



# Emotions and Opportunities: The Interplay of Opportunity Evaluation, Fear, Joy, and Anger as Antecedent of Entrepreneurial Exploitation

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This research examines the interplay of opportunity evaluation and emotions as determinants of entrepreneurial exploitation using affect-as-information theory and the affective processing principle as conceptual bases. Three central assumptions are confirmed across two studies. The first is that the effects of opportunity characteristics on exploitation are mediated by evaluation. The second is that emotions influence exploitation decisions in addition to evaluation. Fear reduces exploitation, whereas joy and anger increase it. The third is that fear, joy, and anger influence evaluation's effect on exploitation with higher levels of fear reducing and higher levels of joy and anger increasing the positive impact of evaluation on exploitation.

## Introduction

Understanding entrepreneurial opportunity exploitation is an important and frequently investigated research issue with individual and economic relevance (e.g., Baron, 2004; Shane, 2000). A widely accepted framework for understanding entrepreneurial

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activity (cf. Endres & Woods, 2006; Goss, 2007; Markman & Baron, 2003) is the individual-opportunity nexus paradigm (Shane, 2003, p. 9), which states that entrepreneurship is primarily about (1) the opportunity's characteristics and (2) an individual's opportunity evaluation and exploitation (Shane & Venkataraman, 2000).

In this regard, examining the individual's inner processes seems particularly important as previous research, along with real-life observations, tells us that potential entrepreneurs differ substantially in their tendency to pursue the same opportunity. Thus, because opportunity characteristics are not sufficient *per se* to adequately predict entrepreneurial exploitation, scientific attention should also be directed to the cognitive and emotional processes of individuals confronted with entrepreneurial opportunities. Interestingly, little is known about the exact cognitive and emotional<sup>1</sup> intraperson processes and their interplay by which individuals decide to exploit entrepreneurial opportunities. Hence, we conduct two studies addressing this research gap.

Empirical examinations of emotions' influence on entrepreneurial decisions only captured the interest of scholars midway through the first decade of the twenty-first century (e.g., Brundin, Patzelt, & Shepherd, 2008; Chen, Yao, & Kotha, 2009; Foo, 2009; Foo, Uy, & Baron, 2009; Shepherd, Wiklund, & Haynie, 2009). Consistent with this new approach and on the basis of the affect-as-information theory (cf. Clore & Huntsinger, 2007) and the affective processing principle (cf. Clore & Huntsinger, 2009), we simultaneously examine the direct influence of emotions and their interactions with the cognitive evaluation of the opportunity (cf. Grichnik, Smeja, & Welpe, 2010; Michl, Welpe, Spörrle, & Picot, 2009; Tumasjan, Welpe, & Spörrle, 2011) on entrepreneurial opportunity exploitation.

The affect-as-information hypothesis assumes that "affective cues of mood and emotion influence judgments directly by serving as experiential and bodily information regarding how one feels about the object of judgment" (Schwarz & Clore, 2007, p. 393). Based on this approach, we hypothesize that emotions, in addition to the characteristics of an experimentally induced opportunity and cognitive evaluation, directly influence an individual's exploitation tendencies.

Moreover, according to the affective processing principle, emotions influence the impact of cognitively processed information on subsequent behavioral tendencies. More precisely, within the pre-exploitation processes, emotions shape the impact of the cognitive evaluation of the opportunity on the tendency to exploit it. Thus, in addition to the direct impact of emotions that is based on the affect-as-information theory, we hypothesize a moderating effect of emotions on the association between entrepreneurial evaluation and exploitation.

These direct effects and the moderating effects of emotions are effective within the pre-exploitation process that has received substantially less empirical attention than the processes after it (Shane & Venkataraman, 2000). Therefore, we develop a pre-exploitation process model under which the influence of objective opportunity characteristics on exploitation tendencies is mediated by the individual's cognitive evaluation of the

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1. There is no interdisciplinary accepted definition of emotion, but Meyer and colleagues provide a comprehensive working definition which we follow in this study. They regard emotions as a person's current psychological states. These states have a certain quality, intensity, and duration and are usually focused on a target. Normally, the experience of the emotion is characteristic for the person in this state, and it often concurs with certain physiological changes and behaviors. The difference between the terms emotion, affect, and mood is not clear (Meyer, Schützwohl, & Reisenzein, 2001). Generally, moods are more global and more diffuse, last longer, and are less intensive than emotions and do not necessarily result from a specific cause or stimulus (Barsade & Gibson, 2007). Affect is considered to be superior to emotions and moods, but in the literature, affect and emotion are often used synonymously (Meyer et al., 2001).

given opportunity. Further, we integrate both the direct and moderating influences of emotions on subsequent exploitation tendencies within this model. To the best of our knowledge, this research is the first to comprehensively examine the combined direct and moderating effects of separate emotions on exploitation tendencies within a pre-exploitation process model linking opportunity characteristics with exploitation tendencies via cognitive evaluation. Such an approach is of crucial importance to the field of entrepreneurship research as it allows for a comprehensive analysis of the interplay between (1) the opportunity characteristics; (2) the cognitive evaluation of the opportunity; (3) the direct effects of emotions; and (4) the moderating effects of emotions when predicting entrepreneurial exploitation.

Based on our review of the opportunity characteristics, the affect-as-information theory and the affective processing principle, we derive a theoretical framework and propose specific hypotheses for two studies regarding the direct and moderating effects of emotions in the relationship between entrepreneurial opportunities and exploitation tendencies in the next section. This section is followed by an explanation of the research methods and the results obtained for both studies. The paper concludes with a discussion of the findings and a summary of the study's contributions to the field.

## Theoretical Foundations and Hypotheses

### Characteristics of Entrepreneurial Opportunities

Shane and Venkataraman (2000) propose that the answers to the questions why, when, and how people exploit an opportunity lie in the characteristics of the opportunity. Many aspects of an entrepreneurial opportunity have the potential to increase or reduce the probability that a potential entrepreneur will exploit it. In the existing literature, four characteristics of entrepreneurial opportunities are consistently associated with opportunity exploitation:

First, the *probability of success* plays a central role in the decision process whether or not to exploit an opportunity. A high probability of success increases the likelihood of engaging in entrepreneurial activity (e.g., Forlani & Mullins, 2000). Moreover, a high probability that the investment can be harvested successfully encourages the decision to exploit an opportunity (MacMillan, Siegel, & SubbaNarasimha, 1985). Correspondingly, numerous studies show that lower probabilities of potential financial loss and lower levels of perceived risk are crucial for the decision to exploit an entrepreneurial opportunity (Keh, Foo, & Lim, 2002; McNamara & Bromiley, 1997; Palich & Bagby, 1995; Simon, Houghton, & Aquino, 2000).

Second, potential entrepreneurs must be convinced that engaging in entrepreneurial activity will be *profitable* enough to compensate for their opportunity costs, i.e., what they lose when starting a business because they give up the alternatives (Busenitz & Barney, 1997; Shane, 2003, pp. 150–152). In other words, all potential entrepreneurs involved in the decision whether to exploit the entrepreneurial opportunity or not weigh the value of the opportunity with the costs to generate that value and with the costs to generate that value in other ways (Amit, Mueller, & Cockburn, 1995; Shane & Venkataraman, 2000). Previous research showed that the transferability of information from the prior experience to the opportunity (Cooper, Woo, & Dunkelberg, 1989; Shane, 2000) and prior entrepreneurial experience (Carroll & Mosakowski, 1987) increase the probability of exploiting an entrepreneurial opportunity because learning reduces the opportunity cost and, thus, increases profits. ‘For most entrepreneurs, opportunity exploitation is a necessary step to generate revenues and thus create a successful business (Block & MacMillan, 1985;

Schoonhoven, Eisenhardt, & Lyman, 1990)" (Choi, Lévesque & Shepherd, 2008, p. 335). Consequently, an entrepreneurial opportunity is more likely to be exploited if expected profits are high (Companys & McMullen, 2007; Dunne, Roberts, & Samuelson, 1989; Shane & Venkataraman, 2000).

In sum, the better these two opportunity characteristics, high chances of success and high profit, the higher the opportunity evaluation, i.e., the subjective mental valuation of the opportunity based on the individual appraisal of its opportunity characteristics. The evaluation criteria used by entrepreneurs reflect values that influence expectations of the venture, personal goals, and effort exerted (e.g., Kanfer, 1990). Thus, we assume a positive association between cognitive evaluation and subsequent more behavior-oriented exploitation tendencies. Hence, entrepreneurial evaluation should have direct effects on entrepreneurial exploitation (Sarason, Dean, & Dillard, 2006; Shane & Venkataraman, 2000).

To sum up, the literature provides compelling evidence that opportunity characteristics are associated with entrepreneurial evaluation and exploitation. Moreover, evaluation is shown to be a direct antecedent of exploitation. Hence, we hypothesize a mediation model in which two opportunity characteristics determine the evaluation of this opportunity that, in turn, influences the exploitation tendency.

