Subordinates' Competence As a Function of Personal Value Orientations. *Academy of Management Journal, 14*(4), 415-423.
- Shamir, B., House, R. J., & Arthur, M. B. (1993). The motivational effects of charismatic leadership: A self-concept based theory. *Organization Science, 4*(4), 577-594.

- Shane, S. (2008). *The Illusions of Entrepreneurship: The Costly Myths That Entrepreneurs, Investors, and Policy Makers Live by*. New Haven: Yale University Press.
- Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. *Human Resource Management Review*, 13(2), 257.
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217-226.
- Shaw, J. B., Fisher, C. D., & Southey, G. N. (1999). Evaluating organizational behavior teaching innovations: More rigorous designs, more relevant criteria, and an example. *Journal of Management Education*, 23(5), 509-536.
- Shepanski, A., Tubbs, R. M., & Grimlund, R. A. (1992). Issues of concern regarding within- and between-subjects designs in behavioral accounting research. *Journal of Accounting Literature*, 11, 121-150.
- Shepherd, D. A. (1999). Venture capitalists' assessment of new venture survival. *Management Science*, 45(5), 621-632.
- Shepherd, D. A. (2003). Learning from business failure: Propositions of grief recovery for the self-employed. *Academy of Management Review*, 28(2), 318-328.
- Shepherd, D. A. (2004). Educating entrepreneurship students about emotion and learning from failure. *Academy of Management Learning & Education*, 3(3), 274.
- Shepherd, D. A. (2009). Grief recovery from the loss of a family business: A multi- and meso-level theory. *Journal of Business Venturing*, 24(1), 81-97.
- Shepherd, D. A., Wiklund, J., & Haynie, J. M. (2009). Moving forward: Balancing the financial and emotional costs of business failure. *Journal of Business Venturing*, 24(2), 134-148.
- Shepherd, D. A., & Zacharakis, A. (1997). Conjoint analysis: A window of opportunity for entrepreneurship research. In J. Katz (Ed.), *Advances in Entrepreneurship, Firm Emergence and Growth* (Vol. III, pp. 203-248). Greenwich, CT: JAI Press.
- Shepherd, D. A., & Zacharakis, A. (1999). Conjoint analysis: A new methodological approach for researching the decision policies of venture capitalists. *Venture Capital*, 1(3), 197-217.
- Shepherd, D. A., Zacharakis, A., & Baron, R. A. (2003). VC's decision processes: Evidence suggesting more experience may not always be better. *Journal of Business Venturing*, 18(3), 381-401.
- Shepperd, J. A., Ouellette, J. A., & Fernandez, J. K. (1996). Abandoning unrealistic optimism: Performance estimates and the temporal proximity of self-relevant feedback. *Journal of Personality and Social Psychology*, 70(4), 844-855.
- Sherer, K. R., & Tannenbaum, P. H. (1986). Emotional experiences in everyday life: A survey approach. *Motivation and Emotion*, 10(4), 295-314.
- Simon, H. A. (1957). *Models of Man: Social and Rational; Mathematical Essays on Rational Human Behavior in Society Settings*. New York: Wiley.
- Simon, H. A. (1967). Motivational and emotional controls of cognition. *Psychological Review*, 74(1), 29-39.
- Simon, H. A. (1990). Invariants of human behavior. *Annual Review of Psychology*, 41(1), 1-19.

- Simon, M., Houghton, S. M., & Aquino, K. (2000). Cognitive biases, risk perception, and venture formation: How individuals decide to start a business. *Journal of Business Venturing, 15*, 113-134.
- Singh, J. V., Tucker, D. J., & House, R. J. (1986). Organizational legitimacy and the liability of newness. *Administrative Science Quarterly, 31*(2), 171-193.
- Smilor, R. W. (1997). Entrepreneurship - Reflections on a subversive activity. *Journal of Business Venturing, 12*(5), 341-346.
- Soman, D. (2001). The mental accounting for sunk time costs: Why time is not like money. *Journal of Behavioral Decision Making, 14*, 169-185.
- Spielberger, C., Gorsuch, R., & Lushene, R. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto: Consulting Psychologist Press.
- Srivastava, A. K., & Krishna, A. (1991). A test of inverted "U"-hypothesis of stress-performance relationship in the industrial context. *Psychological Studies, 36*(1), 34-38.
- Starbuck, W. H. (1976). Organizations and their environments. In M. D. Dunette (Ed.), *Handbook of Industrial and Organizational Psychology* (pp. 1069-1123). Chicago: Rand McNally.
- Starcke, K., Wolf, O. T., Markowitsch, H. J., & Brand, M. (2008). Anticipatory stress influences decision making under explicit risk conditions. *Behavioral Neuroscience, 122*(6), 1352-1360.
- Starr, J., & MacMillan, I. C. (1990). Resource cooptation via social contracting: Resource acquisition strategies for new ventures. *Strategic Management Journal, 11*(Special Issue), 79-92.
- Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review, 6*(4), 577-587.
- Staw, B. M., & Ross, J. (1987). Behavior in escalation situations: Antecedents, prototypes, and solutions. In B. M. Staw & L. L. Cummings (Eds.), *Research in Organizational Behavior* (Vol. 9, pp. 39-78). Greenwich, CT: JAI Press.
- Stewart, T. R. (1993). Judgment analysis: Procedures. In B. Brehmer & C. R. B. Joyce (Eds.), *Human judgment: The SJT view* (pp. 41-74). New York: North-Holland.
- Sullins, E. S. (1991). Emotional contagion revisited: Effects of social comparison and expressive style on mood convergence. *Personality and Social Psychology Bulletin, 17*(2), 166-174.
- Sutton, J. (1997). Gibrat's legacy. *Journal of Economic Literature, 35*(1), 40-59.
- Sutton, R. I., & Staw, B. M. (1995). What theory is not. *Administrative Science Quarterly, 40*(3), 371-384.
- Swann, W. B. (1996). *Selftraps: The Elusive Quest for Higher Selfesteem*. New York: Freeman.
- Sy, T., Côte, S., & Saavedra, R. (2005). The contagious leader: Impact of the leader's mood on the mood of group members, group affective tone, and group processes. *Journal of Applied Psychology, 90*(2), 295-305.
- Tellegen, A., Watson, D., & Clark, L. A. (1999). On the dimensional and hierarchical structure of affect. *Psychological Science, 10*(4), 297-303.
- Teoh, H. Y., & Foo, S. L. (1997). Moderating effects of tolerance for ambiguity and risktaking propensity on the role conflict-perceived performance relationship:

- Evidence from Singaporean entrepreneurs. *Journal of Business Venturing*, 12(1), 67-81.
- The Walt Disney Company. (2008). The Walt Disney Company and Affiliated Companies. Retrieved 24.09.2009, from <http://corporate.disney.go.com/careers/index.html>
- Thompson, J. D. (1967). *Organizations in Action*. New York: McGraw-Hill.
- Thoresen, C. J., Kaplan, S. A., Barsky, A. P., Warren, C. R., & de Chermont, K. (2003). The affective underpinings of job perceptions and attitudes: A meta-analytic review and integration. *Psychological Bulletin*, 129(6), 914-945.
- Timmons, J. A. (1994). *New venture creation: Entrepreneurship for the 21st century*. Homewood, IL: Irwin.
- Todd, P. M., & Gigerenzer, G. (2000). Précis of simple heuristics that make us smart. *Behavioral and Brain Sciences*, 23(5), 727-741.
- Tsui, A. S., & O'Reilly, C. A. (1989). Beyond simple demographic effects: the importance of relational demography in superior-subordinate dyads. *Academy of Management Journal*, 32(2), 402-423.
- Tung, R. L. (1979). Dimensions of organizational environments: An exploratory study of their impact on organizational structure. *Academy of Management Journal*, 22(4), 672-693.
- Turban, D. B., & Jones, A. P. (1988). Supervisor-subordinate similarity: Types, effects, and mechanisms. *Journal of Applied Psychology*, 73(2), 228-234.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
- Ucbasaran, D., Alsos, G. A., Westhead, P., & Wright, M. (2008). Habitual Entrepreneurs. *Foundations and Trends in Entrepreneurship*, 4(4).
- Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 42(1), 37-69.
- Vallerand, R. J., Geneviève, M. A., Ratelle, C., Léonard, M., Blanchard, C., Koestner, R., et al. (2003). Les passions de l'Âme: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, 85(4), 756-767.
- van Burg, E., Romme, A. G. L., Gilsing, V. A., & Reymen, I. M. M. J. (2008). Creating university spin-offs: A science-based design perspective. *Journal of Product Innovation Management*, 25(2), 114-128.
- Vancouver, J. B., Millsap, R. E., & Peters, P. A. (1994). Multilevel analysis of organizational goal congruence. *Journal of Applied Psychology*, 79(5), 666-679.
- Vecchio, R. P. (2003). Entrepreneurship and leadership: common trends and common threads. *Human Resource Management Review*, 13, 303-327.
- Venkataraman, S. (1997). The distinctive domain of entrepreneurship research: An editor's perspective. In R. Katz & R. Brockhaus (Eds.), *Advances in entrepreneurship, firm emergence, and growth* (Vol. 3, pp. 119-138). Greenwich, CT: JAI Press.
- Venkataraman, S., & Sarasvathy, S. D. (2001). Strategy and entrepreneurship: Outlines of an untold story. mimeo.
- Venkatesan, M. (1967). Laboratory experiments in marketing: The experimenter effect. *Journal of Marketing Research*, 4(2), 142-146.

