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# The role of creativity in mediating the relationship between entrepreneurial passion and entrepreneurial alertness

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## Abstract

**Purpose** – The purpose of this paper is to investigate creativity as an intermediate variable existing within the relationship between entrepreneurial passion and entrepreneurial alertness.

**Design/methodology/approach** – This is a quantitative research using a moderated mediation model. A questionnaire is used and the analyses are performed with the answers from 244 people with at least 3 years of professional experience and graduate business studies. The discriminant validity of the variables is revised and a hierarchical regression analysis is performed for the hypotheses test.

**Findings** – Significant relations are obtained with which a positive relationship between entrepreneurial passion and creativity can be confirmed, as well as a positive relationship between creativity and entrepreneurial alertness. However, the results also reported that creativity partially mediates the relationship between entrepreneurial passion and entrepreneurial alertness.

**Originality/value** – The contribution of this research lies on showing empirical evidence of the link between entrepreneurial passion, creativity, and entrepreneurial alertness through the use of measurement scales recently developed. It also presents creativity as an intermediate variable in the entrepreneurial passion-alertness relationship.

**Keywords** – Entrepreneurial passion; creativity; entrepreneurial alertness; opportunity.

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## 1 Introduction

Identifying entrepreneurial opportunities has been a key topic in the field of entrepreneurship (Busenitz, Plummer, Klotz, Shahzad, & Rhoads, 2014; Short, Ketchen, Shook, & Ireland, 2010), and its study has been linked to abilities and capabilities at an individual level (Ardichvili, Cardozo, & Ray, 2003; Gaglio & Katz, 2001; Shane, 2000; Shepherd, McMullen, & Jennings, 2007). The concept of entrepreneurial alertness has contributed to research on opportunity identification since through the development of this concept, a clearer explanation has been obtained as to why only some people are more aware of the information and changes that point towards a possible entrepreneurial opportunity (Tang, Kacmar & Busenitz, 2012). In spite of the relevance entrepreneurial alertness has, very little research has been carried out dealing with its antecedents (McCaffrey, 2013). Alertness requires a creative act, which may influence the further development and improvement of the entrepreneurial opportunity (Baron, 2004; Kirzner, 2009). However, creativity has not been empirically studied as an antecedent of entrepreneurial alertness.

Creativity is another key element in the beginning of the entrepreneurial process, since it contributes to the design of new products and services (Gielnik, Frese, Graf, & Kampschulte, 2012; Heinonen, Hytti, & Stenholm, 2011). Ward (2004, p. 174) commented that “novel and useful ideas are the lifeblood of entrepreneurship”. However, the study of creativity has not been easy because many factors come into play (Baer, 2012). Within the entrepreneurial process, as suggested by Shane, Locke and Collins (2003), cognitive elements and people’s abilities are insufficient, and as such, emotional aspects are required. One of the elements considered in this study as a precedent of creativity is affect, and specifically, entrepreneurial passion (Cardon, Gregoire, Stevens, & Patel, 2013).

This study seeks to contribute to the continuous efforts of research on opportunity

identification, that is, a model that suggests the effect that two individual variables (entrepreneurial passion and creativity) have on entrepreneurial alertness. Specifically, the model suggests that the entrepreneurial passion of a person is related to creativity, and that this in turn is related to entrepreneurial alertness. Therefore, this study formulates three important contributions. First, the beginning of the entrepreneurial process is addressed by involving three individual variables. Second, empirical evidence is provided on the concepts of entrepreneurial passion and entrepreneurial alertness through the use of instruments recently developed by Cardon, Gregoire, Stevens and Patel (2013) and Tang, Kacmar and Busenitz (2012), respectively. Third, creativity is considered an intermediate variable in the entrepreneurial passion-alertness relationship.

We believe that the moderated mediation model stated here is useful to learn more about the beginnings of the entrepreneurial process. Therefore, in the following section, fundamental and empirical theories regarding this model are described in the review of literature and hypotheses are developed. Next, the methodology and main results that led us to testing hypotheses are presented. Finally, the paper concludes with a discussion of the results and contributions, as well as a proposal for future research.