**Hypothesis 1a:** The positive association between probability of success and the tendency to exploit this entrepreneurial opportunity is mediated by evaluation.

**Hypothesis 1b:** The positive association between profit and the tendency to exploit this entrepreneurial opportunity is mediated by evaluation.

In addition to these two opportunity characteristics, i.e., probability of success and profit, we examine two other opportunity characteristics, i.e., personal investment and time to profit, that are less frequently mentioned in literature, but, nevertheless, are considered important for exploitation tendencies.

*Personal investment* is a third central aspect when evaluating entrepreneurial opportunities as entrepreneurs include "the ratio of investment size to total assets in their evaluation processes (Busenitz & Barney, 1997)" (Michl et al., 2009, p. 180). Shane and Venkataraman (2000) outline that entrepreneurial opportunities with low capital costs are more likely to be exploited. Studies by Evans and Leighton (1989) and Timmons (1997) show that individuals are more likely to exploit an entrepreneurial opportunity when the availability of financial capital is higher. In addition, acquiring capital has been described as one of the most frustrating and difficult challenges faced by new ventures (cf. Shepherd, 1999; Van Auken, 2004).

Fourth, the *time to profit* is critical when evaluating entrepreneurial opportunities as entrepreneurs are shown to focus on the expected break-even point when profits will be realized (Busenitz & Barney, 1997). The earlier the break-even point is expected, the more likely the opportunity will be exploited (Timmons, 1997). Correspondingly, the later the break-even point is expected, the less likely it is that an entrepreneur will be willing and capable to sustain intense effort (MacMillan et al., 1985). Thus, an increased time to profit should reduce an individual's opportunity exploitation tendencies.

In sum, the better these two opportunity characteristics, i.e., low personal investment and short time to profit, the higher the opportunity evaluation. Hence, we state a mediation model in which these two opportunity characteristics determine the evaluation of this opportunity which, in turn, influences the individual exploitation tendency.

**Hypothesis 1c:** The negative association between personal investment and the tendency to exploit this entrepreneurial opportunity is mediated by evaluation.

**Hypothesis 1d:** The negative association between time to profit and the tendency to exploit this entrepreneurial opportunity is mediated by evaluation.

## Affect-as-Information Theory

Within the affect-as-information theory (Clore, Gasper, & Garvin, 2001), emotions reflect an underlying appraisal (e.g., Ellsworth & Scherer, 2003; Ortony, Clore, & Collings, 1988) and evaluation of a specific object which in this case is the given opportunity. Thus, emotions provide the person experiencing these emotions with compelling information about the personal value assigned to the object (cf. Schwarz, 1990, 2001). This information influences the individual's reactions toward this object. Note that this influence is assumed to operate independently from the effects of accompanying cognitions as emotions serve as the provider of distinct information. Therefore, we hypothesize that potential entrepreneurs' opportunity-related emotions should directly affect their decision whether or not to exploit the opportunity, which is distinct from the influence of the cognitive evaluation of the opportunity.

The direction of this hypothesized direct and incremental effect of emotions on the opportunity exploitation depends on the motivational tendency of the emotion: Previous research strongly suggests that fear as an avoidance-oriented emotion indicates threat (cf. Gray, 1987, p. 27; Krause, 2004; Lazarus, Kanner, & Folkman, 1980) and should, therefore, decrease exploitation tendencies. Higgins (2005) and Brockner, Higgins, and Low (2004) refer to this as prevention focus. This is consistent with the findings of Foo (2009) and Lerner and Keltner (2001) who show that fear is associated with higher risk perception, thus, indicating that fear might result in decreased founding tendencies.

In this research, we choose fear as the typical negative emotion, which, unlike, for example, guilt or sadness, is operative even when an event is anticipated, and which closely corresponds to the examined situation of deciding whether or not to exploit an opportunity, i.e., the pre-exploitation phase. In sum, we hypothesize a direct effect of fear on the tendency to exploit entrepreneurial opportunities in the following. Note that we assume that this direct effect of fear becomes operative not only independently from the experimentally induced opportunity characteristics and the cognitive evaluation of the opportunity but also independent from other emotions, thus, hypothesizing a distinct predictive value of fear.

**Hypothesis 2a:** Fear negatively predicts the tendency to exploit an entrepreneurial opportunity.

Moreover, we hypothesize another direction of the direct effect of emotions on the opportunity exploitation depending on the motivational tendency of the emotion: Joy as an approach-oriented emotion (cf. Baron, 2000; Brundin et al., 2008; Lyubomirsky, Kennon, & Schkade, 2005; Weiss, 2002) should lead to increased exploitation tendencies. This assumption is further corroborated by emotion research indicating that one of the functions of positive feelings such as joy is to detect new chances and opportunities (see for review: Carver, 2003).

However, the motivational tendency of the emotion is not necessarily identical with its valence: For instance, anger is a negatively valenced emotion such as fear but is considered an approach-related emotion such as joy (Carver & Harmon-Jones, 2009; Harmon-Jones, 2003). Thus, anger, like joy, should have a positive effect on exploitation tendencies. This assumption is supported by findings of Foo (2009) and Lerner and Keltner (2000, 2001) who show that anger is significantly related with lower risk perception and more optimistic judgments, thus indicating that anger and joy might result in increased founding tendencies.

To conclude, we hypothesize the following direct effects of joy and anger on the tendency to exploit an entrepreneurial opportunity.

**Hypothesis 2b:** Joy positively predicts the tendency to exploit an entrepreneurial opportunity.

**Hypothesis 2c:** Anger positively predicts the tendency to exploit an entrepreneurial opportunity.

## Affective Processing Principle

Besides the direct effects of emotions, we follow the conclusions of Storbeck and Clore (2007) and propose an additional moderating effect of emotions on cognitive operations. Based on the affective processing principle we assume approach-oriented emotions to foster the use of and reliance on currently available cognitive content, whereas avoidance-oriented emotions reduce the impact of this cognitive content (cf. Clore & Huntsinger, 2009). We argue that, within the pre-exploitation process, the information most currently available and dominant for the potential entrepreneur is her cognitive evaluation of the given opportunity. Thus, in this case, emotion might also serve as a cue about (not) using cognitive evaluation judgments when deciding on the opportunity exploitation.

Consequently, we state the moderation hypotheses that the positive impact of the given opportunity's cognitive evaluation on exploitation tendencies increases with higher levels of approach-oriented emotions, i.e., joy and anger, and decreases with higher levels of avoidance-oriented emotions, i.e., fear (cf. Smith & Ellsworth, 1985). These assumptions are supported by cognitive research confirming the facilitating and motivating effects of joy (e.g., Isen, 2000) and anger (e.g., Ford et al., 2010) as well as the avoidance effects of fear (e.g., Marsh, Ambady, & Kleck, 2005). Again, since this process is believed to be operative in addition to the other processes described above, each moderation, i.e., for positive and for negative emotions, is believed to exert its influence incrementally on the opportunity characteristics, cognitive evaluation, and the other affect-related main and interaction effects.

**Hypothesis 3a:** The association between opportunity evaluation and the tendency to exploit this opportunity is moderated by fear: increased levels of fear weaken the association.

**Hypothesis 3b:** The association between opportunity evaluation and the tendency to exploit this opportunity is moderated by joy: increased levels of joy strengthen the association.

**Hypothesis 3c:** The association between opportunity evaluation and the tendency to exploit this opportunity is moderated by anger: increased levels of anger strengthen the association.

## Study 1

### Data and Method

**Experimental Design.** A questionnaire-based experiment was implemented using a 3 (probability of success: high vs. low vs. uncertain)  $\times$  2 (profit if it were to succeed: high vs. low) design with independent measures. We used the experimental condition of an uncertain probability of success since one could argue that the influence of emotions might be particularly pronounced under conditions of high uncertainty (Hsu, Bhatt, Adolphs, Tranel, & Camerer, 2005).

**Material and Measures.** The questionnaire employed an experimental scenario technique (cf. Parrott & Hertel, 1999) with two independent variables, i.e., probability of success and profit. After indicating their biological sex and age, participants were instructed to vividly imagine a concrete entrepreneurial situation in the country's current economic situation. In this situation, the probability of success was introduced as being either high (a rating by experts of 90%) or low (a rating by experts of 10%) or uncertain (experts could not provide an estimate), and the profit in the specified situation as being either high (annual earnings of € 350,000) or low (annual earnings of € 25,000). This resulted in a total of six scenario frameworks, each characterized by a specific constellation of the two experimentally induced opportunity characteristics, i.e., probability of success and profit. Each participant was randomly assigned to one of these scenarios. Based on these scenario parameters, participants were instructed to imagine a business idea that would personally be realistic and meaningful to them. Participants were asked to provide a short description of the details of their developed scenario, e.g., regarding industrial sector and business concept, in an open-response format to elaborate their mental representation of the opportunity. Overall, this procedure ensured that the business ideas developed by the participants were realistic to them and that they had sufficiently immersed themselves in the given scenario prior to answering questions about it. Subsequently, participants completed the following scales defining the relevant constructs.