- Veryzer, R. W. (1998). Key factors affecting customer evaluation of discontinuous new products. *Journal of Product Innovation Management*, 15(2), 136-150.
- Walsh, J. P. (1988). Selectivity and selective perception: An investigation of managers' belief structures and information processing. *Academy of Management Journal*, 31(4), 873-896.
- Ward, T. B. (2004). Cognition, creativity, and entrepreneurship. *Journal of Business Venturing*, 19(2), 173-188.
- Wasserman, N. (2008). The founder's dilemma. *Harvard Business Review*, 86(2), 102-109.
- Wassermann, S., & Faust, K. (1994). *Social Network Analysis*. New York: Cambridge University Press.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96(3), 465-490.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
- Webb, R. A. (2004). Managers' commitment to the goals contained in a strategic performance measurement system. *Contemporary Accounting Research*, 21(4), 925-958.
- Weenig, M. W. H., & Midden, C. J. H. (1991). Communication network influences on information diffusion and persuasion. *Journal of Personality & Social Psychology*, 61(5), 734-742.
- Weick, K. E. (1979a). Causal loops and control. In *The Social Psychology of Organizing* (pp. 72-88). New York: Addison-Wesley.
- Weick, K. E. (1979b). Cognitive processes in organizations. In B. M. Staw (Ed.), *Research in Organizational Behavior* (Vol. 1, pp. 41-74). Greenwich, CT: JAI Press.
- Weiss, H. M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. *Research in Organizational Behavior*, 18, 1-74.
- Wernerfelt, B., & Karnani, A. (1987). Competitive strategy under uncertainty. *Strategic Management Journal*, 8(2), 187-194.
- Westerman, J. W., & Cyr, L. A. (2004). An Integrative Analysis of Person-Organization Fit Theories. *International Journal of Selection and Assessment*, 12(3), 252-261.
- Westphal, J. D. (1999). Collaboration in the boardroom: The consequences of social ties in the CEO/board relationship. *Academy of Management Journal*, 42, 7-24.
- Wiklund, J., & Shepherd, D. A. (2005). Entrepreneurial orientation and small business performance: A configurational approach. *Journal of Business Venturing*, 20(1), 71-91.
- Wilson, J. Q. (1966). Innovation in organization: Notes toward a theory. In J. D. Thompson (Ed.), *Approaches to Organizational Design* (pp. 193-218). Pittsburgh: University of Pittsburgh.
- Wincent, J., Cardon, M. S., Singh, J., & Drnovsek, M. (2008). *The different faces of entrepreneurial affect: Why entrepreneurial emotion and passion are distinct*. Paper presented at the 2008 Annual Meeting of the Academy of Management.

- Wincent, J., & Örtqvist, D. (2009). Role stress and entrepreneurship research. *International Entrepreneurship and Management Journal*, 5(1), 1-22.
- Witt, L. A. (1998). Enhancing organizational goal congruence: A solution to organizational politics. *Journal of Applied Psychology*, 83(4), 666-674.
- Wood, M. (1998). Socio-economic status, delay of gratification, and impulse buying. *Journal of Economic Psychology*, 19(3), 295-320.
- Zahra, S. A., & Bogner, W. C. (2000). Technology strategy and software new ventures' performance: Exploring the moderating effect of the competitive environment. *Journal of Business Venturing*, 15(2), 135-173.
- Zahra, S. A., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, 10(1), 43-58.
- Zahra, S. A., Neubaum, D. O., & Huse, M. (1997). The effect of the environment on export performance among telecommunications new venture. *Entrepreneurship: Theory and Practice*, 22, 25-46.
- Zeigarnik, B. (1927). Das Behalten erledigter und unerledigter Handlungen. *Psychologische Forschung*, 9, 1-85.

9 Summary in German

Diese Arbeit mit dem Titel „Decision Making in Innovation and Entrepreneurship – A Collection of Conjoint-based Studies“ beschäftigt sich mit unterschiedlichen Themenbereichen der Kognition, Entscheidungsfindung und des Engagements im innovativen und unternehmerischen Umfeld. Die Conjoint-Analyse bildet dabei die Basis für diese Untersuchungen. Sie erlaubt, Rückschlüsse auf das Entscheidungsverhalten von Unternehmensgründern, deren Mitarbeiter, sowie von Projektmanagern zu ziehen. Forschung im Bereich der Kognition und Entscheidungsfindung von Akteuren im innovativen und unternehmerischen Umfeld ist von hoher Bedeutung. Forschung und Entwicklung in Universitäten und Forschungsinstituten sowie innovative Unternehmen tragen beachtlich zur Innovationstätigkeit und somit zum Wirtschaftswachstum einer Ökonomie bei. Jedoch weisen junge Unternehmen eine geringe Überlebenswahrscheinlichkeit auf. Oft ist das Scheitern junger Unternehmen auf Fehler in Managemententscheidungen und Beurteilungen, z.B. einem zu großen Optimismus, zurückzuführen. Auch Innovationsprojekte von Unternehmen und Forschungsinstituten scheitern deshalb häufig. Einsichten in die Entscheidungsfindung von Unternehmensgründern und Projektmanagern können unser Wissen über mögliche Ursachen für das Scheitern erweitern und Handlungsanweisungen aufzeigen. Weiterhin bilden Mitarbeiter in jungen innovativen Unternehmen eine wichtige Ressource. Ausgeprägtes Engagement von Mitarbeitern kann den Unternehmenserfolg positiv beeinflussen und somit die Überlebenswahrscheinlichkeit für junge Unternehmen erhöhen. Einflüsse auf das

Engagement von Mitarbeitern, im jungen Unternehmen zu arbeiten, sollen in dieser Arbeit aufgezeigt werden, um somit praktische Implikationen für den Unternehmensgründer anzubieten.

Die vorliegende Arbeit besteht aus fünf empirischen Studien, die mit Hilfe der Conjoint-Analyse das Entscheidungsverhalten von Projektmanagern und Unternehmensgründern sowie das Engagement von Mitarbeitern in jungen Unternehmen untersuchen. Insbesondere wird der Einfluss von Unternehmensumwelt, Gründungserfahrung, Affekten und des persönlichen Netzwerkes auf die Entscheidungen und das Engagement von Akteuren im innovativen und unternehmerischen Umfeld untersucht. Jede der folgenden vorgestellten Studien kann als individuelles Forschungspapier angesehen werden.

Für die ersten drei Studien wurden Unternehmensgründer in deutschen Innovations- und Technologiezentren befragt. Die drei Arbeiten bilden den Kern dieser Dissertation. Im Fokus steht jeweils die Entscheidung von Unternehmern, eine neue Geschäftsmöglichkeit zu verwirklichen.

Die erste Studie zeigt auf, dass Umweltbedingungen die Schwerpunkte beeinflussen, die bei der Entscheidung, eine Geschäftsmöglichkeit zu verwirklichen, auf das Vorhandensein einzelner Ressourcen gelegt werden. Es zeigt sich, dass dabei die Erfahrung, ein Unternehmen zu gründen, eine wichtige moderierende Rolle spielt. So konzentrieren sich beispielsweise erfahrene Gründer auf die Natur der Geschäftsmöglichkeit, sowie auf die Flexibilität ihrer Verwirklichung wenn sie in einem heterogenen Umfeld agieren. Wenig erfahrene Gründer konzentrieren sich hingegen auf eine effiziente Verwirklichung der Geschäftsmöglichkeit, um zügig in den Markt

einzusteigen und in einem heterogenen Umfeld in allen Segmenten effizient agieren zu können. Die Studie trägt bedeutend zum Verständnis der Rolle von Erfahrung in der Entscheidungsfindung von Unternehmern bei.