## 2 Theoretical background and hypotheses

### 2.1 Entrepreneurial passion and creativity

A review of the available literature shows that affect is a key element in the business environment. Recently, the study of affect has been incorporated into the field of entrepreneurship due to its influence on the entrepreneurial process (Baron, 2008). However, a certain ambiguity subsists in terms of terminology. Some authors use affect and moods interchangeably (Forgas & Koch, 2013; Isen, 2008), while other authors differentiate affect, moods, and feelings. Davis (2009) mentions that affect can be seen as a higher

order term which includes feelings, emotions and moods. On the other hand, Forgas (1995) states that moods are low intensity, confusing, relatively durable, and occur without a defined cause. Emotions are more intense, short-term, and generally have a defined cause. Affect, whether positive or negative, changes with the passing of time and influences people's thinking and behavior (Friedman & Förster, 2010).

Previous research has shown that the presence of positive affect in people increases the probability of developing their creative side (Baas, De Dreu, & Nijstad, 2008; Binnewies & Wörnlein, 2011). Positive affect leads to greater creativity because it increases cognitive flexibility (De Dreu, Baas, & Nijstad, 2008; Fredrickson, 2001; Fredrickson & Branigan, 2005). Baas et al (2008)'s study reinforces this argument and states that this relationship is favored when combined with high levels of activation, for example, enthusiasm. Amabile, Barsade, Mueller and Staw (2005) find a linear relationship between positive affect and creativity: the greater the level of positive affect in a person, the more creative his or her performance is. Baron and Tang's (2011) research shows that a dynamic environment influences the relationship between positive affect and creativity. Along the same lines, Hayton and Cholakova (2012) mention that affect not only influences creativity through the generation of business ideas, it also influences the intent to improve them. However, evidence contradicting these results has also been found, and negative affect also stimulates creativity under certain circumstances (Bledow, Rosing & Frese, 2013; George & Zhou, 2002, 2007; Kaufmann, 2015; Kaufmann & Vosburg, 2002; Yang & Hung, 2015). Therefore, it is still impossible to generalize the relationship between positive affect and creativity.

Entrepreneurial passion is a positive affect that has been incorporated in recent years into the study of entrepreneurship (Cardon, 2008; Cardon, Wincent, Singh, & Drnovsek, 2009; Cardon, Foo, Shepherd, & Wiklund, 2012;

Murnieks, Mosakowski, & Cardon, 2014). In general, Vallerand et al. (2003) define passion as "a strong inclination toward an activity that people like, that they find important, and in which they invest time and energy" (p. 757). In particular, Cardon, Wincent, Singh, and Drnovsek (2009) define entrepreneurial passion as "consciously accessible, intensely positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur" (p. 517). According to the review of literature published by Chen, Liu and He (2015), passion can be theorized as a motivational hybrid involving an individual's positive affective experience and intense behavioral tendency to engage in, sustain, and identify with a given activity. Therefore, Cardon et al. (2013) mention that obtaining a general value of entrepreneurial passion is inconsistent since, by definition, the former should focus on a particular activity.

As far as we know, minimal research exists analyzing the existing relationship between entrepreneurial passion and creativity. Conceptually, Shane et al. (2003) proposed that passion facilitates entrepreneurial motivation, that is, opportunity recognition, idea development, and execution. Empirically, Liu, Chen and Yao (2011) find that passion mediates the effects of organizational autonomy support and individual autonomy orientation on employee work creativity. In the same perspective, Luh and Lu's (2012) work shows that harmonious passion is positively related to creative achievement. Cardon, Wincent, Singh and Drnovsek (2009) suggest that passion, and specifically passion for inventing, influences creative problem solving in such a way that people follow novel and creative courses of action. Similarly, Cardon et al. (2013) find a significant relationship between passion for inventing and creativity. According to all of these arguments, it seems that the passion a person has for inventing should significantly contribute to his/her creativity. In more formal terms, the following hypothesis may be stated as:

**H1:** *The greater the individuals' entrepreneurial passion (i.e., passion for inventing), the greater their level of creativity.*