**Fear.** We used the six items from the PANAS-X (Watson & Clark, 1994) fear subscale, e.g., afraid, following the instructions of the authors—this applies to all established scales used in this research—to assess the individual's level of fear when deciding whether or not to become entrepreneurially active in this specific scenario with the two experimentally induced opportunity characteristics (Cronbach's alpha [ $\alpha$ ] = .86).

**Joy.** We used seven items from the PANAS-X joviality subscale, e.g., happy, to assess the individual's level of joy when deciding whether or not to become entrepreneurially active in this specific scenario ( $\alpha$  = .82). We refrained from using one item in this scale, i.e., lively, since this item does not necessarily have a positive connotation in German, i.e., *lebhaft*.

**Evaluation.** Participants answered three questions on 11-point rating scales ranging from 0 (not at all) to 10 (extremely) on (1) how positive and (2) how promising they judged the situation to be, and (3) to what extent this scenario would be a realistic alternative to wage employment ( $\alpha$  = .85). These items were developed based on expert interviews building on Shane's (2000) understanding of opportunity evaluation to represent a general evaluation of the situation, not a specific, e.g., financial, one and had been successfully used in previous research to assess opportunity evaluations (Spörrle, Breugst, & Welpe, 2009).

**Exploitation Tendency.** Participants were asked to answer three questions using 11-point rating scales ranging from 0 (impossible) to 10 (completely certain) on how probable it was that they would use this self-chosen opportunity to become an entrepreneur (1) in the near future; (2) after completion of their studies; and (3) sometime later in life. As structural equation modeling literature might consider this operationalization to be a formative index, i.e., direction of causality is from items to the construct, and not a reflective construct, i.e., direction of causality is from the construct to the items (cf. Bollen, 1989; Churchill, 1979; Edwards & Bagozzi, 2000), reporting the internal consistency of this measure is inadequate, even though we obtained high inter-item correlations. Nevertheless, this formative approach seems legitimate as the three indicators are defining characteristics of the exploitation construct (cf. Jarvis, MacKenzie, & Podsakoff, 2003).

**Manipulation Checks.** As a manipulation check, the subjects rated the probability of success and the extent of future profits in the specific opportunity scenario by answering

three questions using 11-point rating scales. Specifically, they provided information on (1) how probable they judged financial success, (2) how high the chances of future financial profits were, and (3) how likely it was that the business would be an economic success ( $\alpha = .91$ ). The mean value of these three manipulation check items is the participant's perceived probability of success score since the mean value represents the participants' subjective representation of the independent variable, i.e., probability of success defining the situation.

The extent of future profits was assessed by estimating (1) the returns, (2) the profits, and (3) the financial gains of the business if it were to succeed ( $\alpha = .90$ ). The mean value of these three manipulation check items is the participant's perceived profit score.

**Participants and Procedure.** We asked 245 MBA and entrepreneurship students to participate in our survey in exchange for course credits. One hundred thirty-eight agreed comprising 86 men and 52 women, which resulted in a response rate of 56%. Respondents were approached individually or during their courses and asked to fill out the questionnaire anonymously. Participants' mean age was 24.98 years ( $SD = 2.76$ ) for men and 26.50 years ( $SD = 4.99$ ) for women. Participants were asked to fill out the questionnaire without consulting others. Upon completion, they were debriefed and thanked.

## Results

**Descriptive Analyses and Correlations.** Correlation analyses (cf. Table 1) supported our hypotheses since the experimentally induced opportunity characteristics, i.e., perceived probability of success and perceived profit, were significantly associated with evaluation and exploitation tendencies ( $rs > .30$ ,  $ps < .01$ ). Moreover, fear was inversely correlated with evaluation ( $r = -.25$ ,  $p < .01$ ) and with exploitation ( $r = -.31$ ,  $p < .01$ ), whereas there were positive correlations between joy and evaluation ( $r = .40$ ,  $p < .01$ ) and exploitation ( $r = .36$ ,  $p < .01$ ).

**Manipulation Checks.** We performed a one-factorial ANOVA with perceived probability of success as the dependent variable and the three levels of probability induction as the independent variables. The results indicated a significant difference between the three means,  $F(2, 134) = 17.41$ ,  $p < .001$ . Post-hoc Games-Howell tests indicated a significant difference ( $p < .001$ ) between the high-probability version ( $M = 6.79$ ,  $SD = 2.99$ ) and the low-probability version ( $M = 4.48$ ,  $SD = 2.31$ ). The results of the uncertain-probability ( $M = 6.40$ ,  $SD = 1.61$ ) version fell between these two groups but only differed significantly from the low-probability ( $p < .001$ ) version not from the high-probability one ( $p > .55$ ). This indicates that the high-probability and the low-probability versions were successfully induced and that the uncertain-probability condition was perceived as more similar to the high-probability scenario than to the low-probability one. As a result of this insignificant difference, we did not examine this uncertainty scenario version separately in subsequent analyses and did not attempt to induce it in the following study. Moreover, our subsequent analyses indicate that high uncertainty is not a necessary prerequisite for emotions to have an impact on exploitation tendencies.

Confirming the successful manipulation of the second independent variable, a *t*-test indicates that participants indeed regarded earnings in the high-profit condition ( $M = 7.17$ ,  $SD = 1.57$ ) as higher than those in the low-profit condition ( $M = 4.82$ ,  $SD = 2.27$ ),  $t(106) = 6.90$ ,  $p < .001$ . Thus, for both independent variables, low and high levels were induced successfully.

Table 1

## Descriptive Statistics, Intercorrelations, and Reliabilities of the Assessed Variables (Study 1)

	M	SD	SK	KU	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Age	25.55	3.82	1.75	3.72	—	.19	-.02	-.08	-.10	.13	.06	.10
(2) Sex (1 = female)	0.38	—	—	—	.08	—	-.11	-.16	.22	-.06	-.21	-.19
(3) Perceived probability	5.87	2.21	-0.55	-0.36	.03	-.13	(.91)	.28	-.09	.23	.55	.46
(4) Perceived profit	6.09	2.25	-0.62	-0.01	-.04	-.21	.30	(.90)	-.05	.26	.52	.34
(5) Fear	2.42	0.82	0.71	-0.04	-.10	.21	-.12	-.08	(.86)	.01	-.25	-.31
(6) Joy	3.63	0.70	-0.85	1.12	.13	-.08	.19	.24	-.03	(.82)	.40	.36
(7) Evaluation	6.14	2.23	-0.55	-0.13	.08	-.27	.52	.51	-.25	.33	(.85)	.67
(8) Exploitation	3.71	2.53	0.39	-0.77	.12	-.18	.42	.32	-.26	.35	.68	—

*Notes:* For descriptive statistics  $133 < n < 139$ , for correlations  $n = 131$  (list-wise deletion). Since most skewness and kurtosis values are within the range of  $-1.00$  and  $+1.00$  suggested by Muthén & Kaplan (1985), parametric analyses seem justified. However, as there were some (slight) deviations from normality regarding age and joy, we additionally computed Spearman's nonparametric rank correlations, which were overall very similar to Pearson's correlation, thus indicating that the parametric indicators of association are not severely influenced by these deviations. For Pearson's correlation (above main diagonal):  $|r| > .17$ ,  $p < .05$  (two-tailed),  $|r| > .23$ ,  $p < .01$  (two-tailed). For Spearman's rank correlation (below main diagonal):  $|r| > .17$ ,  $p < .05$  (two-tailed),  $|r| > .22$ ,  $p < .01$  (two-tailed). Within the main diagonal: Reliabilities (Cronbach's alpha).

M, mean; SD, standard deviation; SK, skewness; KU, kurtosis.

**Predicting Opportunity Exploitation Tendencies.** First, we describe exploitation tendencies' incremental prediction by sociodemographic variables, the experimentally induced opportunity characteristics, i.e., perceived probability of success and perceived profit, and the cognitive, i.e., evaluation, and emotional, i.e., main and interaction effects of fear and joy, variables. We performed a hierarchical regression analysis, using the variables mentioned before as predictors and exploitation tendencies as the criterion (see Table 2). All regression-based analyses were performed using standardized values.

Using age and sex as predictors in the first step resulted in a significant prediction of exploitation tendencies,  $F(2, 128) = 3.77$ ,  $p < .05$ ,  $R^2_{adj} = .04$ , indicating that women were generally slightly less inclined to exploit a given opportunity; however, this effect disappeared in later steps.

In the second step of the regression analysis, we included the experimentally induced opportunity characteristics, which both significantly and incrementally predicted entrepreneurial exploitation,  $\Delta R^2_{adj} = .23$ ,  $p < .001$ , thus indicating that perceived probability of success ( $\beta = .38$ ,  $p < .001$ ) and perceived profit ( $\beta = .22$ ,  $p < .01$ ) independently predicted exploitation tendencies. In this step, age was significant as well, indicating that older participants were less likely to exploit a given situation; again this effect disappeared in later steps.

