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Emotions and Entrepreneurial Opportunity Evaluation

Maw-Der Foo

Emotions may affect opportunity evaluation yet emotions' influence in entrepreneurship research has been neglected. Findings from the two studies in this paper indicate that appraisal dimensions of emotions influence risk perceptions and preferences. In Study 1 (n = 187), the participants' scores on risk perception for a venture scenario were significantly lower for anger and happiness-induced participants (emotions associated with outcome certainty and control) than for fear- and hope-induced participants (emotions associated with outcome uncertainty and a lack of outcome control). In Study 2 (n = 66), the entrepreneurs' preference for the higher value but uncertain outcome related positively to their scores on trait anger and trait happiness.

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Cognition plays a central role in entrepreneurship research with several special issues in entrepreneurship journals devoted to the entrepreneurs' cognitive processes. This cognition focus advances our understanding of how entrepreneurs evaluate business opportunities (Keh, Foo, & Lim, 2002; West, 2007), but the influence of emotions on how entrepreneurs evaluate business opportunities is rare. The role of emotions, however, has started to make inroads into entrepreneurship research. For instance, Cardon, Zietsma, Saparito, Matherne, and Davis (2005) used a parenthood metaphor to illustrate that emotion is a critical factor in the entrepreneurial process. In a special issue of *Entrepreneurship Theory and Practice*, Mitchell et al. (2007) called for affect (i.e., feelings and emotions) to be included in entrepreneurship research.

Emotions, both trait and state emotions, may shape evaluations because they influence how individuals process information (Beal, Weiss, Barros, & Macdermid, 2005; Isen & Labroo, 2003; Lyubomirsky, King, & Deiner, 2005; Oaksford, Morris, Grainger, & Williams, 1996). Trait emotions are individual tendencies to feel particular emotions. State emotions result from events eliciting particular emotions. The impact of emotion should especially be significant in circumstances characterized by high uncertainty and high engagement. In these circumstances, individuals may use feelings as cues on preferred courses of actions (Baron, 2008; Forgas, 1995). The environment in which entrepreneurs operate is frequently unpredictable with rapid changes. In this environment, emotions may tip the balance toward certain decisions (Baron).

Although there is disagreement among researchers about the definition of emotion (for a brief review, see Seo, Barrett, & Bartunek, 2004), many researchers outside the field

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of entrepreneurship who study emotions on evaluations usually employ a valence-based approach. Valence is defined as the extent to which an experience is pleasurable (for reviews, see Elster, 1998; Forgas, 1995; Higgins, 1997). This approach is incomplete because emotions of the same valence can result in different risk assessments (Lerner & Keltner, 2000, 2001). Therefore, in this study, emotions are defined as feelings of pleasure or displeasure together with the appraisal tendencies linked to these feelings (Lerner & Keltner, 2000; Smith & Ellsworth, 1985; Tiedens & Linton, 2001). For example, two emotions of different valence, fear and hope, are defined by the appraisal tendencies of a lack of individual control and uncertainty, and by the fact that individuals experiencing these emotions are predisposed to perceive risk. Anger and happiness, again emotions of different valence, are defined by appraisal tendencies of individual control and certainty (Lerner & Keltner, 2001; Smith & Ellsworth). Individuals experiencing these emotions are predisposed to perceive less risk.

This paper used the appraisal tendency framework to examine how emotions influence opportunity evaluation as represented by risk perceptions and risk preferences. Two studies were conducted: one using a student sample, another using an entrepreneur sample. This article makes the following contributions. First, this is one of the few empirical studies demonstrating emotions to affect opportunity evaluations. These findings are consistent with studies outside the entrepreneurship field, establishing trait emotions (individual tendencies) and state emotions (those elicited from events) to shape risk assessments and preferences (Lerner, Gonzalez, Small, & Fischhoff, 2003; Lerner & Keltner, 2001). Second, our findings suggest that emotions of similar valence influence risk perceptions and risk preferences. Researchers studying emotions in entrepreneurship should, therefore, be alert to the appraisal tendencies associated with each emotion and should not focus solely on emotional valence.

The next section reviews the literature on the valence approach and the appraisal tendency framework to evaluations. The appraisal tendency framework is then used to develop the hypotheses. Following that section, Studies 1 and 2 are presented. The final section discusses the theoretical implications of the study, suggests directions for future research, and offers practical implications of an emotion approach to entrepreneurship.

Theoretical Development

Existing literature on how entrepreneurs evaluate business opportunities focuses on cognitive factors (Baron, 1998; Mitchell et al., 2007; Simon, Houghton, & Aquino, 2000), but affect may also predict entrepreneurial actions (Foo, Uy, & Baron, 2009; Robinson, Stimpson, Huefner, & Hunt, 1991) by triggering a complex series of thoughts that shape evaluations (Beal et al., 2005; Isen & Labroo, 2003; Oaksford et al., 1996). According to the affect infusion model (AIM) (Forgas, 1995), the affect–evaluation link should be particularly strong when the context is complex with uncertainty and time constraints. Recent research supports Forgas's (1995) claims regarding affect infusion (Bless & Fiedler, 2006; Forgas, 2007). Also consistent with the AIM's predictions, affect infusion is greater in circumstances requiring elaborate, complex, and substantive processing strategies (Forgas & Tehani, 2005).