Die zweite Studie befasst sich mit dem Einfluss von Affekten auf die Entscheidungsfindung von Unternehmensgründern. Leidenschaft spielt eine große Rolle bei der Gründung und dem Führen eines jungen Unternehmens. In vorherigen Studien wurde jedoch nicht zwischen harmonischer und obsessiver Leidenschaft für die eigene Tätigkeit unterschieden. Die vorliegende Studie unterscheidet diese beiden Komponenten und findet einen positiven Einfluss von harmonischer Leidenschaft auf die Neigung, eine Geschäftsmöglichkeit zu verwirklichen. Außerdem wird der Einfluss kurzlebiger Affekte, wie Begeisterung, auf die Beziehung zwischen langlebiger harmonischer und obsessiver Leidenschaft und dem Verwirklichen einer Geschäftsmöglichkeit untersucht. Es zeigt sich, dass ein Einfluss von Begeisterung vorhanden ist, wenn Unternehmensgründer obsessive Leidenschaft für ihre Arbeit empfinden. Die Begründung dafür wird in einer verminderten Impulskontrolle dieser Unternehmensgründer gesehen. In dieser Studie wird erstmals der simultane Einfluss von lang- und kurzlebigen Affekten sowie deren Wechselwirkung auf die Entscheidungsfindung von Unternehmensgründern untersucht.

Auch Gegenstand der dritten Studie ist die Interaktion von kurz- und langlebigen Affekten bei der unternehmerischen Entscheidungsfindung. Im Fokus steht hier allerdings der Einfluss von Arbeitsstress auf die Entscheidung, eine Geschäftsmöglichkeit zu verwirklichen. Stress kann sowohl eine „Flucht“- , sowie eine „Kampf“-Reaktion auslösen. D.h., unter Stress ist die Wahrscheinlichkeit, dass der

Unternehmer eine Geschäftswirklichkeit verwirklicht, entweder erhöht oder niedriger. Moderiert wird diese Reaktion von der Angst des Gründers zu Scheitern. Diese Persönlichkeitseigenschaft des Unternehmensgründers gibt den Ausschlag dafür, welche Reaktion unter Stresseinfluss eintritt. Ist die Angst vor dem Scheitern hoch und empfindet der Entrepreneur Stress, tritt eine Fluchtreaktion ein und der Unternehmensgründer wird die Geschäftsmöglichkeit sehr wahrscheinlich nicht verwirklichen. Ist die Angst des Unternehmensgründers zu Scheitern niedrig, führt empfundener Stress zu einer Kampfreaktion und die Wahrscheinlichkeit, dass eine Geschäftsmöglichkeit verwirklicht wird, ist erhöht. Die Studie gibt Einblick in Stressreaktionen von Unternehmensgründern und legt dar, wie diese durch Persönlichkeitseigenschaften beeinflusst werden.

In der vierten Studie wechselt die Perspektive vom Entrepreneur zu den Mitarbeitern in jungen Unternehmen. Die Studie zeigt empirisch, dass unternehmerische Leidenschaft nicht nur Einfluss auf die Entscheidungen des Unternehmers selbst hat, sondern dass wahrgenommene unternehmerische Leidenschaft des Gründers ebenfalls die Mitarbeiter des jungen Unternehmens beeinflusst. Diese wahrgenommene Leidenschaft erhöht das Engagement der Mitarbeiter, in dem jungen Unternehmen zu arbeiten. Dieser positive Zusammenhang zwischen wahrgenommener Leidenschaft und Mitarbeiterengagement wird moderiert von der Ähnlichkeit in nicht-finanziellen Zielen zwischen Mitarbeitern und Unternehmern. Somit wird die Rolle des Unternehmensgründers als Führungsperson hervorgehoben und ein Einfluss der gezeigten unternehmerischen Leidenschaft auf die Mitarbeiter des Unternehmens gezeigt.

In der fünften und letzten Studie wird der Einfluss des persönlichen Netzwerkes auf die Entscheidung von Projektmanagern, ein bisher wenig erfolgreiches Forschungsprojekt weiterzuführen, untersucht. Positives Feedback zum Forschungsprojekt führt dabei eher zu einem Weiterführen des Projekts, negatives Feedback eher zu dessen Abbruch. Bestimmte Eigenschaften des persönlichen Netzwerkes - die Netzwerkgröße, Netzwerkdichte, und Kommunikationshäufigkeit - führen jedoch dazu dass der Einfluss des positiven Feedbacks noch erhöht wird. Dieser Artikel erweitert bereits bestehendes Wissen zur „Aspiration“-Theorie und zeigt Handlungsimplicationen für Forscher auf, wie positives Feedback aus dem persönlichen Netzwerk aufgefasst werden sollte.

10 Appendix

The appendix contains the conducted conjoint studies and the original data obtained in this thesis. The introductions to the conjoint experiments and the example scenarios are presented in the original language German.

10.1 Conjoint study presented in chapter 2, 3, and 4

10.1.1 Introduction of the conjoint experiment

Studie zum Entscheidungsverhalten von Unternehmensgründern

Sehr geehrter Teilnehmer,

Vielen Dank, dass Sie sich die Zeit nehmen, diese Befragung zu bearbeiten.

Die Studie untersucht die Entscheidung von Unternehmensgründern, eine neue Geschäftsmöglichkeit zu erschließen.

Es ist wichtig, dass Sie alle Fragen der Studie beantworten, da unvollständig ausgefüllte Befragungen bei der Analyse nicht berücksichtigt werden können.

Vorausgehende Tests haben ergeben, dass die meisten Teilnehmer nicht mehr als **25-30 Minuten** für eine komplette Bearbeitung benötigen. Sie brauchen pro Seite des Bogens nur eine Beurteilung abzugeben. Normalerweise nimmt die Zeit für die Beurteilung einer Situation mit der Zahl der bereits bearbeiteten Situationen ab.

Alle Informationen der Studie sind streng vertraulich und werden nur in einer Form berichtet, in der keine Rückschlüsse auf Ihr individuelles Antwortverhalten gezogen werden können.

Vielen Dank für Ihre Kooperation!

Wir kommen nun zur eigentlichen Studie. In dieser Studie bitten wir sie in Ihrer Funktion als Unternehmensgründer, eine Reihe hypothetischer, bislang ungenutzter, Geschäftsmöglichkeiten zu beurteilen und zu entscheiden, ob Sie die jeweilige Geschäftsidee verwirklichen würden.

Beschreibung der Geschäftsidee

Seit der Gründung Ihres Unternehmens haben Sie im Rahmen ihrer gegenwärtigen Geschäftsidee 2 Jahre lang über Möglichkeiten zur Verbesserung ihrer Produkte und die Erschließung neuer Geschäftsfelder und Technologien nachgedacht. Bisher haben Sie jedoch noch nicht den nächsten Schritt getan und die zur Realisierung nötigen Investitionen getätigt. Gegenwärtig ist der Finanzmarkt sehr attraktiv für neue Unternehmen. Die Gefahr, von Mitbewerbern imitiert zu werden ist niedrig, da wenig Information über ihre neuen Geschäftsideen und Produkte nach außen gelangt sind. Mittlerweile denken Sie darüber nach, eine neue Geschäftsmöglichkeit zu verwirklichen, d.h. Ressourcen bereit zu stellen, um das erste Produkt auszuliefern und damit Umsätze erzielen zu können. Die jeweilige Geschäftsmöglichkeit wird im Folgenden durch die auf der nächsten Seite dargestellten Parameter und deren Ausprägungen beschrieben.

Ihre Aufgabe

Auf den folgenden Seiten werden Sie aufgefordert, die dargestellten Geschäftsmöglichkeiten zu beurteilen. Bitte kreuzen Sie dazu die Nummer an, die Ihrer Einschätzung am nächsten kommt. Auf der nachfolgenden Beispielskala ist die 2 angekreuzt, um zu zeigen, dass Sie den Anreiz, diese Geschäftsmöglichkeit auszuschöpfen, als gering einschätzen (aber nicht sehr gering).

	1	2	3	4	5	6	7	
Sehr niedriger Anreiz	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sehr hoher Anreiz

Während Sie die Fragen beantworten, werden in regelmäßigen Abständen Bilder⁴ eingeblendet. Wir bitten Sie, sich während dieser Einblendung voll auf die dargestellte Situation zu konzentrieren und sich in diese hineinzudenken. Stellen Sie sich die Situation so klar wie möglich vor, sehen Sie die Leute um Sie herum und hören Sie die Geräusche. Erleben Sie diese Situation so, als ob sie Ihnen gerade widerfährt.