In the third step, evaluation was included, which not only explained a significant amount of incremental variance,  $\beta = .58$ ,  $p < .001$ ,  $\Delta R^2_{adj} = .18$ ,  $p < .001$ , but also resulted in the loss of the experimentally induced opportunity characteristics', i.e., perceived probability of success and perceived profit, predictive value. This indicates that the cognitive evaluation of an opportunity is more important for the exploitation decision than the experimentally induced economic characteristics of the opportunity are. This also

Table 2

## Multiple Regression Models Predicting Entrepreneurial Exploitation (Study 1)

Predictors:	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Age	-0.14		-0.16	*	-0.08		-0.05	
Sex (1 = female)	-0.22	*	-0.14		-0.07		-0.02	
Perceived probability			0.38	***	0.13		0.13	
Perceived profit			0.22	**	-0.01		0.00	
Evaluation					0.58	***	0.54	***
Fear							-0.16	*
Joy							0.15	*
Evaluation $\times$ Fear							-0.14	*
Evaluation $\times$ Joy							0.17	*
$R^2 adj$	0.04	*	0.27	***	0.45	***	0.50	***
$\Delta R^2 adj$			0.23	***	0.18	***	0.05	**

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

One-tailed tests for hypotheses, two-tailed tests for others; no collinearities were detected, residuals suggest homoscedasticity.

supports our assumption that evaluation mediates opportunity characteristics' influence on exploitation tendencies, which is also tested in the subsequent mediation analysis.

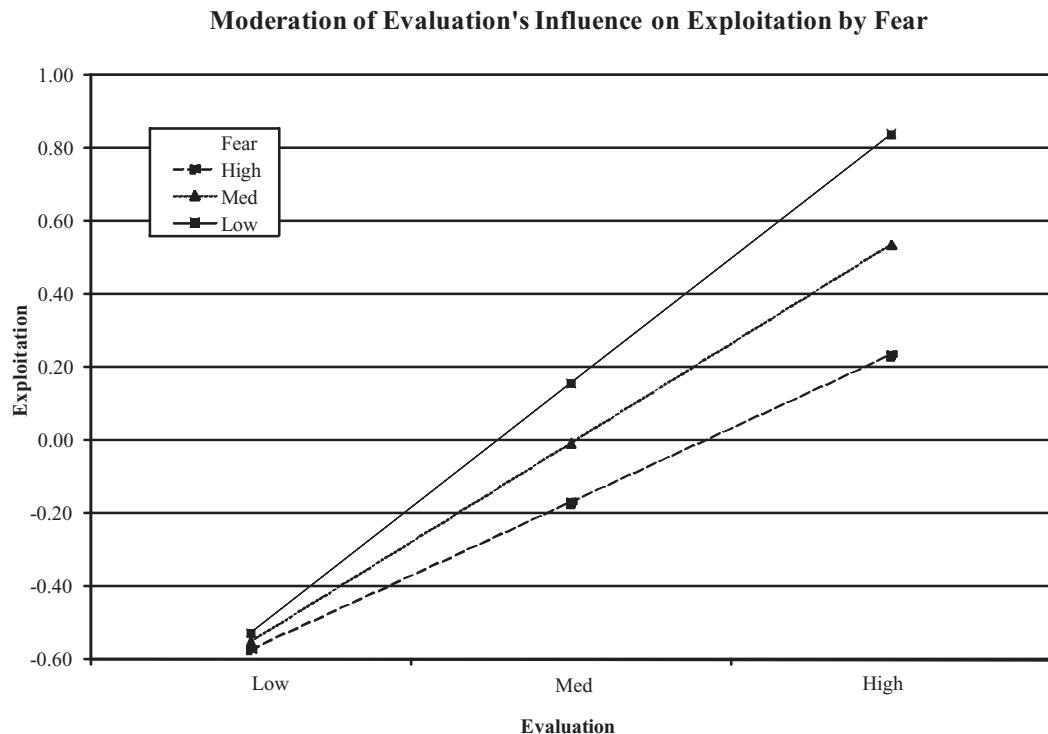
In the final step of the regression analysis, all emotion-related predictors were entered, which resulted in an overall significant increase in predicted variance in addition to all the variables already included in the model,  $\Delta R^2 adj = .05, p < .01$ . More specifically, the fear and joy main effects were significant, indicating that both fear ( $\beta = -.16, p < .05$ ) and joy ( $\beta = .15, p < .05$ ) directly and independently predicted exploitation tendencies, which supports hypotheses 2a and 2b. Additionally, confirming hypotheses 3a and 3b, both the emotions' interactions with cognitive evaluation were significant indicating that, simultaneously, fear decreases ( $\beta = -.14, p < .05$ , see Figure 1) and joy increases ( $\beta = .17, p < .05$ , see Figure 2) the positive impact of cognitive evaluation on behavior-oriented exploitation tendencies. Almost none of cognitive evaluation's predictive power was lost when the emotion-related variables were entered, denoting the relative independence and incrementality of cognitive and emotional variables when predicting exploitation tendencies.

**Mediation of Opportunity Characteristics' Influence on Exploitation Through Evaluation.** Consistent with our assumptions, the regression analysis revealed that the predictive power of the experimentally induced opportunity characteristics on exploitation tendencies, i.e., the criterion, disappeared when the cognitive evaluation, i.e., the mediator, was entered. Consequently, this indicated the potential mediation of the opportunity characteristics' influence on exploitation tendencies through evaluation. Moreover, the regression analysis confirmed emotions' hypothesized moderation of the relation between evaluation and exploitation. To adequately represent this pattern, we performed mediation (Preacher & Hayes, 2008) and moderated mediation analyses (Preacher, Rucker, & Hayes, 2007).

To test hypotheses 1a and 1b, we applied mediation analyses (cf. Preacher & Hayes, 2008) using 1,000 bootstrap samples and age, sex, and the other opportunity characteristic, i.e., perceived probability of success or perceived profit, as covariates. Our analyses

Figure 1

Simple Slopes for the Interaction of Fear and Evaluation of Entrepreneurial Opportunity When Predicting Exploitation of Entrepreneurial Opportunity (Study 1)



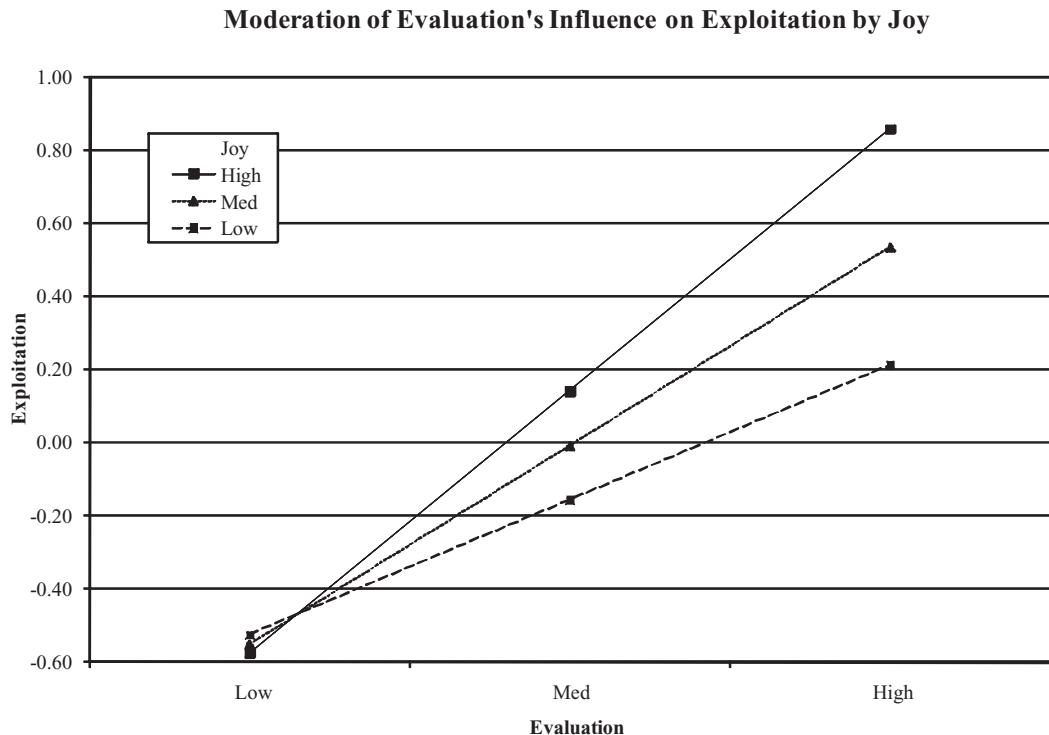
demonstrated a significant indirect effect on exploitation tendencies via evaluation for perceived probability of success (indirect effect = .25, bias corrected and accelerated 95% confidence interval [BCa 95% CI] = .15 to .38) and for perceived profit (indirect effect = .23, BCa 95% CI = .11 to .40). Indicating a complete mediation in both cases, the experimentally induced opportunity characteristic lost its significant influence on exploitation when evaluation was included as mediator.<sup>2</sup>

This overall pattern, i.e., the mediation effects of evaluation on the impact of the opportunity characteristics on exploitation and the moderating effects of emotions on

2. As our analyses are based on cross-sectional data sharing common method the obtained relations might at least to some extent be a result of common method variance, but not of associations between the underlying constructs themselves (see for review: Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Therefore, within each of the reported mediation analyses we tested each path, i.e., from predictor to criterion, from predictor to mediator, from mediator to criterion, by using the correlational marker technique (see Richardson, Simmering, & Sturman, 2009) developed by Lindell and Whitney (2001) and recommended by Grant and Campbell (2007) and Sendjaya, Sarros, and Santora (2008). In no cases was a regression weight substantially influenced in its size or significance, i.e., in no cases did we observe that a previously significant association was no longer significant or vice versa, thus indicating that our mediation findings are very unlikely to be explained by methodological artifacts instead of associations between the constructs observed.