As Baron (2008) observed, the conditions of complexity and uncertainty characterize the environment in which entrepreneurs operate. Affect is the general term to include both moods and emotions (see Baron for review of affect in entrepreneurship). Moods are general feelings of positivity or negativity. In comparison, emotions are specific affect types, which can include anger, happiness, fear, and hope (Lerner & Keltner, 2000). An

emotion has a valence component (positive or negative); emotions also induce appraisals of the situation, including the extent to which the environment is controllable, and whether the outcome is predictable (Lerner & Keltner). Below, I first review the valence approach to evaluation, followed by the appraisal tendency framework used in this study.

Valence Approach to Risk Perceptions and Risk Preferences

Emotions influence risk perceptions and preferences because individuals can use emotions as a source of information (Ellsworth & Scherer, 2003; Ellsworth & Smith, 1988; Schwarz & Clore, 1983). For example, if we are asked to describe our level of life satisfaction, we can use our emotions at that point to gauge how satisfied we are. More pertinently, emotions may be used as information even if the emotions are produced by unrelated events (e.g., Forgas, 1995; Gangemi, Mancini, & van den Hout, 2007; Lerner, Small, & Loewenstein, 2004; Schwarz & Clore, 1996) such as a movie, the weather, and stress from life experiences. Therefore, entrepreneurs can evaluate business opportunities favorably on a pleasant day because of the positive emotions induced by that day. Most early studies of emotional influences on evaluations use the valence approach; i.e., the extent to which emotions are pleasant or unpleasant (e.g., Levin & Isen, 1975; Sinclair, 1988; Teasdale & Fogarty, 1980). Positively valenced emotions include happiness and hope; negatively valenced emotions include fear, sadness, and anger. Positively valenced emotions, in general, trigger recall of positive information and optimistic assessments; negatively valenced emotions trigger recall of negative information and pessimistic assessments (Direnfeld & Roberts, 2006; Johnson & Tversky, 1983).

Positive emotions can lead individuals to make more positive evaluations of a situation (Carver, 2003; Isen & Shalker, 1982) and to take more risks (Leith & Baumeister, 1996). Two mechanisms explain this phenomenon. The first is explained by mood congruence theories, where emotions direct attention toward, and facilitates recall of, similarly valenced information (Forgas & George, 2001; Isen & Shalker). Said otherwise, positive affect primes happy thoughts and memories, while negative affect does the opposite. Entrepreneurs experiencing positive emotions might focus on the venture's positive aspects, those experiencing negative emotions on the venture's negative aspects.

The second mechanism is affect-as-information (Schwarz & Clore, 1983, 2003). Our emotions provide information about the world around us. Positive emotions signal that things are going well and the environment is safe. These conditions may encourage individuals to try novel things (Fredrickson, 2001). In contrast, negative emotions signal things are not going well; in this situation, individuals have to process information carefully before they decide on a course of action (Martin & Stoner, 1996).

Appraisal Tendency Framework to Risk Perceptions and Risk Preferences

The valence approach assumes emotions of the same valence produce the same evaluations. For instance, individuals feeling happy and individuals experiencing hope, both positive emotions, are assumed to make decisions in the same direction. This assumption contradicts research using the appraisal tendency framework (Lerner & Keltner, 2000, 2001) that emotions of the same valence can produce different risk assessments. For example, Lerner et al. (2003) showed that participants experimentally induced to experience fear, as compared to their counterparts who were induced to experience anger, evaluated a scenario presented to them as riskier and preferred policy options of a more precautionary nature. Several other studies demonstrated that the appraisal

tendencies of specific emotions, not the valence, influenced evaluations (Bodenhausen, Sheppard, & Kramer, 1994; DeSteno, Petty, Wegener, & Rucker, 2000). In an experiment, sad participants, more so than angry participants, tended to appraise the situational forces as the cause of an ambiguous event, while angry participants, more so than sad participants, tended to appraise others to be the cause of that event (Keltner, Ellsworth, & Edwards, 1993).

The tendency of emotions to elicit particular appraisals is known as the *appraisal tendency framework* and this framework is based mostly on seminal work by Smith and Ellsworth (1985) and Ellsworth and Smith (1988). The appraisal tendency framework makes two assumptions. First, emotions trigger changes in cognition, which persist beyond the time when the emotion-eliciting situation has passed, and possibly to unrelated events (Gangemi et al., 2007; Lerner et al., 2004). Second, emotions are linked to specific appraisals of the environment. Through these appraisals, emotions predispose individuals to take particular actions. Smith and Ellsworth and Ellsworth and Smith identified six appraisals, or central dimensions, underlying emotions, namely, certainty, pleasantness, attentional activity, control, anticipated effort, and responsibility. Of these six appraisal dimensions, certainty and control determine judgments of risk (Lerner & Keltner, 2001). I focus on risk because the need to assess risk may be ubiquitous in an entrepreneurial environment (Baron, 1998). Control can be divided into individual control and situational control. In individual control, people perceive that they can determine the outcome of an event; while in situational control, people perceive less ability to influence the event's outcome. Certainty is the extent to which individuals perceive they can predict the event's outcome. Using these two central dimensions of control and certainty, I studied anger, fear, happiness, and hope. As explained previously, anger and fear have similar valence but differ in appraisals of control and certainty. Correspondingly, happiness and hope are of the same valence, but differ in appraisals of control and certainty.