Bitte treffen Sie bei der anschließenden Darstellung der hypothetischen Geschäftsideen Ihre Entscheidung bestmöglich basierend auf der zur Verfügung stehenden Information und nehmen Sie an, dass alle anderen potentiellen Entscheidungsparameter und Umwelteinflüsse konstant sind.

Nach den Beurteilungen werden Sie gebeten, einige zusätzliche Fragen zu beantworten. Ihre Antworten werden uns helfen, Ihre Beurteilungen besser zu verstehen und werden vertraulich behandelt.

⁴ Die gezeigten Bilder dienen zur Emotionsinduktion für die in Kapitel 3 vorgestellte Studie. Dabei wurden in der zweiten Wiederholung des Conjoint-Experiments Bilder der IAPS-Datenbank gezeigt, die die Emotion „Begeisterung“ auslösen. Für die Studien in Kapitel 2 und 4 wurde nur der erste Teil des Conjoint-Experiments ohne Emotionsinduktion verwendet.

BESCHREIBUNG DER PARAMETER

Parameter	Ausprägung	Beschreibung
Fähigkeiten des Managements	Hoch	Sie und Ihr Managementteam haben <u>beachtliche Fähigkeiten, Wissen und Erfahrung</u> und sind in der Lage, schwierige und komplexe Aufgaben der Unternehmensführung und der Produktion zu meistern.
	Niedrig	Sie und Ihr Managementteam haben <u>begrenzte Fähigkeiten, Wissen und Erfahrung</u> und sind nur bedingt in der Lage, schwierige und komplexe Aufgaben der Unternehmensführung und der Produktion zu meistern.
Akzeptanz beim Kunden	Hoch	Ihre Kunden haben umfangreiches Wissen über ihr neues Produkt oder ihre neue Dienstleistung und Sie sind sich <u>ziemlich sicher, dass die zukünftige Nachfrage beachtlich sein wird.</u>
	Niedrig	Ihre Kunden haben wenig Wissen über ihr neues Produkt oder ihre neue Dienstleistung und Sie sind <u>unsicher über die zukünftige Nachfrage.</u>
Technologische Unsicherheit	Hoch	Für ihr neues Vorhaben sind die Technologien zur Umsetzung der Geschäftsidee <u>noch nicht vollständig entwickelt.</u>
	Niedrig	Für ihr neues Vorhaben sind die Technologien zur Umsetzung der Geschäftsidee <u>vollständig entwickelt.</u>
Engagement von Stakeholdern	Hoch	Stakeholder (wie Managementteam, Investoren und Zulieferer) <u>unterstützen</u> die neue Unternehmung <u>sehr stark.</u>
	Niedrig	Stakeholder (wie Managementteam, Investoren und Zulieferer) <u>unterstützen</u> die neue Unternehmung nur <u>wenig.</u>

10.1.2 Example scenario of the conjoint experiment

Situation 1: dxo

1. Fähigkeiten des Managements	Hoch	Sie und Ihr Managementteam sind in der Lage, schwierige und komplexe Aufgaben zu meistern.
2. Akzeptanz beim Kunden	Hoch	Kunden kennen Ihre Idee und Sie sind sich sicher, dass die zukünftige Nachfrage beachtlich sein wird.
3. Technologische Unsicherheit	Hoch	Ihre grundlegende Technologie ist noch nicht vollständig entwickelt.
4. Engagement von Stakeholdern	Niedrig	Stakeholder unterstützen Ihre Idee nur wenig.

Beurteilung

Basierend auf obiger Beschreibung Ihrer neuen Geschäftsmöglichkeit, wie schätzen Sie den Anreiz ein, diese Möglichkeit zu verwirklichen? Bitte kreuzen Sie Ihre Antwort auf nachfolgender Skala an.

Sehr niedriger Anreiz	1	2	3	4	5	6	7	Sehr hoher Anreiz
------------------------------	---	---	---	---	---	---	---	--------------------------

10.1.3 Design of the four experiment versions

Version 1

	Management Capabilities	Customer Demand	Technological Uncertainty	Stakeholder Support
1 dxo	High	High	High	Low
2 tbd	Low	Low	High	High
3 bgm	High	High	Low	Low
4 hae	Low	Low	Low	Low
5 tcy	Low	High	Low	High
6 whl	High	High	High	High
7 wer	High	Low	Low	High
8 pdp	Low	High	High	Low
9 hfa	High	Low	High	Low
10 tbd	Low	Low	High	High
11 hae	Low	Low	Low	Low
12 whl	High	High	High	High
13 tcy	Low	High	Low	High
14 wer	High	Low	Low	High
15 bgm	High	High	Low	Low
16 pdp	Low	High	High	Low
17 hfa	High	Low	High	Low

Table 9: Conjoint experiment version 1

Version 2

	Technological Uncertainty	Management Capabilities	Stakeholder Support	Customer Demand
1 dxo	High	High	High	Low
2 tbd	High	Low	High	Low
3 bgm	Low	High	Low	High
4 hae	Low	Low	Low	Low
5 tcy	Low	Low	High	High
6 whl	High	High	High	High
7 wer	Low	High	High	Low
8 pdp	High	Low	Low	High
9 hfa	High	High	Low	Low
10 tbd	High	Low	High	Low
11 hae	Low	Low	Low	Low
12 whl	High	High	High	High
13 tcy	Low	Low	High	High
14 wer	Low	High	High	Low
15 bgm	Low	High	Low	High
16 pdp	High	Low	Low	High
17 hfa	High	High	Low	Low

Table 10: Conjoint experiment version 2

Version 3

	Management Capabilities	Customer Demand	Technological Uncertainty	Stakeholder Support
1 dxo	High	High	High	Low
2 hfa	High	Low	High	Low
3 bgm	High	High	Low	Low
4 whl	High	High	High	High
5 tbd	Low	Low	High	High
6 wer	High	Low	Low	High
7 hae	Low	Low	Low	Low
8 pdp	Low	High	High	Low
9 tcy	Low	High	Low	High
10 hfa	High	Low	High	Low
11 whl	High	High	High	High
12 hae	Low	Low	Low	Low
13 pdp	Low	High	High	Low
14 tcy	Low	High	Low	High
15 wer	High	Low	Low	High
16 tbd	Low	Low	High	High
17 bgm	High	High	Low	Low

Table 11: Conjoint experiment version 3

Version 4

	Technological Uncertainty	Management Capabilities	Stakeholder Support	Customer Demand
1 dxo	High	High	High	Low
2 hfa	High	High	Low	Low
3 bgm	Low	High	Low	High
4 whl	High	High	High	High
5 tbd	High	Low	High	Low
6 wer	Low	High	High	Low
7 hae	Low	Low	Low	Low
8 pdp	High	Low	Low	High
9 tcy	High	Low	Low	High
10 hfa	High	High	Low	Low
11 whl	High	High	High	High
12 hae	Low	Low	Low	Low
13 pdp	High	Low	Low	High
14 tcy	High	Low	Low	High
15 wer	Low	High	High	Low
16 tbd	High	Low	High	Low
17 bgm	Low	High	Low	High

Table 12: Conjoint experiment version 4

10.2 Conjoint study presented in chapter 5

10.2.1 Introduction of the conjoint experiment

Dipl.-Vw. Anja Klaukien
Norman Bedtke
Max-Planck-Institut für Ökonomik
Kahlaische Straße 10, 07745 Jena
Tel.: 03641 686 739, Fax: 03641 686 710

Version 1

ZWECK DER STUDIE

Die Studie untersucht den Einfluss verschiedener, in jungen Unternehmen vorherrschenden Faktoren auf das Engagement der Mitarbeiter.

WICHTIGE INFORMATION

Es ist wichtig, dass Sie alle Fragen der Studie beantworten, da unvollständig ausgefüllte Bögen bei der Analyse nicht berücksichtigt werden können.

Vorausgehende Tests haben ergeben, dass die meisten Teilnehmer nicht mehr als 20-25 Minuten für eine komplette Bearbeitung benötigen. Sie brauchen pro Seite des Bogens nur eine Beurteilung abzugeben. Normalerweise nimmt die Zeit für die Beurteilung einer Situation mit der Zahl der bereits bearbeiteten Situationen ab.

Alle Informationen der Studie sind streng vertraulich und werden nur in einer Form berichtet, in der keine Rückschlüsse auf Ihr individuelles Antwortverhalten gezogen werden können.

Vielen Dank für Ihre Kooperation!