## 2.2 Creativity and entrepreneurial alertness

One of the topics that has been significant in the field of entrepreneurship is the identification of entrepreneurial opportunities. Identifying an opportunity not only represents the beginning of the entrepreneurial process (Eckhardt & Shane, 2003), but also of the creative acts of the person who identifies the opportunity (Gielnik et al., 2012). One of the theories that has contributed to the research on opportunity identification is the Israel Kirzner's theory of entrepreneurial alertness. Initially, Kirzner (1979) defines entrepreneurial alertness as "the ability to notice without searching opportunities that have hitherto been overlooked" (p. 48). In further research, Kirzner (1985) defines alertness as "a motivated propensity of man to formulate an image of the future" (p. 56). More recently, Kirzner (2009) mentions that entrepreneurial alertness involves a creative action which influences activities that will be performed in the future.

Kirzner (2009) recognizes that the goal of his work is not to identify the antecedents of alertness, but its consequences. However, there is research that has addressed antecedents of entrepreneurial alertness, including mental schemes or models that help interpreting information and make sense of it (Gaglio & Katz, 2001; Valliere, 2013), information availability (Minniti, 2004), knowledge (Fiet & Patel, 2008), and significant pattern recognition in complex events (Baron, 2006; Baron & Ensley, 2006). In spite of the fact that creativity has been linked to the initial discernment people make and which shows them the possible existence of an entrepreneurial opportunity (Tang et al., 2012), no research has openly addressed creativity as an antecedent of entrepreneurial alertness. Ardichvili, Cardozo and Ray (2003)'s work identifies this relationship, but it does so conceptually.

Creativity plays an important role in the entrepreneurial process, whether to design novel solutions, market products or break barriers to the use of resources (Zhou, 2008). The work of Heinonen, Hytti and Stenholm (2011) and Gielnik, Frese, Graf and Kampschulte (2012) confirms that there is a positive relationship between creativity and the generation of ideas for new products or services. As such, entrepreneurial alertness has been considered a state of mind that is prone to opportunity identification (Short et al., 2010). This aspect leads to the figure of mind processes that entrepreneurs carry out, which in Isen's (2002) words, are those through which a person perceives information, stores it in his or her memory, processes it, and recovers it for later use. In general, creativity is a necessary condition, but it is insufficient for innovation, since many creative ideas are not marketable or cannot be developed by the people who generated them (Ward, 2004). This reasoning leads us to suppose that there are enough theoretical reasons to consider that a person's creativity increases his or her entrepreneurial alertness. Therefore, the following hypothesis is proposed:

**H2:** *The higher the individuals' level of creativity, the greater their entrepreneurial alertness (i.e., scanning and searching for information).*

## 2.3 Creativity as an intermediate variable

It has been argued that variations in entrepreneurial passion could help explain why some individuals (but not others) are able to recognize or imagine opportunities to introduce new products or services (Cardon et al., 2009). Passion enables some individuals to perceive unique patterns of meaning among noisy environmental signals (Baron & Ensley, 2006). However, Cardon et al. (2013) state that it is important to know if the role of passion is unique and separate, or if it interacts with other resources and dispositions to facilitate the identification of opportunities. In order to



contribute to Cardon et al (2013)'s proposal, this paper establishes that entrepreneurial passion is linked to creativity, which in turn is linked to entrepreneurial alertness. In this sense, Foo (2011) mentions that passion fosters creativity, as well as the acknowledgment of information contributing to the discovery and evaluation of entrepreneurial opportunities.

Furthermore, Tang et al. (2012) declare that passion could lead to interesting research on how this construct leads to cognitive processes such as judgments, perceptions and entrepreneurial alertness. Entrepreneurial alertness reflects the individual's ability to piece together previously unconnected information. Therefore, alertness should be related to individuals' creativity, or the ability to generate novel and appropriate ideas, products, processes, or solutions (Shalley, 1995). Past research suggests that creative problem solving is particularly important for generating novel, useful ideas and opportunities for business ventures (Ward, 2004).