Fear, Anger, Happiness, Hope, and Risk Perceptions

The appraisal tendency framework generates testable hypotheses. Figure 1 shows how appraisal tendencies lead to predictions of risk perceptions for anger, fear, happiness, and hope. Individuals experiencing fear, a negatively valenced emotion, perceive high outcome uncertainty and limited personal control over the outcome. Anger, also an emotion of negative valence, is in contrast, associated with high certainty and individual control (Lerner & Keltner, 2001; Smith & Ellsworth, 1985).

Among the positive emotions, hope is associated with high uncertainty about the outcome, with outcomes perceived as largely controlled by the situation (Smith & Ellsworth, 1985). Therefore, in terms of the appraisal tendencies of emotions, hope resembles fear more than anger. Happiness is associated with appraisals of high certainty and a sense of individual control (Lerner & Keltner, 2001; Smith & Ellsworth). Happiness, therefore, resembles anger in appraisal tendencies. Since hope and fear are both characterized by appraisal tendencies of uncertainty and situational control, individuals experiencing either emotion should evaluate risks in the same direction, in this case, higher risk perceptions. Anger and happiness are characterized by appraisal tendencies of certainty and individual control; individuals experiencing either emotion should perceive less risk.

Hypothesis 1: Scores on risk perception will be significantly lower for anger-induced or happiness-induced individuals than for fear-induced or hope-induced individuals.

In contrast to induced emotions, which are state emotions, trait emotions are stable individual tendencies to experience specific emotions across situations (for review, see

Figure 1

Influences of Two Negative Emotions, Fear and Anger, and Two Positive Emotions, Happiness and Hope, on Perceived Risk

Emotion valence

Perceived risk	Positive	Negative
High	**Hope** High perceived risk due to appraisal tendencies of low certainty and situation control	**Fear** High perceived risk due to appraisal tendencies of low certainty and situation control
Low	**Happiness** Low perceived risk due to appraisal tendencies of high certainty and individual control	**Anger** Low perceived risk due to appraisal tendencies of high certainty and individual control

Kagan, 1994). For example, some individuals are predisposed to experience negative emotions while others are predisposed to be cheerful. Although state and trait come from different sources, the first elicited by events and the other may have biological and genetic bases (Eysenck, 1990), state and trait emotions can produce similar effects (see Lyubomirsky et al., 2005 for a detailed review). For example, Lerner and Keltner (2001) found individuals high in trait fear were more likely to perceive risk and to adopt risk-averse behaviors; they found similar effects among fear-induced participants. State and trait emotions producing parallel effects were also found by an experiment conducted by Lerner et al. (2003). State fear and trait fear increased risk estimates and plans for precautionary measures; state anger and trait anger reduced risk estimates and plans for precautionary measures. Drawing from the appraisal tendency framework, trait anger and trait happiness should be linked to a preference for the higher value, but uncertain outcome, since these emotions are linked to appraisal tendencies of certainty and individual control.

Hypothesis 2: Individuals' preference for the higher value but uncertain outcome will relate positively to their scores on (1) trait anger and (2) trait happiness.

Methods

Two studies using the appraisal tendency framework were conducted to examine the research question of the effects of emotions on risk evaluations. Study 1 used a student sample to test hypothesis 1 where participants were experimentally induced to experience one of the four emotions: anger, happiness, fear, and hope. This study examined the effects of induced emotions on risk perceptions. Study 2 used an entrepreneur sample to examine the effect of trait anger and trait happiness on risk preferences. Study 1 differed from Study 2 in two significant ways. The first difference is Study 1 centered on state emotions while Study 2 centered on trait emotions. Each study focused on either trait or

state emotions because making emotions salient can reduce their effects (Keltner, Locke, & Audrain, 1993); thus, having trait and state emotions in one study can make emotions so salient as to negate their effects. Moreover, to get participant cooperation, the studies were designed so that participants can quickly complete the assigned tasks. The second difference is Study 1 measured perceived risks as the outcome, while Study 2 measured risk preferences as the outcome. Different outcomes were used because Lerner and Keltner (2000, 2001) found emotion appraisal tendencies to influence risk perceptions and risk preferences. Risk perceptions and risk preferences are not similar but usually go together as those who perceive less risk may take riskier actions. By having different outcomes, I examine if Lerner and Keltner's (2000, 2001) findings extend to entrepreneurship related decisions. However, because Study 1 used a student sample, the results for this study should be interpreted with caution when applied to entrepreneurs.