ANLEITUNG

In dieser Studie bitten wir Sie als Mitarbeiter eines jungen Unternehmens, eine Reihe hypothetischer Szenarien zu beurteilen. Sie sollen hierbei entscheiden, ob Sie, beeinflusst von verschiedenen Faktoren aus Ihrem Arbeitsumfeld, Engagement bei Ihrer Arbeit zeigen würden.

Beschreibung des Szenarios

Sie sind Angestellter in einem jungen aufstrebenden Unternehmen, dessen Gründungsphase erst kürzlich abgeschlossen wurde. Mittlerweile versucht sich das Unternehmen zu etablieren und strebt Wachstum und Expansion an. Sie sind somit einer der ersten Angestellten und stehen aufgrund der überschaubaren Anzahl an Mitarbeitern in häufigem direktem Kontakt mit dem Unternehmensgründer. Durch das häufige Zusammentreffen mit dem Unternehmensgründer ist es Ihnen möglich, seine Aktivitäten im Zusammenhang mit der Firma zu beobachten und sich mit ihm über seine Ziele und Absichten auszutauschen.

Beschreibung von Engagement

Im Rahmen dieses Fragebogens beschreibt Ihr Engagement das Ausmaß, in dem Sie sich mit dem Unternehmen identifizieren und bereit sind, sich darin einbringen.

Ihre Aufgabe

Bitte beurteilen Sie die auf den folgenden Seiten dargestellten Situationen, indem Sie die Nummer ankreuzen, die Ihrer Einschätzung am nächsten kommt. Die exemplarisch angekreuzte 2 auf der Beispielskala zeigt, dass Sie eher geringes Engagement zeigen (aber kein sehr geringes Engagement).

Sehr niedriges Engagement	1	2	3	4	5	6	7	Sehr hohes Engagement
------------------------------------------	---	--------------	---	---	---	---	---	--------------------------------------

Bitte treffen Sie Ihre Entscheidung bestmöglich, basierend auf der zur Verfügung stehenden Information und nehmen Sie an, dass alle anderen potentiellen Entscheidungsparameter und Umwelteinflüsse konstant sind.

Nach den Beurteilungen werden Sie gebeten, einige zusätzliche Fragen zu beantworten. Ihre Antworten werden uns helfen, Ihre Beurteilungen besser zu verstehen und werden vertraulich behandelt.

Es werden Ihnen nun kurz drei fiktive Gründerpersönlichkeiten vorgestellt. Versuchen Sie, sich in deren Werdegang hineinzuversetzen, da diese Grundcharaktere in der anschließenden Befragung eine wichtige Rolle spielen. Diese drei stellen typische Beispiele dar, es sind aber **durchaus auch Mischformen dieser drei Typen denkbar**. Stellen Sie sich die fiktive Gründerpersönlichkeit **weiterhin** als einen 35-jährigen Mann vor, der ein Hochschulstudium in Betriebswirtschaftslehre abgeschlossen hat und **zudem Ihr Vorgesetzter** ist.

Der Erfinder

Schon während der Schulzeit und des Studiums war der Erfinder-Typ bei verschiedenen Gründerpreis-Wettbewerben aktiv und gewann mit innovativen Geschäftsideen verschiedene Preise. So ist es auch nicht verwunderlich, dass durch diese Leidenschaft später eine innovative Idee entstand, die im heutigen Alltag nicht wegzudenken ist. Er ist zwar heute der Geschäftsführer des Unternehmens, das zur Vermarktung dieser hervorragenden Idee gegründet wurde, gibt aber die meisten kaufmännischen Entscheidungen an sein näheres Umfeld ab. Er widmet sich lieber ungestört seiner eigentlichen Leidenschaft, der Ideenfindung.

Der Gründer

Der Gründer-Typ zeigte schon in seiner Kindheit ein besonderes Gespür für lukrative Gelegenheiten und trieb den ersten Handel bereits auf dem Schulhof. Später begann er mit einem einzelnen Lieferwagen, welchen er sich durch Gewinne aus früheren Geschäften leisten konnte, den Aufbau eines heute lokal tätigen Online-Kaufhauses. Da es ihm eine ungeheure Freude bereitete, aus dem Nichts ein derartiges Unternehmen aufzubauen, versuchte er sich später in zahlreichen weiteren Firmengründungen, aus denen eine Vielzahl erfolgreicher Firmen hervorgingen. Es langweilt ihn in funktionierenden Unternehmen zu agieren, er wirkt bei diesen allerdings noch im Hintergrund mit. Wahre Begeisterung entwickelt er nur für die Bewältigung der anfänglichen Schwierigkeiten und beim Beschaffen der notwendigen Ressourcen.

Der Manager

Zu einer eigenen Firma kam der Manager-Typ durch den Kauf eines durchschnittlich laufenden kleinen Unternehmens. Er war nie wirklich daran interessiert eine eigene Firma zu gründen oder sich später weiteren Neugründungen zu widmen. Vielmehr bereitet es ihm eine ungeheure Freude, sein einziges Unternehmen ständig zu vergrößern und auszubauen. So leitet er ein mittlerweile äußerst erfolgreiches international tätiges Unternehmen, das praktisch weltweit bekannt ist.

BESCHREIBUNG DER PARAMETER

Parameter	Ausprägung	Beschreibung
Erfinder-Typ	Stark	Ihr Vorgesetzter zeigt eine <u>starke Leidenschaft</u> für Tätigkeiten, welche sich mit dem Identifizieren, Erfinden und Ausprobieren von neuen Geschäftsmöglichkeiten befassen (z.B. „Herumspielen“ mit potentiellen neuen Produkten).
	Schwach	Ihr Vorgesetzter zeigt <u>kaum Leidenschaft</u> für Tätigkeiten, welche sich mit dem Identifizieren, Erfinden und Ausprobieren von neuen Geschäftsmöglichkeiten befassen (z.B. „Herumspielen“ mit potentiellen neuen Produkten).
Gründer-Typ	Stark	Ihr Vorgesetzter zeigt eine <u>starke Leidenschaft</u> für Tätigkeiten, die sich mit der Gründung eines Unternehmens zur Kommerzialisierung und Realisierung von Geschäftsmöglichkeiten befassen (z.B. die Beschaffung des Startkapitals).
	Schwach	Ihr Vorgesetzter zeigt <u>kaum Leidenschaft</u> für Tätigkeiten, die sich mit der Gründung eines Unternehmens zur Kommerzialisierung und Realisierung von Geschäftsmöglichkeiten befassen (z.B. die Beschaffung des Startkapitals).
Manager-Typ	Stark	Ihr Vorgesetzter zeigt eine <u>starke Leidenschaft</u> für Tätigkeiten, welche die Entwicklung, das Wachstum und die Expansion des Unternehmens nach seiner Gründung bewirken sollen (z.B. Neukundengewinnung).
	Schwach	Ihr Vorgesetzter zeigt <u>kaum Leidenschaft</u> für Tätigkeiten, welche die Entwicklung, das Wachstum und die Expansion des Unternehmens nach seiner Gründung bewirken sollen (z.B. Neukundengewinnung).
Übereinstimmung mit monetären Zielen	Hoch	Sie <u>stimmen</u> mit Ihren Vorgesetzten darin überein, welche finanziellen Ziele für das Unternehmen wichtig sind (z.B. geplante Unternehmenserweiterung, Umsatzziele).
	Niedrig	Sie <u>stimmen</u> mit Ihren Vorgesetzten <u>nicht</u> darin überein, welche finanziellen Ziele für das Unternehmen wichtig sind (z.B. geplante Unternehmenserweiterung, Umsatzziele).
Übereinstimmung mit nichtmonetären Zielen	Hoch	Sie <u>stimmen</u> Ihrem Vorgesetzten darin überein, welche nicht-finanziellen Ziele für das Unternehmen wichtig sind (z.B. Unternehmensimage, Umweltschutzziele).
	Niedrig	Sie <u>stimmen</u> Ihrem Vorgesetzten <u>nicht</u> darin überein, welche nicht-finanziellen Ziele für das Unternehmen wichtig sind (z.B. Unternehmensimage, Umweltschutzziele).

Bitte betrachten Sie jede der folgenden Beschreibungen als eigenständiges Szenario, welches unabhängig von allen anderen ist. Bitte blättern Sie **nicht** zu bereits beurteilten Projekten zurück.

10.2.2 Example scenario of the conjoint experiment

Situation 1: dxo

Der hier beschriebene Unternehmensgründer (und gleichzeitig Ihr Vorgesetzter) ist ein 35-jähriger Mann, der einen Hochschulabschluss in Betriebswirtschaftslehre besitzt.