Figure 2

Simple Slopes for the Interaction of Joy and Evaluation of Entrepreneurial Opportunity When Predicting Exploitation of Entrepreneurial Opportunity (Study 1)



the impact of evaluation on exploitation, is summarized in a moderated mediation model (cf. Preacher et al., 2007) in Figure 3. Altogether, four moderated mediations were computed to assess the mediation of the two experimentally induced opportunity characteristics separately using both emotions separately as moderators.

Using 1,000 bootstrap samples, the results of these analyses confirmed the simultaneous presence of the mediation via evaluation and the moderation via emotions of the path of the mediator, i.e., evaluation, on the criterion, i.e., exploitation, as all four moderations reached significance ( $ps < .05$ ) within the mediation models. Thus, these findings indicate that evaluation completely mediates the association between experimentally induced opportunity characteristics and exploitation and that this mediation effect varies as a function of both emotions.

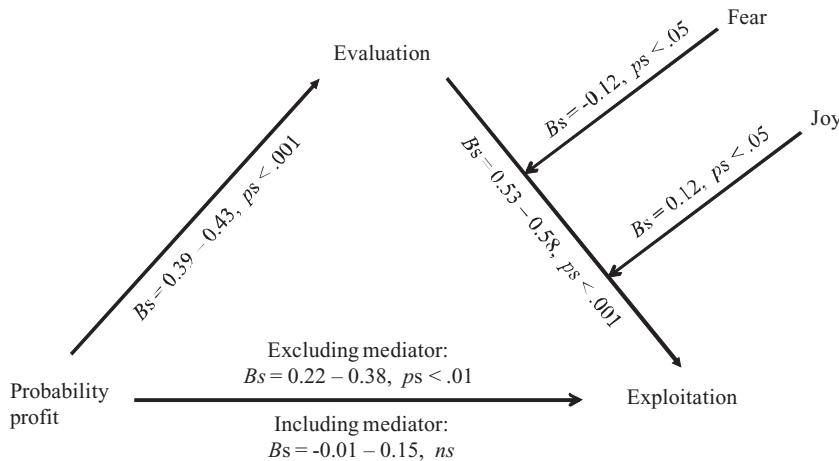
## Study 2

### Data and Method

**Experimental Design.** Study 2 was designed to replicate and extend the findings of study 1 by experimentally inducing additional opportunity characteristics and including an

Figure 3

Moderated Mediation of the Association Between Opportunity Characteristics and Exploitation (Study 1)



additional emotion. Examining four independent variables, study 2 was based on a 2 (probability of success: high vs. low)  $\times$  2 (profit if it were to succeed: high vs. low)  $\times$  2 (share of personal investment: high vs. low)  $\times$  2 (time to profit: high vs. low) design with independent measures thus resulting in 16 experimental scenario frameworks.

**Material and Measures.** The entrepreneurial scenario in study 2 was introduced with the probability of success as being either high (a rating by experts of 90%) or low (a rating by experts of 10%), the profit as being either high (annual earnings of € 350,000) or low (annual earnings of € 25,000), the time to profit being either long (if successful, 7 years) or short (if successful, 1 year), and the personal investment being either high (equity ratio 90%) or low (equity ratio 10%). As in study 1, participants were instructed to use these experimentally induced opportunity characteristics as a framework to develop and briefly describe an entrepreneurial opportunity with personal meaning. After imagining themselves in this scenario participants answered the following self-assessment scales:

**Fear.** We used three items of the PANAS-X fear subscale, e.g., afraid, in the same procedure as in study 1 ( $\alpha = .89$ ).

**Joy.** We used three items of the PANAS-X joviality subscale, e.g., happy, in the same procedure as in study 1 ( $\alpha = .88$ ).

**Anger.** In addition, we used three items of the PANAS-X hostility subscale, e.g., angry, to assess the individual's level of anger, e.g., about the specific characteristics of their developed opportunity, when deciding whether or not to become entrepreneurially active in this specific scenario ( $\alpha = .71$ ).

**Evaluation.** The same three items as in study 1 formed a scale with high internal consistency ( $\alpha = .86$ ).

**Exploitation Tendency.** We used the same three items as in study 1.

**Manipulation Checks.** The same three items as in study 1 were used to rate the probability of success ( $\alpha = .95$ ) and the extent of future profits ( $\alpha = .91$ ) in the specific scenario.

In a similar way, participants additionally rated personal investment and time to profit in the specific scenario by answering three questions using 11-point rating scales. Specifically, they provided answers to (1) how high the required personal investment from their point of view is; (2) if they decide themselves to found this venture, how much equity share they themselves might have to invest from their point of view; and (3) how much money they themselves would have to invest, if they decide to found this venture ( $\alpha = .95$ ). The mean value of these three manipulation check items is the participant's perceived investment score.

The time to profit ( $\alpha = .93$ ) was assessed by rating (1) how long the time from their point of view is until their founded venture is profitable, thus focusing on the time between foundation and profitability; (2) if they decide to found this venture, how long it would take from their point of view until they generate profit, thus focusing on the time between the decision to found and profitability; and (3) how long the time to profitability of their venture is from their point of view, thus not being very specific about the exact period of time. The mean value of these three manipulation check items is the participant's perceived duration score.

**Participants and Procedure.** The sample in study 2 consisted of 78 male and 100 female students with mean age of 25.79 ( $SD = 2.43$ ) for men and 26.28 ( $SD = 4.74$ ) for women. The procedure was the same as in study 1, except that this time the assessment was computer-based, and participants were recruited via university mailing lists.

In addition to biological sex and age, we also assessed whether participants had ever founded their own business (founder: yes/no) and used the software code for the rank of participation (i.e., rank 1 for the first participant, rank 178 for the last participant) to examine potential response biases as a function of time of participation.

## Results

**Descriptive Analyses and Correlations.** As shown in Table 3, perceived probability of success and perceived profit were significantly associated with evaluation and exploitation tendencies ( $rs > .22, ps < .05$ ), whereas perceived investment and perceived duration were not ( $rs > -0.03, ns$ ). As in study 1, fear was inversely correlated with evaluation ( $r = -.20, p < .05$ ) and with exploitation ( $r = -.20, p < .05$ ), whereas there were positive correlations between joy and evaluation ( $r = .38, p < .01$ ) and with exploitation ( $r = .42, p < .01$ ). Anger was inversely associated with evaluation ( $r = -.19, p < .05$ ) but not with exploitation ( $r = -.09, ns$ ).

**Manipulation Checks.** Analyses indicated that all four independent variables, i.e., the opportunity characteristics, were successfully induced,  $ps < .001$ . As in study 1, these manipulation checks were used in subsequent analyses as indicators of the experimentally induced opportunity characteristics.

**Predicting Opportunity Exploitation Tendencies.** As in study 1, exploitation tendencies were predicted by sociodemographic variables, the experimentally induced opportunity characteristics, i.e., perceived probability, profit, investment, and duration, and the cognitive as well as emotional variables in a hierarchical regression analysis (see Table 4).