Study 1: State Emotions and Risk Perceptions

Sample

Study 1 examined the influences of emotions on risk perception. Participants in the experiment were 187 undergraduate students (90 males, 97 females) enrolled in an introductory management course. Participant ages ranged from 17 to 26 years, with mean age of 20.47 (SD 1.45) years. The ethnic origin of the participants was a mix of Chinese (89.8%), Malays (1.1%), Indians (3.2%), and other ethnicities (5.9%). Most of the participants were business majors (55.1%), with other majors including engineering (31%), humanities (7.5%), sciences (2.7%), design and engineering (2.1%), and computing (1.6%). Participants were mainly in their first year of study (64.7%), with 24.1% in their second year, 10.7% in their third year, and 0.5% in their fourth year. All participants received course credit for completing their questionnaires.

Procedure and Materials

Since labeling an emotion may influence its effects on judgment (Keltner et al., 1993), I followed previous studies (Lerner & Keltner, 2001) on emotion effects on evaluations by not asking participants to report their emotions. Instead an induction technique found by Lerner and Keltner to be effective in inducing the respective emotions was used. The 187 participants were randomly assigned to the four emotion induction conditions of anger, happiness, fear, and hope with 48, 46, 47, and 46 participants in each condition, respectively.

For each condition, the participants received a questionnaire with two induction questions and were told to write their answers in the questionnaire. The questions were similar except for the emotion induced. For example, the first question for the participants in the angry condition was to describe three to five things that made them angry. In the second question, the participants were told to select one item from question 1 and to describe it in more detail. The participants were told to write the description in such a way that someone reading the description might become angry just from learning about the situation.

Following emotion induction, the new venture choice used by Forlani and Mullins (2000) in their article published in the *Journal of Business Venturing* was used to measure the perceived risk in a business opportunity. Each participant was presented with a situation and was asked to imagine that he or she was about to undertake a new venture.

The anticipated outcome was provided such that there was a 30% chance of being under target by $5 million, a 40% chance of meeting target return on investment (ROI), and a 30% chance of going over target by $5 million.

After the participants read the description of the business opportunity and the anticipated outcomes, the participants had to indicate the level of perceived risk on a 2-item, 5-level semantic differential scale. The items were high-low and minimal-extreme; the first item was reverse scored so that larger numbers indicate greater risk evaluations. The risk evaluation scale had an alpha of .79. The investment choices are shown in the Appendix.

Results for Study 1

For the background information, age did not correlate with perceived risk ($r = -.008$, n.s.). Consistent with the meta-analysis of Byrnes, Miller, and Schafer (1999), men perceived less risk ($M = 3.57$, $SD = 1.22$) than women ($M = 4.14$, $SD = 1.02$) ($t = 3.52$, $p < .01$). Since most participants were of Chinese descent (84.8%), I tested perceived risk difference between Chinese ethnicity ($M = 3.86$, $SD = 1.15$) and non-Chinese ethnicities ($M = 3.95$, $SD = 1.21$), a difference that was not significant ($t = .32$, n.s.).

A one-way analysis of variance testing the influence of emotion (anger, happiness, fear, and hope) on the perceived riskiness of the new venture was significant ($F[3, 183] = 2.81$, $p < .05$). The Levene statistic (1.81, n.s.) indicates that the assumption of homogeneity of variances was not violated. Participants in the angry condition ($M = 3.64$, $SD = 1.06$) and the happy condition ($M = 3.64$, $SD = 1.20$) perceived the least risk, followed by the fearful condition ($M = 3.99$, $SD = 1.01$) and the hopeful condition ($M = 4.21$, $SD = 1.28$). A planned contrast was performed comparing perceived risk in the angry and happy conditions against the fearful and hopeful conditions. The results supported the hypothesis that participants in the angry and happy conditions ($M = 3.64$, $SD = 1.12$) compared with participants in the fearful and hopeful conditions ($M = 4.09$, $SD = 1.15$) perceived less risk ($t = 2.76$, $p < .01$). The t-tests indicate that the main differences in means were those of angry condition vs. hopeful condition (mean difference = .57, $t = 2.43$, standard error = .24, $p < .05$), and happy condition vs. hopeful condition (mean difference = .57, $t = 2.38$, standard error = .26, $p < .05$).

Discussion for Study 1

Results from Study 1 indicate that emotions, resulting from emotion induction, lead to risk perceptions. Participants induced to anger and those induced to experience happiness, both emotions with underlying appraisal tendencies of certainty and control, reported lower risk estimates for a new venture. In contrast, participants induced to experience fear and those induced to experience hope, both emotions with underlying appraisal tendencies of uncertainty and a lack of control, reported higher risk estimates for a new venture. Hence, this study provides evidence of the value of examining specific emotions, together with the appraisals attached to these emotions.

Study 2: Trait Emotions and Risk Preferences

Results of Study 1 show emotions can be induced, and these emotions shape how opportunities are evaluated. Emotions people experience at a point in time, caused by

events such as emotion induction, are state emotions. Study 2 focuses on the effects of trait emotions (i.e., individual tendencies) on risk preferences. In Study 2, participants were given two investment choices: one with a certain outcome and the other with a higher value, but uncertain outcome. Both outcomes had similar expected values. These choices were based on entrepreneurship research on how entrepreneurs make investment decisions (Mullins & Forlani, 2005).