Given the previous arguments and the proposal stated from hypotheses 1 and 2, creativity can be formalized as a mediating variable in the following hypothesis:

**H3:** *Creativity mediates the relationship between entrepreneurial passion and entrepreneurial alertness.*

### 3 Methodological procedure

#### 3.1 Sample and data collection

This study was based on a purposive sampling method in which business graduate students from four private universities in Puebla, Mexico participated. The estimated population was made up of all graduate students enrolled in these four universities (around 1,200 students). The graduate programs considered were Business Administration, International Management, Hospitality Management, Marketing, and Information Technology Management.

The instrument used for data collection was a questionnaire. Prior to the definitive application of the questionnaire, a pilot test was performed using five people in order to make sure the questionnaire was understandable. The feedback obtained was taken into account and the definitive questionnaire was applied from January to June 2015. To apply the questionnaire, a team was constituted which received the assistance from professors of the four universities for application of the questionnaire in class, and, in some cases, the survey was also sent by e-mail.

275 questionnaires were collected, of which 31 were eliminated because they had been answered by people with less than three years of professional experience. The calculations were performed with 244 questionnaires, which represented approximately 20% of the target population. The participants' ages ranged from 25 to 58 years old, with an average age of 29.7. 58% of the respondents were men and 37% had between three and five years of professional experience.

#### 3.2 Measurement

The instrument used to collect information was made up of three scales. All scale items were evaluated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

For the measurement of entrepreneurial passion, a scale developed by Cardon et al. (2013) was used. These authors identified three ways in which a person may manifest his or her entrepreneurial passion: passion for inventing new products or services, passion for founding new organizations, and passion for developing these organizations beyond their initial survival and successes. In this study, the "passion for inventing" domain was used because it represents people with the desire and motivation to develop solutions to existing problems or needs (Cardon et al., 2009). For passion for inventing, two subscales were defined, including the intense positive feelings the entrepreneur had toward this particular activity and the identity centrality of this entrepreneurial

role (Cardon et al., 2013). The experience of intense positive feelings was measured by two items such as “it is exciting to figure out new ways to solve unmet market needs that can be commercialized” and “searching for new ideas for products/services to offer is enjoyable to me.” The feelings items were averaged to form a single composite measure of the intense positive feelings of the entrepreneur for passion for inventing. The identity aspect of passion for inventing was measured using one item such as “inventing new solutions to problems is an important part of who I am.” These two dimensions are conceptually and empirically different from another; therefore, their individual and combined effects on other variables must be analyzed (Cardon et al., 2013). The alpha coefficient for intense positive feelings was 0.81, which is consistent with the scale’s reliability.

There are different scales for measuring creativity. However, the purpose of this study was to learn how creativity influences entrepreneurial alertness of individuals in their daily work. With that purpose in mind, we implemented a scale in which individuals were asked to indicate the extent to which they regularly demonstrate various creative behaviors in the jobs. Thus, the measurement of creativity was performed using a scale that had been used in previous research in the field of entrepreneurship with similar purposes (Baron & Tang, 2011; Perry-Smith, 2006). The participants in the study evaluated to what extent work in their companies implied: (1) new ideas or approaches to solving problems or needs; (2) new applications for existing technologies; (3) risk-taking; (4) radical new ideas; and (5) a new long-term vision. This scale showed an acceptable reliability of 0.73.

The third scale in this study was used to measure entrepreneurial alertness. We used the scale developed by Tang et al. (2012), who proposed three dimensions of entrepreneurial alertness: scanning and searching for information, connecting previously disparate information and evaluating whether the new information represents an opportunity. Tang et al. (2012,

p. 88) mention that “the three dimensions of alertness are distinct and measure different aspects of alertness”. Therefore, it is not appropriate to group all items and obtain one value for entrepreneurial alertness. This study used the scanning and searching for information dimension since it identifies people who are persistent and unconventional in their search for new business ideas as well as in the development of knowledge that may help find answers to specific questions (Tang et al., 2012). The scanning and searching dimension was measured by way of six items such as “I have frequent interactions with others to acquire new information” and “I always keep an eye out for new business ideas when looking for information.” The six items were averaged to form a single composite measure of this dimension. The alpha coefficient for this scale was 0.85.