Using founder (yes/no), rank of participation (cf. Conover & Iman, 1981) as an indicator of potential nonresponse bias, age, and sex as predictors in the first step

Table 3

## Descriptive Statistics, Intercorrelations, and Reliabilities of the Assessed Variables (Study 2)

	M	SD	SK	KU	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Age	26.08	3.90	2.90	13.66	—	0.06	-0.15	-0.03	-0.10	-0.24	-0.07	-0.02	-0.05	-0.06	-0.03
(2) Sex (1 = female)	0.56	—	—	-0.04	—	0.13	0.05	0.22	0.21	0.14	0.05	-0.01	0.03	-0.14	—
(3) Perceived probability	6.44	2.36	-0.37	-0.86	-0.10	0.11	(.95)	0.31	0.14	0.18	-0.14	-0.02	0.24	0.55	0.34
(4) Perceived profit	7.09	2.09	-0.47	-0.49	0.03	0.03	0.27	(.91)	0.19	0.05	-0.06	-0.05	0.11	0.36	0.27
(5) Perceived investment	6.70	2.56	-0.18	-1.17	-0.17	0.21	0.14	0.18	(.95)	0.43	0.11	0.04	-0.05	0.04	-0.03
(6) Perceived duration	6.22	2.33	-0.04	-1.01	-0.24	0.22	0.16	0.03	0.41	(.93)	0.18	0.09	0.00	0.09	0.02
(7) Fear	2.73	1.10	0.32	-1.04	-0.10	0.21	-0.13	-0.09	0.13	0.21	(.89)	0.36	-0.18	-0.24	-0.25
(8) Joy	3.09	0.99	-0.29	-0.55	0.05	0.00	0.23	0.12	-0.05	-0.01	-0.17	(.88)	-0.16	0.43	0.40
(9) Anger	1.54	0.66	1.89	4.00	0.04	0.07	-0.07	-0.10	0.05	0.13	0.38	-0.14	(.71)	-0.19	-0.09
(10) Evaluation	6.11	2.28	-0.42	-0.69	0.09	0.02	0.54	0.34	0.02	0.06	-0.20	-0.11	0.38	(.86)	0.63
(11) Exploitation	3.78	2.53	0.95	0.17	0.07	-0.11	0.31	0.22	-0.03	0.01	-0.20	-0.08	0.42	0.65	—

*Notes:* For descriptive statistics  $n = 178$ . Since most skewness and kurtosis values are within the range of -1.00 and +1.00 suggested by Muthén & Kaplan (1985), parametric analyses seem justified. However, as there were some (slight) deviations from normality for age and joy, we additionally computed Spearman's nonparametric rank correlations which overall were very similar to Pearson's correlation, thus indicating that the parametric indicators of association are not severely influenced by these deviations. For Pearson correlation (above main diagonal):  $|r| > .19, p < .05$  (two-tailed),  $|r| > .24, p < .01$  (two-tailed). For Spearman rank correlation (below main diagonal):  $|r| > .18, p < .05$  (two-tailed),  $|r| > .23, p < .01$  (two-tailed).

Within main diagonal: Reliabilities (Cronbach's alpha).

M, mean; SD, standard deviation; SK, skewness; KU, kurtosis.

Table 4

## Multiple Regression Models Predicting Entrepreneurial Exploitation (Study 2)

Predictors:	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Founder (1 = yes)	0.05		0.03		0.03		0.04	
Rank of participation	0.15		0.09		0.07		0.11	
Age	-0.03		0.03		0.02		-0.01	
Sex (1 = female)	-0.12		-0.17	*	-0.15	**	-0.13	*
Perceived probability			0.30	***	0.01		0.01	
Perceived profit			0.19	**	0.05		0.04	
Perceived investment			-0.08		-0.04		-0.01	
Perceived duration			0.05		0.03		0.03	
Evaluation					0.60	***	0.54	***
Fear							-0.11	*
Joy							0.17	**
Anger							0.13	*
Evaluation × Fear							-0.14	*
Evaluation × Joy							0.17	**
Evaluation × Anger							0.16	*
$R^2_{adj}$	0.02		0.16	***	0.40	***	0.45	***
$\Delta R^2_{adj}$	0.04		0.15	***	0.23	***	0.07	***

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

One-tailed tests for hypotheses, two-tailed tests for others; no collinearities were detected, residuals suggest homoscedasticity.

resulted in a nonsignificant prediction of exploitation tendencies,  $F(4, 173) = 1.97$ ,  $ns$ ,  $R^2_{adj} = .02$ .

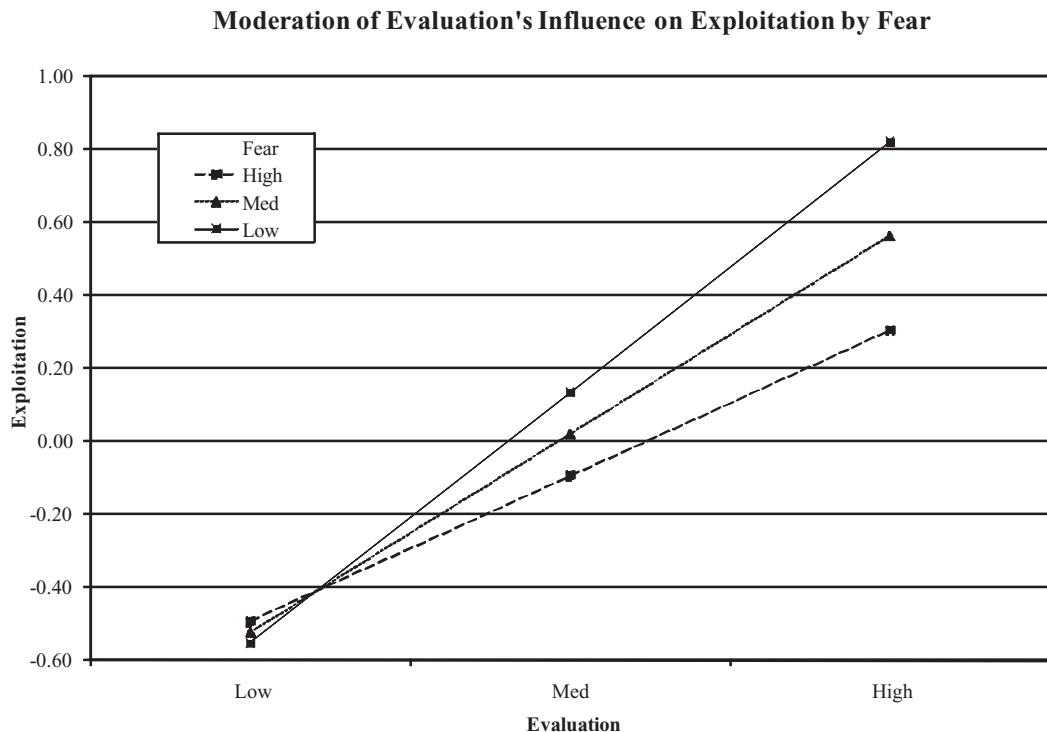
In the second step of the regression analysis, we included the experimentally induced opportunity characteristics which significantly and incrementally predicted entrepreneurial exploitation,  $\Delta R^2_{adj} = .15$ ,  $p < .001$ , thus indicating that perceived probability of success ( $\beta = .30$ ,  $p < .001$ ) and perceived profit ( $\beta = .19$ ,  $p < .01$ ) independently predicted exploitation tendencies. Share of investment and duration did not emerge as significant predictors. In this step, sex was significant as well indicating that women were generally slightly less inclined to exploit a given opportunity.

In the third step, evaluation was entered, which again not only explained a significant amount of incremental variance,  $\beta = .60$ ,  $p < .001$ ,  $\Delta R^2_{adj} = .23$ ,  $p < .001$ , but also resulted in the loss of the opportunity characteristics' predictive value, thus again supporting the mediation hypothesis.

In the final step of the regression analysis, all emotion-related main and interaction terms were entered, which resulted in an overall significant increase in predicted variance in addition to all the variables already included in the model,  $\Delta R^2_{adj} = .07$ ,  $p < .001$ . More specifically, the main effects of fear ( $\beta = -.11$ ,  $p < .05$ ), joy ( $\beta = .17$ ,  $p < .01$ ), and anger ( $\beta = .13$ ,  $p < .05$ ) were significant indicating that these emotions directly and independently predicted exploitation tendencies thereby supporting hypotheses 2a, 2b, and 2c. Moreover, confirming hypotheses 3a, 3b, and 3c, the emotions' interactions with evaluation were significant. This indicates that fear decreases ( $\beta = -.14$ ,  $p < .05$ , see Figure 4), joy increases ( $\beta = .17$ ,  $p < .01$ , see Figure 5), and anger increases ( $\beta = .16$ ,  $p < .05$ , see Figure 6) simultaneously the positive association between cognitive evaluation and behavior-oriented exploitation tendencies. Almost none of evaluation's predictive power

Figure 4

Simple Slopes for the Interaction of Fear and Evaluation of Entrepreneurial Opportunity When Predicting Exploitation of Entrepreneurial Opportunity (Study 2)



was lost when the emotion-related variables were entered, denoting the relative independence of cognitive and emotional variables when predicting exploitation tendencies.

**Mediation of Opportunity Characteristics' Influence on Exploitation Through Evaluation.** To test hypotheses 1a and 1b, we applied mediation analyses (cf. Preacher & Hayes, 2008) using 1,000 bootstrap samples, the same covariates as the regression model and the other three opportunity characteristics as covariates. Our analyses demonstrated a significant indirect effect via evaluation for probability (indirect effect = .13, BCa 95% CI = .07 to .18) and profit (indirect effect = .06, BCa 95% CI = .02 to .11) but not for perceived investment and perceived duration, thus not supporting hypotheses 1c and 1d.