Sample

Participants in this study consisted of entrepreneurs in Singapore from two sources. The first source was entrepreneurs nominated for the Spirit of Enterprise (SOE) 2003 and 2004 awards. SOE is a nonprofit organization founded to promote entrepreneurship in Singapore and to recognize entrepreneurs whose stories can serve to inspire others to be entrepreneurs. There were a total of 300 nominees for the SOE 2003 (152) and 2004 (148) awards who were invited to participate in the study. Given the low response rate of 11%, I followed the procedures by some emotion researchers (e.g., Tiedens, Ellsworth, & Mesquita, 2000) and approached individuals directly to complete the survey. The second source was entrepreneurs with businesses operating in major shopping malls and town centers in Singapore. Two shopping malls or town centers (each from the Northern, Western, Eastern, and Southern/Central districts of Singapore) were selected to ensure a geographically representative sample. A total of 66 entrepreneurs (50 males, 16 females) participated in the survey with half coming from the SOE sample and the other half from the retail sample. The response rate including the SOE and retail entrepreneurs was 20%. This was a low response rate, but this rate is typical of studies of small business owners (e.g., 21% found by Paxson, Dillman, and Tarnai, 1995). Despite the low response, the results of this study should be read in conjunction with Study 1 to appreciate how emotion influences risk perceptions and preferences.

Participant ages ranged from 25 to 58 years, with a mean of 37.64 years. Most were of Chinese ethnicity (84.8%). The rest were Malays (6.1%) and others (9.1%). A majority of the businesses were founded by the participants (92.4%); others were acquired (6.1%) and inherited (1.5%). A majority (71.2%) did not own prior businesses. Some 53% became entrepreneurs because they identified an attractive business opportunity; others indicated that they had reached a crucial point in their lives (22.7%), felt that their previous employment provided limited prospects (13.6%), or a combination of these three factors (10.6%).

This study included measures for trait anger and trait happiness only to make the task short and simple for the entrepreneurs. These traits, while differing in valence, are related to the appraisals of certainty and control. The effects of state emotions were not tested in this study due to time constraints of the entrepreneurs.

Procedure and Materials

Trait Anger. A 10-item anger scale adopted from Lerner and Keltner (2000) was used to assess the participants' trait anger. Items included "I often find myself feeling angry," and "a lot of people anger me." Participants were asked to indicate the extent to which each statement was representative of them on a 5-point scale ranging from 1 (not at all true of me) to 5 (very true of me). The anger scale for this study had reliability (Cronbach's α) of .80.

Trait Happiness. This was measured using a 6-item happiness scale adopted from Underwood and Froming (1980) that assessed participants' chronic tendency to feel happy (e.g., "I consider myself a happy person," and "I laugh joyfully"). The 5-point scale ranged from 1 (almost never) to 5 (almost always) with Cronbach's α of .84.

Risk Preferences. Participants were given two investment choices based on how entrepreneurs make investment decisions (Mullins & Forlani, 2005). This measure was chosen because it was used in past entrepreneurship research and because it dealt with personal propensities toward financial risk taking, as opposed to other kinds of risk such as those associated with lifestyle choices or sports, such as sky diving. This distinction is important since entrepreneurs may not have generalized risk-taking propensities, decreasing the effectiveness of other research instruments that focused on risk taking in everyday life situations instead of situations encountered during the entrepreneurial process (Ray, 1994). In investment choice 1, participants had to choose between (1) a 90% chance of winning $200,000, or (2) receiving $180,000 for sure. Both choices had an expected payout of $180,000. In investment choice 2, participants had to choose between (1) receiving $16,000 for sure, and (2) a 10% chance of getting $160,000. Both choices had an expected payout of $16,000. In each investment choice, participants who chose the riskier option (i.e., option [1] for investment choice 1 and option [2] for investment choice 2), were given a score of 1, participants who chose the safer option were given a score of 0. The scores for both investment choices were summed up so that the scores ranged from 0 (where participants selected the lower risk choice in both cases) to 2 (where the participants selected the riskier choice in both cases). The bivariate correlation between the two investment choices was .45 ($p < .01$).

Control Variables. Participant demographic and general information were collected in the questionnaire. As in Study 1, I controlled for sex and coded males as 1, and females as 2. I controlled for sex because there could be sex differences in risk-taking behaviors and preferences. A meta-analysis by Byrnes et al. (1999) found that men, as compared with women, are more likely to take risks in a wide variety of activities. I controlled for ethnicity because certain ethnicities are perceived to be more likely to start new businesses; Saxenian (2002) documented that many start-ups in Silicon Valley have founders of Indian and Chinese descent. Since entrepreneurs of Chinese descent form a significant proportion of the participants in this study (84.8%) and individuals of this descent are perceived to be entrepreneurial (Lim, 2000), this factor was controlled for in the analyses. Participants of Chinese descent were coded as 1, and otherwise, 0. Finally, I controlled for business founding experience prior to the current business because past founding experience may affect the entrepreneurs' confidence in succeeding in their businesses (Hayward, Shepherd, & Griffin, 2006).