Erfinder-Typ	Stark	Gründer zeigt eine <u>starke Leidenschaft</u> für das Identifizieren, Erfinden und Ausprobieren von neuen Ideen (z.B. „Herumspielen“ mit potentiellen neuen Produkten).
Gründer-Typ	Schwach	Gründer zeigt <u>kaum Leidenschaft</u> für die Gründung eines Unternehmens.
Manager-Typ	Stark	Gründer zeigt eine <u>starke Leidenschaft</u> für Tätigkeiten, welche das Wachstum des Unternehmens nach der Gründung bewirken sollen (z.B. Neukundengewinnung).
Übereinstimmung mit monetären Zielen	Niedrig	Sie <u>stimmen</u> mit den verfolgten finanziellen Zielen <u>nicht überein</u> (z.B. geplante Unternehmenserweiterung, Umsatzziele).
Übereinstimmung mit nichtmonetären Zielen	Hoch	Sie <u>stimmen</u> mit den verfolgten nichtfinanziellen Zielen <u>überein</u> (z.B. Unternehmensimage, Umweltschutzziele).

Beurteilung

Basierend auf obiger Beschreibung Ihres Vorgesetzten und dem Grad Ihrer Übereinstimmung mit dessen Zielen, wie hoch schätzen Sie Ihre Identifikation und Ihr Mitwirken im Unternehmen ein?

Sehr niedriges Engagement	1	2	3	4	5	6	7	Sehr hohes Engagement
----------------------------------	---	---	---	---	---	---	---	------------------------------

10.2.3 Design of the four experiment versions

Version 1

		Inventor Passion	Founder Passion	Developer Passion	Similarity in financial goals	Similarity in non- financial goals
1	dxo	Strong	Weak	Strong	Low	High
2	kjl	Strong	Weak	Weak	High	Low
3	hlv	Strong	Weak	Strong	High	High
4	gnz	Strong	Strong	Weak	High	High
5	pdp	Weak	Weak	Strong	High	Low
6	xpv	Strong	Strong	Strong	High	Low
7	hfa	Weak	Strong	Weak	High	Low
8	hae	Weak	Weak	Weak	Low	Low
9	whl	Weak	Strong	Strong	High	High
10	piu	Strong	Weak	Weak	Low	High
11	tcy	Weak	Weak	Strong	Low	High
12	rkw	Strong	Weak	Strong	Low	Low
13	tbd	Weak	Weak	Weak	High	High
14	smq	Strong	Strong	Weak	Low	Low
15	wer	Weak	Strong	Weak	Low	High
16	lop	Strong	Strong	Strong	Low	High
17	bgm	Weak	Strong	Strong	Low	Low
18	gnz	Strong	Strong	Weak	High	High
19	hlv	Strong	Weak	Strong	High	High
20	kjl	Strong	Weak	Weak	High	Low
21	wer	Weak	Strong	Weak	Low	High
22	xpv	Strong	Strong	Strong	High	Low
23	hfa	Weak	Strong	Weak	High	Low
24	tcy	Weak	Weak	Strong	Low	High
25	whl	Weak	Strong	Strong	High	High
26	piu	Strong	Weak	Weak	Low	High
27	pdp	Weak	Weak	Strong	High	Low
28	rkw	Strong	Weak	Strong	Low	Low
29	bgm	Weak	Strong	Strong	Low	Low
30	smq	Strong	Strong	Weak	Low	Low
31	tbd	Weak	Weak	Weak	High	High
32	hae	Weak	Weak	Weak	Low	Low
33	lop	Strong	Strong	Strong	Low	High

Table 13: Conjoint experiment version 1

Version 2

		Founder passion	Similarity in financial goals	Inventor passion	Similarity in non- financial goals	Developer passion
1	dxo	Weak	Low	Strong	High	Strong
2	kjl	Weak	High	Strong	Low	Weak
3	hlv	Weak	High	Strong	High	Strong
4	gnz	Strong	High	Strong	High	Weak
5	pdp	Weak	High	Weak	Low	Strong
6	xpv	Strong	High	Strong	Low	Strong
7	hfa	Strong	High	Weak	Low	Weak
8	hae	Weak	Low	Weak	Low	Weak
9	whl	Strong	High	Weak	High	Strong
10	piu	Weak	Low	Strong	High	Weak
11	tcy	Weak	Low	Weak	High	Strong
12	rkw	Weak	Low	Strong	Low	Strong
13	tbd	Weak	High	Weak	High	Weak
14	smq	Strong	Low	Strong	Low	Weak
15	wer	Strong	Low	Weak	High	Weak
16	lop	Strong	Low	Strong	High	Strong
17	bgm	Strong	Low	Weak	Low	Strong
18	gnz	Strong	High	Strong	High	Weak
19	hlv	Weak	High	Strong	High	Strong
20	kjl	Weak	High	Strong	Low	Weak
21	wer	Strong	Low	Weak	High	Weak
22	xpv	Strong	High	Strong	Low	Strong
23	hfa	Strong	High	Weak	Low	Weak
24	tcy	Weak	Low	Weak	High	Strong
25	whl	Strong	High	Weak	High	Strong
26	piu	Weak	Low	Strong	High	Weak
27	pdp	Weak	High	Weak	Low	Strong
28	rkw	Weak	Low	Strong	Low	Strong
29	bgm	Strong	Low	Weak	Low	Strong
30	smq	Strong	Low	Strong	Low	Weak
31	tbd	Weak	High	Weak	High	Weak
32	hae	Weak	Low	Weak	Low	Weak
33	lop	Strong	Low	Strong	High	Strong

Table 14: Conjoint experiment version 2

Version 3

		Inventor Passion	Founder Passion	Developer Passion	Similarity in financial goals	Similarity in non- financial goals
1	dxo	Strong	Weak	Strong	Low	High
2	hfa	Weak	Strong	Weak	High	Low
3	tcy	Weak	Weak	Strong	Low	High
4	piu	Strong	Weak	Weak	Low	High
5	hae	Weak	Weak	Weak	Low	Low
6	gnz	Strong	Strong	Weak	High	High
7	smq	Strong	Strong	Weak	Low	Low
8	tbd	Weak	Weak	Weak	High	High
9	pdp	Weak	Weak	Strong	High	Low
10	wer	Weak	Strong	Weak	Low	High
11	xpv	Strong	Strong	Strong	High	Low
12	rkw	Strong	Weak	Strong	Low	Low
13	lop	Strong	Strong	Strong	Low	High
14	whl	Weak	Strong	Strong	High	High
15	kjl	Strong	Weak	Weak	High	Low
16	bgm	Weak	Strong	Strong	Low	Low
17	hlv	Strong	Weak	Strong	High	High
18	gnz	Strong	Strong	Weak	High	High
19	hfa	Weak	Strong	Weak	High	Low
20	piu	Strong	Weak	Weak	Low	High
21	tcy	Weak	Weak	Strong	Low	High
22	pdp	Weak	Weak	Strong	High	Low
23	smq	Strong	Strong	Weak	Low	Low
24	hae	Weak	Weak	Weak	Low	Low
25	tbd	Weak	Weak	Weak	High	High
26	wer	Weak	Strong	Weak	Low	High
27	whl	Weak	Strong	Strong	High	High
28	rkw	Strong	Weak	Strong	Low	Low
29	kjl	Strong	Weak	Weak	High	Low
30	bgm	Weak	Strong	Strong	Low	Low
31	lop	Strong	Strong	Strong	Low	High
32	hlv	Strong	Weak	Strong	High	High
33	xpv	Strong	Strong	Strong	High	Low

Table 15: Conjoint experiment version 3

Version 4

		Founder passion	Similarity in financial goals	Inventor passion	Similarity in non- financial goals	Developer passion
1	dxo	Weak	Low	Strong	High	Strong
2	hfa	Strong	High	Weak	Low	Weak
3	tcy	Weak	Low	Weak	High	Strong
4	piu	Weak	Low	Strong	High	Weak
5	hae	Weak	Low	Weak	Low	Weak
6	gnz	Strong	High	Strong	High	Weak
7	smq	Strong	Low	Strong	Low	Weak
8	tbd	Weak	High	Weak	High	Weak
9	pdp	Weak	High	Weak	Low	Strong
10	wer	Strong	Low	Weak	High	Weak
11	xpv	Strong	High	Strong	Low	Strong
12	rkw	Weak	Low	Strong	Low	Strong
13	lop	Strong	Low	Strong	High	Strong
14	whl	Strong	High	Weak	High	Strong
15	kjl	Weak	High	Strong	Low	Weak
16	bgm	Strong	Low	Weak	Low	Strong
17	hlv	Weak	High	Strong	High	Strong
18	gnz	Strong	High	Strong	High	Weak
19	hfa	Strong	High	Weak	Low	Weak
20	piu	Weak	Low	Strong	High	Weak
21	tcy	Weak	Low	Weak	High	Strong
22	pdp	Weak	High	Weak	Low	Strong
23	smq	Strong	Low	Strong	Low	Weak
24	hae	Weak	Low	Weak	Low	Weak
25	tbd	Weak	High	Weak	High	Weak
26	wer	Strong	Low	Weak	High	Weak
27	whl	Strong	High	Weak	High	Strong
28	rkw	Weak	Low	Strong	Low	Strong
29	kjl	Weak	High	Strong	Low	Weak
30	bgm	Strong	Low	Weak	Low	Strong
31	lop	Strong	Low	Strong	High	Strong
32	hlv	Weak	High	Strong	High	Strong
33	xpv	Strong	High	Strong	Low	Strong