Finally, three control variables were considered, each at an individual level: age, gender (female=0; male=1), and work experience of at least 3 years. Previous research has found that these variables may influence activities performed in the entrepreneurial process (Bledow et al., 2013).

### 3.3 Data analysis

Prior to testing our hypotheses, we analyzed the variables’ discriminant validity. Although entrepreneurial passion, creativity and entrepreneurial alertness are variables that can be distinguished theoretically from each other, confirmatory factor analysis (CFA) was performed and the square root of the average variance extracted (AVE) was obtained for each variable in order to empirically evaluate discriminant validity.

In order to perform the CFA, three empirical models were identified and compared. The first model considered all items in one factor. This is a baseline model which is routinely estimated based on the idea that all variables can be captured in one factor. The second model was obtained using three factors, in which it was expected that the passion, creativity, and alertness variables would load in their respective

factors. Finally, a third model with four factors was estimated, in which it was considered that all the elements were loaded in their proposed dimensions. In this model, entrepreneurial passion was considered to have two dimensions that cannot be combined (intense positive feelings and identity centrality).

Table 1 shows the threshold values according to Hu and Bentler (1999), as well as

**Table 1**

**Overall fit indexes for passion, creativity, and alertness (threshold values in brackets)**

Model	CFI (>.90)	NFI (>.90)	GFI (>.90)	RMSEA (<.05)	$\chi^2/df$ (<3.0)
One factor	.77	.81	.73	.183	6.81
Three factors	.89	.91	.90	.06	2.77
Four factors	.92	.91	.93	.04	2.55

Later, the square root of the AVE was obtained for each of the three variables (Fornell & Larcker, 1981). According to the AVE method, a variable's square root of the average variance extracted should be greater than the absolute values of the standardized correlations held up to any other variable in the analysis. Our results indicate that the square root of the AVE values (.78 for intense positive feelings in entrepreneurial passion, .70 for creativity, and .84 for entrepreneurial alertness) were greater than all the correlations they had with the other variables. The results of the CFA and AVE analyses indicate that passion, creativity, and alertness are different variables, suggesting satisfactory discriminant validity.

In order to test the hypothesized relationships, we performed hierarchical regression analysis because this method examines the effects of additional variables above and beyond the effects of the variables in the previous model (Cohen, Cohen, West, & Aiken, 2003). Besides, it avoids issues of model fit that can become problematic with the use of the structural equation model in small data sets (Kline, 2005). Five models were identified in which independent variables were added with a multiplying effect among them. Finally, the possibility of multicollinearity in regression

the results for each model. The results indicate that the four-factor model has better adjustment. The three-factor model can be considered to be marginally acceptable, but it is clearly less feasible than the four-factor model. In the four-factor model, all items loaded significantly in their respective latent variables.

analysis was considered. In order to achieve this, tolerance was calculated and a variance inflation factor (VIF-test) was performed. Tolerance values under 0.20 and/or VIF values over 5 indicate a problem of multicollinearity (O'Brien, 2007). The results obtained from these two tests indicated that regression analysis did not show multicollinearity.

## 4 Results

Table 2 summarizes the averages, standard deviations and correlations for the variables considered in this study. It is important to note the coefficients among the main variables in the study. First, the existing link between intense positive feelings and identity centrality is strong and significant ( $r = .58$ ,  $p < .001$ ), as predicted (Cardon et al., 2013). Another important relation worth noting is the one between entrepreneurial passion and creativity. Intense positive feelings and identity centrality showed strong and significant links to creativity ( $r = .43$  and  $r = .46$  respectively, both with  $p < .001$ ), an aspect which coincides with previous studies (Cardon et al., 2009; Luh & Lu, 2012). Finally, the link between creativity and entrepreneurial alertness was also positive and significant ( $r = .40$ ,  $p < .001$ ), coinciding with previous results (Gielnik et al., 2012; Heinonen et al., 2011).