Results for Study 2

The variables tested were trait anger, and trait happiness with controls for sex, Chinese ethnicity, and prior business founding experience apart from the current business. The correlations for Study 2 are presented in Table 1 and the results are shown in Table 2. From the correlation matrix in Study 2, trait happiness significantly correlated with selecting the riskier investment choices ($r = .25$, $p < .05$). For the control variables, participants of Chinese ethnicity, as compared to other ethnicities, were more likely to choose the riskier option ($r = .33$, $p < .05$).

Table 1

Means, Standard Deviations, and Correlations of Study 2 Variables

		Mean	SD	1	2	3	4	5	6
1	Investment preference	0.85	0.85						
2	Sex	1.24	0.43	–0.07					
3	Prior start-up	1.71	0.46	0.12	–0.11				
4	Chinese ethnicity	0.85	0.36	0.33	0.14	0.01			
5	Trait anger	2.57	0.83	0.19	–0.07	–0.18	0.00	(0.80)	
6	Trait happiness	3.43	0.39	0.25	0.04	0.12	0.05	–0.14	(.84)

Note: Correlations above ± 0.25 significant at 0.05 level (2-tailed). N = 66. Internal reliabilities are in parentheses.

Table 2

Ordered Probit Analyses of the Effects of Emotions on Investment Preferences (Study 2)

	Investment preference					
	Model 1			Model 2		
	Coefficient	SD		Coefficient	SD	
Sex	–0.30	0.34		–0.37	0.35	
Prior start-up	0.34	0.33		0.46	0.35	
Chinese ethnicity	1.36	0.49	**	1.50	0.52	**
Trait anger				0.44	0.19	*
Trait happiness				0.95	0.40	*
Log likelihood χ^2 (3 df)	10.22	*		19.54	**	
Pseudo R^2	0.07			0.14		

* $p < 0.05$, ** $p < 0.01$, all tests are two-tailed. N = 66.

Table 2 presents the results of the ordered probit analysis. Ordered probit analysis is appropriate when participants have to make choices among alternatives (Becker & Kennedy, 1992). In this study, participants made one of three choices for the two scenarios presented to them: The lower risk choice for both scenarios, the higher risk choice for both scenarios, or one higher risk choice and one lower risk choice. Model 1 included the control variables of sex, prior start-up experience, and Chinese ethnicity. The pseudo R-square for the model is .07, with a log likelihood chi-square of 10.22 ($p < .05$). As model 1 shows, those of Chinese ethnicity, as compared to other ethnicities, were more likely to choose the riskier option (coefficient of 1.36, $p < .01$).

Model 2 included the control variables and the predictor variables of trait anger and trait happiness. The chi-square change of model 1 compared to model 2 is 9.32 (2 df) and was significant at $p < .05$, suggesting that trait anger and trait happiness added to the model's ability to predict the level of risk that the entrepreneur took. For model 2, the log likelihood chi-square statistic clearly showed the effects of the independent variables to differ from zero (log likelihood chi-square of 19.54 ($p < .01$). The R^2 analogous measure of goodness of fit was .14. Both the parameter estimates of the predictor variables of trait anger and trait happiness were significant at $p < .05$ for a 2-tail test. In particular, a one-unit increase in trait anger was associated with increased odds (.44) of being in a higher risk category. The corresponding figure for trait happiness was .95.

To test the robustness of the results to the estimation procedures, I reran the analyses using ordinary least squares. The results remained the same such that trait anger and trait happiness increased the likelihood that entrepreneurs would make riskier investment decisions. Thus, the findings supported hypothesis 2 that the entrepreneurs' preference for the higher value but uncertain outcome related positively to their scores on (1) trait anger and (2) trait happiness.

Discussion for Study 2

The findings from Study 2 suggest that trait emotions had an effect on an entrepreneur's investment choice, with the results showing trait happiness and trait anger to be significantly linked to the choice of the more uncertain options. Trait happiness and trait anger are emotions linked to appraisals of certainty and individual control (Lerner & Keltner, 2000, 2001; Smith & Ellsworth, 1985).

General Discussion

The results of Study 1 and Study 2 indicate that emotions do indeed play a significant role in opportunity evaluation as represented by risk perceptions and risk preferences. Consistent with the appraisal tendency framework, findings in Study 1 support hypothesis 1 that the participants' scores on risk perception for the venture scenario will be significantly lower for anger- and happiness-induced participants (emotions associated with outcome certainty and control) than for fear- and hope-induced participants (emotions associated with outcome uncertainty and a lack of outcome control). Consistent with the appraisal tendency framework, findings in Study 2 support hypothesis 2 that the entrepreneurs' preference for the higher value but uncertain outcome will relate positively to their scores on (1) trait anger and (2) trait happiness.