Table 16: Conjoint experiment version 4

10.3 Conjoint study presented in chapter 6

10.3.1 Introduction of the conjoint experiment

Netzwerke und Engagement in Forschungsprojekten

Dr. Dr. Holger Patzelt
Anja Klaukien
Max-Planck-Institut für Ökonomik
Kahlaische Straße 10, 07745 Jena
Tel.: 03641 686 739, Fax: 03641 686 710

ZWECK DER STUDIE

Die Studie untersucht den Einfluss des persönlichen Netzwerkes von Wissenschaftlern auf deren Entscheidung, wenig erfolgreiche Projekte weiterzuführen.

WICHTIGE INFORMATION

Es ist wichtig, dass Sie alle Fragen der Studie beantworten, da unvollständig ausgefüllte Bögen bei der Analyse nicht berücksichtigt werden können.

Vorausgehende Tests haben ergeben, dass die meisten Teilnehmer nicht mehr als **20-25 Minuten** für eine komplette Bearbeitung benötigen. Sie brauchen pro Seite des Bogens nur eine Beurteilung abzugeben. Normalerweise nimmt die Zeit für die Beurteilung einer Situation mit der Zahl der bereits bearbeiteten Situationen ab.

Alle Informationen der Studie sind streng vertraulich und werden nur in einer Form berichtet, in der keine Rückschlüsse auf Ihr individuelles Antwortverhalten gezogen werden können.

Vielen Dank für Ihre Kooperation!

ANLEITUNG

In dieser Studie bitten wir Sie in Ihrer Funktion als Wissenschaftler eine Reihe hypothetischer, bislang wenig erfolgreicher Forschungsprojekte zu beurteilen und zu entscheiden, ob Sie, beeinflusst von verschiedenen Faktoren aus ihrer persönlichen Umgebung, den Projekten weitere Ressourcen zuteilen würden.

Beschreibung des Forschungsprojekts

Sie sind verantwortlich für die Leitung eines Forschungsprojektes. Sie haben persönlich an der Auswahl des Projektes und dessen Aufbau mitgearbeitet und seine Durchführung bei Ihrem Vorgesetzten durchgesetzt. Mit ihren den Personen Ihres persönlichen Netzwerkes haben Sie dieses Projekt in der Vergangenheit diskutiert.

Seit einiger Zeit sind Sie jedoch zu der Ansicht gelangt, dass das Projekt bislang wenig erfolgreich verläuft. Deshalb denken Sie darüber nach ob es sich noch lohnt, Zeit und weitere Ressourcen (z. B. Geld, Personal) in das Projekt zu investieren.

Beschreibung des Netzwerkes

Ihr persönliches Netzwerk besteht aus allen Personen, mit denen sie bisher über Ihr Forschungsprojekt und dessen Fortgang gesprochen haben. Dies können die Kollegen der eigenen Forschergruppe sein, aber auch Familie, Freunde und Bekannte sowie Forscherkollegen an anderen wissenschaftlichen Einrichtungen. Das Netzwerk wird im Folgenden durch die auf der nächsten Seite dargestellten Parameter und deren Ausprägungen beschrieben.

Ihre Aufgabe

Bitte beurteilen Sie die auf den folgenden Seiten dargestellten Situationen indem Sie die Nummer ankreuzen, die Ihrer Einschätzung am nächsten kommt. Auf der nachfolgenden Beispielskala ist die 2 angekreuzt, um zu zeigen, dass den Anreiz, in dieses Projekt weiter Ressourcen zu investieren, als gering einschätzen (aber nicht sehr gering).

Sehr niedriger Anreiz	1	2	3	4	5	6	7	Sehr hoher Anreiz
--------------------------------------	---	--------------	---	---	---	---	---	----------------------------------

Bitte treffen Sie Ihre Entscheidung bestmöglich basierend auf der zur Verfügung stehenden Information und nehmen Sie an, dass alle anderen potentiellen Entscheidungsparameter und Umwelteinflüsse konstant sind.

Nach den Beurteilungen werden Sie gebeten, einige zusätzliche Fragen zu beantworten. Ihre Antworten werden uns helfen, Ihre Beurteilungen besser zu verstehen und werden vertraulich behandelt.

BESCHREIBUNG DER PARAMETER

Parameter	Ausprägung	Beschreibung
Bindungsstärke	Stark	Zu den Netzwerkpartnern bestehen vorwiegend <u>starke Bindungen</u> . Diese basieren auf Gefühlen, Vertrauen und Gegenseitigkeit (z. B. Freunde und Familie).
	Schwach	Zu den Netzwerkpartnern bestehen vorwiegend <u>schwache Bindungen</u> . Diese basieren kaum auf Gefühlen, Vertrauen und Gegenseitigkeit, sondern dienen hauptsächlich zum Informationsaustausch (z. B. nicht befreundete Kollegen).
Feedback	Positiv	Von Ihren Netzwerkpartnern haben Sie in der Vergangenheit meist <u>positives Feedback und Unterstützung</u> für Ihr Projekt erhalten.
	Negativ	Von Ihren Netzwerkpartnern haben Sie in der Vergangenheit meist <u>negatives Feedback und Kritik</u> für Ihr Projekt erhalten.
Netzwerkdicke	Hoch	Ihre Netzwerkpartner <u>kennen sich untereinander</u> . Sie glauben, dass Ihr Projekt zwischen den anderen Partnern diskutiert wird.
	Gering	Ihre Netzwerkpartner <u>kennen sich untereinander kaum</u> . Sie glauben nicht, dass Ihr Projekt zwischen den anderen Partnern diskutiert wird.
Kommunikation	Stark	Sie diskutieren das Projekt <u>häufig und intensiv</u> mit den Netzwerkpartnern.
	Gering	Sie diskutieren das Projekt <u>selten und oberflächlich</u> mit den Netzwerkpartnern.
Netzwerkgröße	Groß	Ihr Netzwerk besteht aus <u>vielen Partnern</u> , mit denen Sie über das Projekt sprechen.
	Klein	Ihr Netzwerk besteht aus <u>wenigen Partnern</u> , mit denen Sie über das Projekt sprechen.

Bitte betrachten Sie jede der folgenden Beschreibungen als eigenständiges, wenig erfolgreiches Projekt unabhängig von allen anderen. Bitte blättern Sie **nicht** zu bereits beurteilten Projekten zurück.

10.3.2 Example scenario of the conjoint experiment

Situation 1: dxo

1. Bindungsstärke	Stark	Bindungen basieren auf Gefühlen, Vertrauen, Gegenseitigkeit (z.B. Freunde und Familie).
2. Feedback	Negativ	In der Vergangenheit negatives Feedback und Kritik.
3. Netzwerkdichte	Hoch	Die Netzwerkpartner kennen sich untereinander und diskutieren das Projekt.
4. Kommunikation	Gering	Seltene und oberflächliche Diskussion mit den Netzwerkpartnern.
5. Netzwerkgröße	Groß	Viele Netzwerkpartner, mit denen Sie über das Projekt sprechen.

Beurteilung

Basierend auf obiger Beschreibung Ihres Netzwerkes, mit dem Sie über ein bislang wenig erfolgreiches Forschungsprojekt gesprochen haben, wie schätzen Sie den Anreiz ein, dem Projekt weitere Ressourcen zuzuteilen? Bitte kreuzen Sie Ihre Antwort auf nachfolgender Skala an.