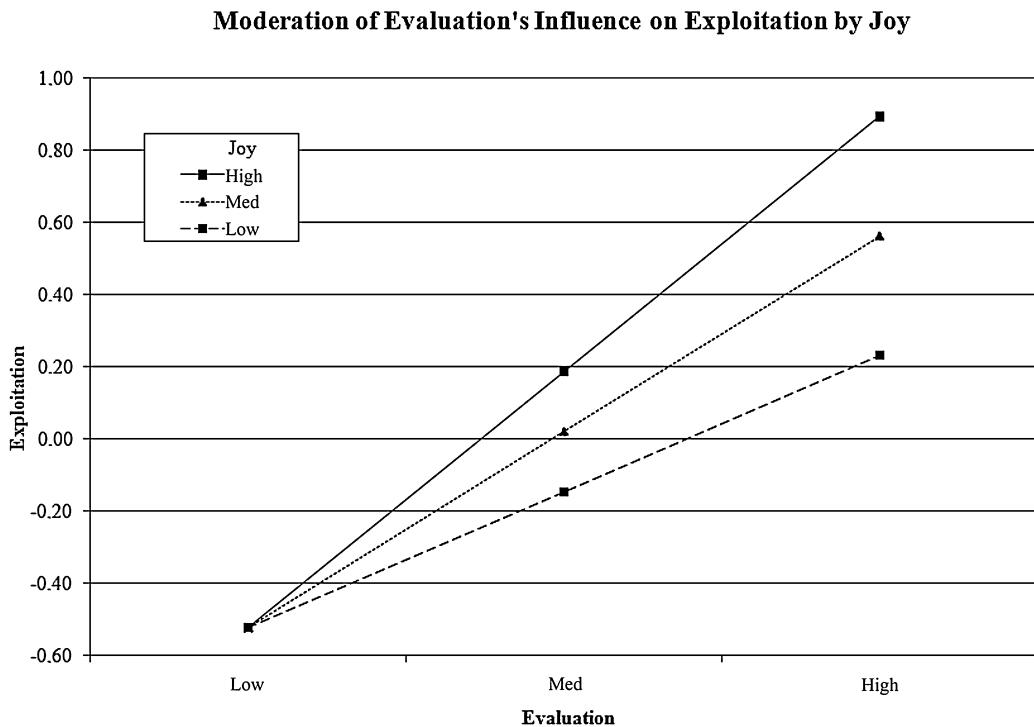
The findings of moderated mediation analyses are shown in Figure 7. These analyses confirmed the moderating effects of all three emotions ( $p < .05$ ) on the impact of evaluation on exploitation for the only two supported mediations, i.e., when using perceived probability of success and perceived profit as predictors.

## Discussion and Conclusion

This research set out to examine the direct and the moderating effects of emotions on exploitation tendencies. Within a mediation model, we predicted entrepreneurial

Figure 5

Simple Slopes for the Interaction of Joy and Evaluation of Entrepreneurial Opportunity When Predicting Exploitation of Entrepreneurial Opportunity (Study 2)

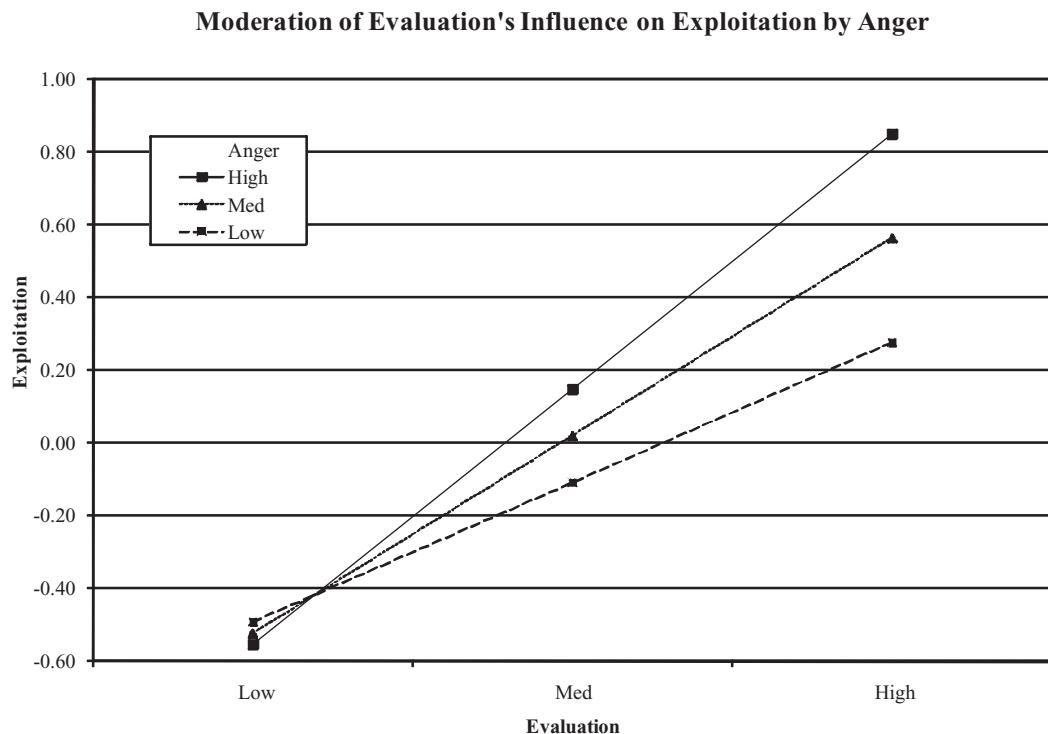


exploitation tendencies by experimentally induced opportunity characteristics, i.e., perceived probability of success, profit, investment, and time to profit, via cognitive evaluation. In addition to the indirect effects of opportunity characteristics on exploitation via evaluation, we hypothesized direct negative effects of an avoidance-oriented emotion, i.e., fear, and direct positive effects for approach-oriented emotions, i.e., joy and anger, on exploitation. Moreover, based on the affective processing principle, we predicted incremental moderating effects of these emotions on the positive association between opportunity evaluation and exploitation. We assumed approach-oriented emotions to increase and avoidance-oriented emotions to decrease the positive predictive value of evaluation on exploitation.

Overall, our hypotheses were supported. The influence of opportunity's characteristics, at least of those significantly predicting exploitation decisions, i.e., perceived probability of success and perceived profit, was mediated by the cognitive evaluation of the opportunity. Across both studies, findings show that probability of success and profit are central determinants of evaluation, which, in turn, emerged as a pivotal determinant of exploitation. Evaluation was demonstrated to completely mediate the positive impact of perceived probability of success and of perceived profit on exploitation. Despite their theoretical relevance and successful induction, the opportunity characteristics of personal investment

Figure 6

Simple Slopes for the Interaction of Anger and Evaluation of Entrepreneurial Opportunity When Predicting Exploitation of Entrepreneurial Opportunity (Study 2)



and time to profit did not emerge as significant predictors of opportunity exploitation when evaluation was included in the model.

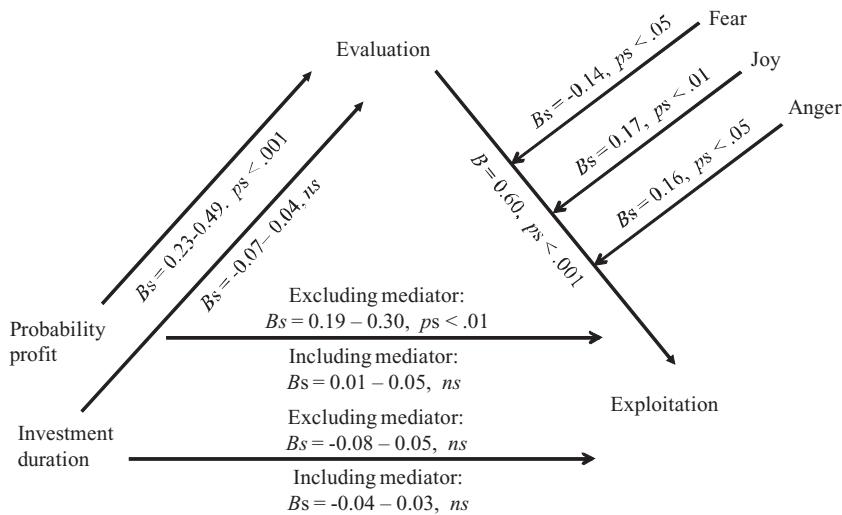
More importantly, all opportunity-evoked emotions directly influenced opportunity exploitation. In accordance with the affect-as-information theory, fear decreased entrepreneurial exploitation, whereas joy and anger were associated with increased exploitation tendencies. Furthermore, in agreement with the affective processing principle, fear, joy, and anger moderated the mediation of the association between opportunity characteristics and exploitation by evaluation, indicating a moderated mediation higher levels of fear reduced, and higher levels of joy and anger increased the positive impact of evaluation on exploitation.