Theoretical Implications

Existing studies provide compelling evidence that cognitive factors influence how business opportunities are evaluated (Keh et al., 2002; Palich & Bagby, 1995; Simon et al., 2000). While this research is valuable, factors beyond cognition impact evaluations (as Baron, 2008, argues). One such factor is emotion, which directly influences many of the processes involved in opportunity evaluation, such as information recall, processing, and new information attended to. As researchers have dedicated a tremendous amount of effort toward studying the cognitive links in opportunity evaluation, it may be time to investigate how emotions play a role in this process (Baron; Mitchell et al., 2007). For

instance, Baron argued that the emotions' valence impacts opportunity evaluation. Our findings indicate that the appraisal tendencies of state and trait emotions, not only valence per se, impact risk perceptions and preferences.

State emotions are event-generated, and proximal to the object being evaluated. In comparison, trait emotions are only inclinations, since a person predisposed to experience a particular emotion does not always feel that emotion. For example, a person predisposed to be angry may not be angry if the environment does not provoke that emotion. Consistent with Baron's (2008) assertion, the findings suggest state and trait emotions produce parallel effects on opportunity evaluation. Based on proximal effects, state emotions should have stronger effects than trait emotions on opportunity evaluation, an assertion that future research can examine. Future research can also vary task complexity to investigate how task complexity interacts with emotions to influence risk perceptions and risk preferences. As Forgas (1995) predicted, affect infusion should be greater for more complex tasks; a prediction supported by findings of Bless and Fiedler (2006) and Forgas and Tehani (2005).

Beyond state and trait emotions, researchers can investigate how other emotion-related concepts influence entrepreneurial motivations. These concepts include passion, defined as the energy that "gives individuals a sense of pleasure and promise and engages them wholeheartedly with what they love" (Cardon, Wincent, Singh, & Drnovsek, 2009). Entrepreneurs who are passionate about their ventures may be more likely to succeed in their venturing efforts, as these efforts require emotional energy, drive, and spirit (Bird, 1989, pp. 7–8). More excitingly, research can study feedback loops among emotions, cognition, and intentions. As Ellsworth and Scherer (2003) noted, "thinking and feelings are inextricably linked most of the time" (p. 572), and it may be difficult to separate thoughts from feelings. As Haidt's (2001) review article noted, individuals often use emotions to decide on a course of action and subsequently use logic to support their actions. Researchers can examine how emotions create an event chain leading to intentions, and through these intentions, reinforce the entrepreneurs' feelings about their ventures. More generally, while we often think of entrepreneurs as trying to pursue careers that offer independence, or to be successful at starting something, the underlying reason they do these things may be more basic: to feel good with what they do. Autonomy and money can be proxies for this objective of feeling good with what they do and with themselves.

Although this study provides the first step toward understanding the effects of emotions in entrepreneurship, future studies can tease out the main and interactive impact of cognition and emotions on opportunity evaluation. For instance, a study can investigate if individuals who take the most risk are those who exhibit high levels of cognitive biases together with emotions such as anger and happiness. Another exciting possibility is to study how entrepreneurial attitude orientation (EAO) (Robinson et al., 1991) relates to entrepreneurial activities. EAO is a type of attitude linked to an individual's predisposition to respond in a generally favorable or unfavorable manner toward entrepreneurship. Concepts related to the EAO have been linked to new venture success (e.g., Krauss, Frese, Friedrich, & Unger, 2005; for a review, see Cromie, 2000). Attitudes are usually domain-specific and, therefore, close to the phenomenon being studied. Moreover, since the EAO contains cognitive, affective (i.e., feelings and emotions), and conation components, it can be used to examine the relative impact of cognitive and emotional influences on entrepreneurial actions.

In this study, the participants were induced to experience one emotion, and future research can investigate how mixed emotions influence opportunity evaluations. For example, an entrepreneur who discovers a business opportunity can experience the joy of

acquiring new customers in conjunction with the fear of overstretching the venture's financial resources. Will happy emotions predominate, resulting in risk-taking actions? Or, will fear predominate, resulting in less risk taking? Researchers can explore factors determining the strength of one emotion over the other in driving actions. In this scenario, entrepreneurs high in the personality trait of openness to experience may take risks since these individuals like novelty and respond well to challenges (Costa & McCrae, 1992). In contrast, entrepreneurs high in trait neuroticism can be risk-averse, as these individuals react badly to uncertainty (Costa & McCrae).

Beyond trait and state emotions examined in this study, new venture outcomes may be shaped by emotional intelligence (EI), defined as the "ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Salovey & Mayer, 1990, p. 189). Evidence suggests that EI skills can be developed through life experiences (Wong, Foo, Wang, & Wong, 2007) and perhaps through training courses (DePaulo, 1994; Ekman, O'Sullivan, & Frank, 1999). Through EI skills, entrepreneurs can increase their chances of financial success (Baron & Markman, 2003). For instance, the ability to read facial emotions can lead to better negotiation outcomes (Elfenbein, Foo, Tan, & Aik, 2007); entrepreneurs can use this skill when negotiating with clients or potential investors.