Sehr niedriger Anreiz 1 2 3 4 5 6 7 **Sehr hoher Anreiz**

10.3.3 Design of the four experiment versions

Version 1

		Bond strength	Feedback	Network density	Communication	Network size
1	dxo	Strong	Negative	High	Low	Large
2	kjl	Strong	Negative	Low	High	Small
3	hlv	Strong	Negative	High	High	Large
4	gnz	Strong	Positive	Low	High	Large
5	pdp	Weak	Negative	High	High	Small
6	xpv	Strong	Positive	High	High	Small
7	hfa	Weak	Positive	Low	High	Small
8	hae	Weak	Negative	Low	Low	Small
9	whl	Weak	Positive	High	High	Large
10	piu	Strong	Negative	Low	Low	Large
11	tcy	Weak	Negative	High	Low	Large
12	rkw	Strong	Negative	High	Low	Small
13	tbd	Weak	Negative	Low	High	Large
14	smq	Strong	Positive	Low	Low	Small
15	wer	Weak	Positive	Low	Low	Large
16	lop	Strong	Positive	High	Low	Large
17	bgm	Weak	Positive	High	Low	Small
18	gnz	Strong	Positive	Low	High	Large
19	hlv	Strong	Negative	High	High	Large
20	kjl	Strong	Negative	Low	High	Small
21	wer	Weak	Positive	Low	Low	Large
22	xpv	Strong	Positive	High	High	Small
23	hfa	Weak	Positive	Low	High	Small
24	tcy	Weak	Negative	High	Low	Large
25	whl	Weak	Positive	High	High	Large
26	piu	Strong	Negative	Low	Low	Large
27	pdp	Weak	Negative	High	High	Small
28	rkw	Strong	Negative	High	Low	Small
29	bgm	Weak	Positive	High	Low	Small
30	smq	Strong	Positive	Low	Low	Small
31	tbd	Weak	Negative	Low	High	Large
32	hae	Weak	Negative	Low	Low	Small
33	lop	Strong	Positive	High	Low	Large

Table 17: Conjoint experiment version 1

Version 2

	Network size	Communication	Network density	Bond strength	Feedback	
1	dxo	Large	Low	High	Strong	Negative
2	kjl	Small	High	Low	Strong	Negative
3	hlv	Large	High	High	Strong	Negative
4	gnz	Large	High	Low	Strong	Positive
5	pdp	Small	High	High	Weak	Negative
6	xpv	Small	High	High	Strong	Positive
7	hfa	Small	High	Low	Weak	Positive
8	hae	Small	Low	Low	Weak	Negative
9	whl	Large	High	High	Weak	Positive
10	piu	Large	Low	Low	Strong	Negative
11	tcy	Large	Low	High	Weak	Negative
12	rkw	Small	Low	High	Strong	Negative
13	tbd	Large	High	Low	Weak	Negative
14	smq	Small	Low	Low	Strong	Positive
15	wer	Large	Low	Low	Weak	Positive
16	lop	Large	Low	High	Strong	Positive
17	bgm	Small	Low	High	Weak	Positive
18	gnz	Large	High	Low	Strong	Positive
19	hlv	Large	High	High	Strong	Negative
20	kjl	Small	High	Low	Strong	Negative
21	wer	Large	Low	Low	Weak	Positive
22	xpv	Small	High	High	Strong	Positive
23	hfa	Small	High	Low	Weak	Positive
24	tcy	Large	Low	High	Weak	Negative
25	whl	Large	High	High	Weak	Positive
26	piu	Large	Low	Low	Strong	Negative
27	pdp	Small	High	High	Weak	Negative
28	rkw	Small	Low	High	Strong	Negative
29	bgm	Small	Low	High	Weak	Positive
30	smq	Small	Low	Low	Strong	Positive
31	tbd	Large	High	Low	Weak	Negative
32	hae	Small	Low	Low	Weak	Negative
33	lop	Large	Low	High	Strong	Positive

Table 18: Conjoint experiment version 2

Version 3

	Bond strength	Feedback	Network density	Communication	Network size
1 dxo	Strong	Negative	High	Low	Large
2 hfa	Weak	Positive	Low	High	Small
3 tcy	Weak	Negative	High	Low	Large
4 piu	Strong	Negative	Low	Low	Large
5 hae	Weak	Negative	Low	Low	Small
6 gnz	Strong	Positive	Low	High	Large
7 smq	Strong	Positive	Low	Low	Small
8 tbd	Weak	Negative	Low	High	Large
9 pdp	Weak	Negative	High	High	Small
10 wer	Weak	Positive	Low	Low	Large
11 xpv	Strong	Positive	High	High	Small
12 rkw	Strong	Negative	High	Low	Small
13 lop	Strong	Positive	High	Low	Large
14 whl	Weak	Positive	High	High	Large
15 kjl	Strong	Negative	Low	High	Small
16 bgm	Weak	Positive	High	Low	Small
17 hlv	Strong	Negative	High	High	Large
18 gnz	Strong	Positive	Low	High	Large
19 hfa	Weak	Positive	Low	High	Small
20 piu	Strong	Negative	Low	Low	Large
21 tcy	Weak	Negative	High	Low	Large
22 pdp	Weak	Negative	High	High	Small
23 smq	Strong	Positive	Low	Low	Small
24 hae	Weak	Negative	Low	Low	Small
25 tbd	Weak	Negative	Low	High	Large
26 wer	Weak	Positive	Low	Low	Large
27 whl	Weak	Positive	High	High	Large
28 rkw	Strong	Negative	High	Low	Small
29 kjl	Strong	Negative	Low	High	Small
30 bgm	Weak	Positive	High	Low	Small
31 lop	Strong	Positive	High	Low	Large
32 hlv	Strong	Negative	High	High	Large
33 xpv	Strong	Positive	High	High	Small

Table 19: Conjoint experiment version 3

Version 4

		Network size	Communication	Network density	Bond strength	Feedback
1	dxo	Large	Low	High	Strong	Negative
2	hfa	Small	High	Low	Weak	Positive
3	tcy	Large	Low	High	Weak	Negative
4	piu	Large	Low	Low	Strong	Negative
5	hae	Small	Low	Low	Weak	Negative
6	gnz	Large	High	Low	Strong	Positive
7	smq	Small	Low	Low	Strong	Positive
8	tbd	Large	High	Low	Weak	Negative
9	pdp	Small	High	High	Weak	Negative
10	wer	Large	Low	Low	Weak	Positive
11	xpv	Small	High	High	Strong	Positive
12	rkw	Small	Low	High	Strong	Negative
13	lop	Large	Low	High	Strong	Positive
14	whl	Large	High	High	Weak	Positive
15	kjl	Small	High	Low	Strong	Negative
16	bgm	Small	Low	High	Weak	Positive
17	hlv	Large	High	High	Strong	Negative
18	gnz	Large	High	Low	Strong	Positive
19	hfa	Small	High	Low	Weak	Positive
20	piu	Large	Low	Low	Strong	Negative
21	tcy	Large	Low	High	Weak	Negative
22	pdp	Small	High	High	Weak	Negative
23	smq	Small	Low	Low	Strong	Positive
24	hae	Small	Low	Low	Weak	Negative
25	tbd	Large	High	Low	Weak	Negative
26	wer	Large	Low	Low	Weak	Positive
27	whl	Large	High	High	Weak	Positive
28	rkw	Small	Low	High	Strong	Negative
29	kjl	Small	High	Low	Strong	Negative
30	bgm	Small	Low	High	Weak	Positive
31	lop	Large	Low	High	Strong	Positive
32	hlv	Large	High	High	Strong	Negative
33	xpv	Small	High	High	Strong	Positive

Table 20: Conjoint experiment version 4

Statutory declaration

Hiermit erkläre ich,

1. dass mir die geltende Promotionsordnung bekannt ist;
2. dass ich die Dissertation selbst angefertigt, keine Textabschnitte eines Dritten oder eigener Prüfungsarbeiten ohne Kennzeichnung übernommen und alle von mir benutzten Hilfsmittel, persönlichen Mitteilungen und Quellen in meiner Arbeit angegeben habe;
3. dass ich bei der Auswahl und Auswertung des Materials sowie bei der Herstellung des Manuskriptes keine unzulässige Hilfe in Anspruch genommen habe;
4. dass ich nicht die Hilfe eines Promotionsberaters in Anspruch genommen habe und dass Dritte weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten haben, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen;
5. dass ich die Dissertation noch nicht als Prüfungsarbeit für eine staatliche oder andere wissenschaftliche Prüfung eingereicht habe;
6. dass ich nicht die gleiche, eine in wesentlichen Teilen ähnliche oder eine andere Abhandlung bei einer anderen Hochschule bzw. anderen Fakultät als Dissertation eingereicht habe.

Anja Klaukien
Jena, 27.01.2010