### Theoretical Implications

We think that these findings contribute to our understanding of entrepreneurial decision making in four ways. First, our results consistently indicate that the objective characteristics of a given opportunity's probability of success and profit are closely connected with the subjective cognitive evaluation which, in turn, is associated with exploitation tendencies. Hence, the opportunity characteristics are only a distant predictor of entrepreneurial

Figure 7

Moderated Mediation of the Association Between Opportunity Characteristics and Exploitation (Study 2)



exploitation. The influence of these opportunity characteristics on exploitation tendency is mediated by the subjective cognitive evaluation of the opportunity. Whereas prior literature has largely focused on objective characteristics of entrepreneurial opportunities, these findings indicate that the subjective evaluations might be even more important and more closely connected to exploitation tendencies than opportunity specifics. Therefore, evaluative processes are of special interest for entrepreneurship scholars. This is in accordance with findings of entrepreneurship scholars examining the individual's decision to start a new venture (Simon et al., 2000) strongly indicating the relevance of cognitive-evaluative processes within entrepreneurial decision making (cf. Keh et al., 2002). Thus, our study contributes to the literature on the opportunity-individual nexus (Shane, 2003, p. 9): Our findings point out that objective opportunity characteristics do not directly influence entrepreneurial opportunity exploitation. Instead, it is an evaluative process that determines if individuals will become entrepreneurs in a specific situation.

Second, our study addresses the calls of Cardon, Wincent, Singh, and Drnovsek (2009), Goss (2007), and Shepherd (2004) for empirical investigations on the role of emotions in the entrepreneurial process. Our findings emphasize the *simultaneous* and *distinct* role of different emotions for the exploitation of entrepreneurial opportunities, which is not only independent from the effects of the other emotions examined but also from the effects of opportunity characteristics and cognitive evaluation. Thus, this study strongly argues for a unique predictive value of discrete emotions within the pre-exploitation decision process which cannot be accounted for by the cognitive evaluation of the opportunity. Furthermore, the findings of this study are highly consistent with conceptual work by Baron (2008) whose propositions accentuate the motivational tone of emotional states, i.e., approach vs. avoidance, instead of their valence, i.e., positive vs. negative. Our results provide clear support that the influence of anger as an approach-oriented emotion with negative valence on exploitation tendencies is more similar to the influence of joy, i.e., an approach-oriented emotion with positive valence than to the effect

of fear, i.e., an avoidance-oriented emotion with negative valence. This differentiation is consistent with emotion theories (cf. Clore & Palmer, 2009), existing empirical evidence in the field of psychology (Bodenhausen, Sheppard, & Kramer, 1994), and empirical evidence in the field of entrepreneurship (Foo, 2009). The study by Foo confirms that emotions of similar valence could exhibit a different influence due to different underlying appraisal tendencies: Fear-experiencing entrepreneurs could evaluate a specific opportunity differently, e.g., in terms of its riskiness, compared to entrepreneurs experiencing anger. Summarizing these findings, it seems necessary for future entrepreneurship research to differentiate emotions in terms of their valence, their motivational tone, and their underlying appraisals although this distinction has so far not been consistently considered in entrepreneurship research.

Third, in addition to these main effects, we confirmed the existence of incremental moderation effects for each emotion for the first time within entrepreneurial research. The positive impact of evaluation on exploitation varied as a function of lingering emotions. This finding provides important implications for entrepreneurship research because it points to the necessity of addressing the direct and the moderating effects of emotions: Emotions do not merely provide stop or go signals, i.e., main effects, when predicting exploitation. Positive/negative emotions also increase/decrease the impact of central cognitive evaluations on exploitation judgments. Interestingly, these direct and moderating effects occur independently from each other and independently from opportunity characteristics and cognitive aspects. Thus, as much as other fields of economic research consider these two effects of emotions (cf. Smith & Bolton, 2002), entrepreneurship research is well advised to study both direct and moderating effects of emotions on entrepreneurial exploitation tendencies.

Fourth, several scholars (cf. Sarason et al., 2006) argued for the development of a dynamic model integrating the characteristics of the potential entrepreneur as well as of the entrepreneurial situation. Based on an integrative process model, this study confirms that entrepreneurial behavior is a result of the interplay between (1) objective opportunity characteristics, (2) subjective evaluations of these objectives by entrepreneurs, and (3) their emotional interference. Thus, we address the call by Casson (2005) who argues that the nature of an opportunity and cognitive opportunity-related aspects should be considered in future research. We addressed this research gap by additionally considering distinct emotions and their complex impact.

## Practical Implications

Turning to the practical implications of our findings, entrepreneurs should be aware that they always have a subjective view for entrepreneurial opportunities. Even opportunities with highly positive characteristics might not result in increased exploitation tendencies. If an individual's current emotion configuration is characterized, for instance, by high levels of fear and low levels of anger and joy, a decreased exploitation tendency results. Thus, entrepreneurs should know and consider that emotions systematically influence their decisions in addition to their individual cognitive evaluations. For entrepreneurship educators, our study indicates that it might be wise to supplement standard business planning and entrepreneurship courses with material that addresses emotion and cognition awareness.

Moreover, entrepreneurs should be informed that, for instance, fear does not only decrease exploitation tendencies directly but also reduces the impact of positive opportunity evaluations. Therefore, potential entrepreneurs should judge an opportunity under various emotional states that can be easily induced by external factors as the object to be

evaluated does not need to be the affect-inducing stimulus (Clore & Huntsinger, 2009). Furthermore, making entrepreneurs reattribute their emotions originally related to the opportunity, e.g., fear of failure (Shepherd, 2003), or to other objects, e.g., an irritating experience right before making the judgments, should reduce the influence of emotions on exploitation judgments (Schwarz & Clore, 1983).

## **Limitations**

Several limitations should be taken into consideration when interpreting the results of this study and extending its generalizability. Since we employed a questionnaire, we were only able to record data related to participants' attitudes and could not obtain any direct behavioral measures. As self-reported data are not necessarily the same as actual behavior, these data only allow us to infer with caution how people would actually react. Nevertheless, Krueger and colleagues (Krueger & Carsrud, 1993; Krueger, Reilly, & Carsrud, 2000) point out that entrepreneurial intentions are the best predictors of venture formation and, thus, indicate the validity of our dependent variable. This is consistent with previous empirical work analyzing the antecedents of entrepreneurial activities that also use the likelihood or the intention of starting a business as a good proxy for entrepreneurial behavior (e.g., Lee, Wong, Foo, & Leung, 2011; Phan, Wong, & Wang, 2002).

It is sometimes argued that students are not an appropriate sample for entrepreneurship research (Davidsson, 2005, p. 72) since they merely comprise a subsection of society with a certain level of education (Crant, 1996). However, we assume that the mechanisms and phenomena that we study, such as emotions and cognitive evaluation, are fundamental by nature. Consequently, we do not expect a student sample and a sample of the general population to show differences in the relationships between variables. Furthermore, our study aims at understanding the antecedents of entrepreneurship, not established entrepreneurs, and addresses the question why some people decide to exploit entrepreneurial opportunities while others do not. Regarding the antecedents of entrepreneurship, students make a good sample as higher educated people have a higher probability of becoming entrepreneurs (Shane, 2003, pp. 267–270).

## **Suggestions for Future Research**

Future research should investigate the influence of a greater variety of emotions in addition to fear, joy, and anger. It would be particularly interesting to examine the influence of positive emotions on entrepreneurial activity including those emotions connected to passion and enthusiasm which have already received some academic attention (e.g., Baum & Locke, 2004; Cardon et al., 2009; Cardon, Zietsma, Saparito, Matherne, & Davis, 2005; Smilor, 1997). When examining the influence of these affective states, future research should additionally account for the individual's ability to regulate and control for emotions (Spörrle & Welpe, 2006; Spörrle, Welpe, & Försterling, 2006).

Another interesting line of inquiry is the exploration of additional psychological phenomena further differentiating the association between evaluation and exploitation. In general, the likelihood of exploitation is higher when the situation is evaluated as more positive. Since we did not find this relationship to be deterministic but to be moderated by emotions, future research should elaborate further causes why some people deny the exploitation of opportunities they evaluate positively. For instance, low self-efficacy might result in reduced exploitation tendencies even if opportunity evaluation is high (cf. Bandura, 2001; Strobel, Tumasjan, & Spörrle, 2011). Correspondingly, future research

should examine why some people exhibit a high likelihood that they will exploit an opportunity even if they evaluate it as not very positive. General entrepreneurial attitude (Douglas & Shepherd, 2000, 2002), irrational cognitions (cf. Spörrle, Strobel, & Tumasjan, 2010), or positive cognitive illusions such as overconfidence (Keh et al., 2002) might affect the association between evaluation and exploitation.

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