Limitations

The results of the study should be read along with several limitations discussed here. Study 1 did not directly test the extent to which the participants perceived certainty and control associated with the four emotions induced. Therefore, future studies can confirm if the effects of emotions on risk evaluation are mediated by the appraisal dimensions of certainty and control. Yet another limitation of Study 1 was that the experiment did not include a manipulation check for the respondents to self-report their emotions after the induction because previous research has indicated that labeling state emotions influences their impact on evaluations (Keltner et al., 1993). Previous studies did demonstrate that the induction method is effective in eliciting the desired emotions (Lerner & Keltner, 2001). Future studies, however, can include manipulation checks after the participants complete their risk assessments to confirm that the manipulations were successful. Moreover, because this study used a student sample, the results should be interpreted with caution when applied to entrepreneurs. Notwithstanding this limitation, results of Study 1 may help predict which nonentrepreneurs become future entrepreneurs.

A limitation of Study 2 was the scenarios used. These scenarios were based on past research (Mullins & Forlani, 2005) where entrepreneurs had to choose one investment or the other. Using scenarios from past research allows researchers to compare findings from several studies. Researchers can be more confident that results are due to the variables studied, not the stimulus materials. The scenarios, however, provided limited information. Future research can use more realistic descriptions, such as detailed descriptions of the investment choices. Moreover, the scenarios used a forced choice approach. While this design may be ecologically valid as entrepreneurs often have to choose one investment choice over another, future studies can use ratio-interval data. Ratio data can be analyzed using parametric techniques while ordinal data are usually analyzed using nonparametric techniques. In general, parametric tests (compared with nonparametric tests) are more efficient as more data are used. Thus, parametric tests require a smaller sample size to achieve equivalent power (Walpole, Myers, Myers, & Ye, 2002, p. 600).

Practical Implications

Entrepreneurs can gain considerable value from a better understanding of their own emotions together with how emotions influence their decisions. Because of emotion impacts, high trait happiness entrepreneurs may take unnecessary risks, while high trait fear entrepreneurs may be too risk-averse. For example, the founder of a biotechnology start-up with a high happy trait may take the risky action of conducting in-house clinical trials, instead of partnering, even though the returns for the first option may be more volatile. In comparison, another founder with a high fear trait may choose the partnering option. By understanding where they stand on their trait emotions, entrepreneurs can take steps to counteract the tendencies linked to the emotions. While trait emotions persist across situations, state emotions are event-driven; for example, an entrepreneur experiencing extreme joy due to the birth of his or her child. Ideally, entrepreneurs should delay decision making when they experience strong emotions, as feelings can predispose people to take particular actions.

Fortunately, when entrepreneurs face critical decisions, the decisions are often made with their management teams (West, 2007). The effects of emotion still persist, since emotions are contagious, transmitting from one person to another (Barsade, 2002; Hatfield, Cacioppo, & Rapson, 1994), leading to ripple effects of emotional influences. The emotion lens provided by our studies provides entrepreneurs with a tool to understand that their preferences can be due to their emotions and not entirely based on factors relating to the decision context.

The study has implications for entrepreneurship education. Many entrepreneurship courses teach skills such as developing business plans, evaluating business opportunities, and devising strategies for obtaining venture finance. Emotion management skills should also be taught in entrepreneurship courses. These skills may be critical for entrepreneurs high in trait fear to lower appraisals of uncertainty impeding the entrepreneurs' ability to persevere through adversity. These skills may also be critical for entrepreneurs high in trait anger as they may take unnecessary risks due to appraisals of outcome certainty and individual control. Instruments such as those used in this study can be adopted to measure the entrepreneurs' trait emotions.

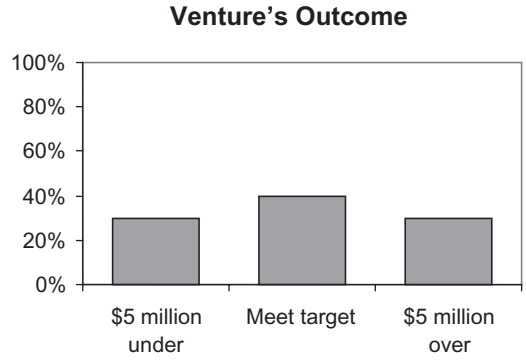
To conclude, this study introduces emotions as an important factor affecting how entrepreneurs evaluate business opportunities. The findings suggest that trait emotions and state emotions influence evaluations in parallel ways. Moreover, the findings suggest that the appraisal tendencies linked with emotions determine choices that entrepreneurs make. Future research should extend beyond cognitive factors to include emotions as antecedents of entrepreneurial behavior. Excitingly, future research can respond to the call to explore how cognition and emotions interact to shape entrepreneurial behaviors (Mitchell et al., 2007).

Appendix

Investment Choices Used in Study 1

Imagine you are about to undertake a new venture. Below is a description of a potential new venture and its anticipated outcome. After reading the venture description, please indicate on the accompanying scale the amount of risk you perceive for the venture.

There is a 30% chance of being under target by $5 million, a 40% chance of meeting target ROI and a 30% chance of going over target by $5 million. Graphically the distribution appears as:



Scale of perceived new venture risk

For each question below, kindly circle the number which you feel best assesses the amount of RISK associated with this venture:

HIGH	1	2	3	4	5	6	7	LOW
MINIMAL	1	2	3	4	5	6	7	EXTREME

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