**Table 2**  
Means, standard deviations, and correlations.

Variables	Mean	S.D.	1	2	3	4	5	6
Age	29.70	3.20						
Gender	.52	.32	.04					
Experience	.80	.56	.33**	.08				
IPF-inventing <sup>a</sup>	4.33	.71	.03*	-.11	.03			
IC-inventing <sup>b</sup>	3.98	.89	.11*	.05	.07*	.58***		
Creativity	3.50	.88	.07	.01	.01	.43***	.46***	
Scanning-searching <sup>c</sup>	4.20	.31	.14*	.03	.14*	.32**	.26**	.40***

<sup>a</sup> Intense Positive Feelings in entrepreneurial passion for inventing

<sup>b</sup> Identity Centrality in entrepreneurial passion for inventing

<sup>c</sup> Scanning and searching in entrepreneurial alertness

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

#### 4.1 Testing hypotheses

Hypothesis 1 predicts that people's entrepreneurial passion is positively related to creativity. The results proving this hypothesis may be observed in Model 2, Table 3, which indicates that entrepreneurial passion is significantly linked to creativity as predicted. Intense positive feelings and identity centrality were positively and significantly linked to creativity (Model 2: B = .34, p<.001; and B = .19, p<.01), and there is evidence

of significant interaction between feelings and identity centrality for inventing on creativity (Model 2: B = .23, p<.01). These results show that the positive significant relationship existing between intense positive feelings towards inventing and creativity increases when people report that inventing is highly important to their identity. As for hypothesis 2, the results (Model 5, Table 3) provide evidence that confirms the hypothesis: creativity is positively and significantly linked to entrepreneurial alertness (B = .29, p<.01).

**Table 3**  
Results of regression analysis for the antecedents and consequences of creative personality

Variables	Creativity		Entrepreneurial alertness		
	Model 1	Model 2	Model 3	Model 4	Model 5
Age	.012	.030*	.006	.077	.101*
Gender	.008	.188	.001	.041	.130
Experience	.143	.097*	.105	.109*	.125**
IPF-inventing <sup>a</sup>		.34****		.40***	.25**
IC-inventing <sup>b</sup>		.19***		.34***	.21**
IPF * IC –inventing		.23***		.31***	.18**
Creativity					.29***
R <sup>2</sup>	.05	.25	.03	.28	.39
Adjusted R <sup>2</sup>	.03	.23	.01	.26	.38
DR <sup>2</sup>	.05	.20	.03	.25	.11
ΔF	1.10	13.5***	.98	11.3**	14.7***

<sup>a</sup> Intense Positive Feelings in entrepreneurial passion for inventing

<sup>b</sup> Identity Centrality in entrepreneurial passion for inventing

\*p<.10 \*\*p<.05 \*\*\*p<.01 \*\*\*\*p<.001

## 4.2 The mediating role of creativity

In order to test hypothesis 3 that creativity is an intermediate variable in the existing link between entrepreneurial passion and entrepreneurial alertness, this study followed the work of Baron and Kenny (1986) along with Preacher and Hayes (2008) which were used in previous studies on entrepreneurship (e.g., Baron & Tang, 2011; Dalborg & Wincent, 2015; Welppe, Spörrle, Grichnik, Michl, & Audretsch, 2012). According to these authors, a variable's mediation must meet three conditions: 1. The independent variable is a significant predictor of both the dependent and mediator variables; 2. The mediator variable is a significant predictor of the dependent variable, and 3. The effects of the independent variable on the dependent variable are reduced when the mediator variable is added to the regression model. Mediation is completely accepted if the effect of the independent variable is no longer significant when the mediator variable is added. On the other hand, mediation is partially accepted if the effect of the independent variable decreases, but remains significant (Baron & Kenny, 1986; Preacher & Hayes, 2008).

Following this line of thought, first, the link between the independent and dependent variables was analyzed, along with the link between the independent variable and mediator variables. In Model 4, Table 3, feelings, identity centrality and their combined effect were significantly linked to entrepreneurial alertness ( $B = .40$ ;  $B = .34$ , and  $B = .31$ , respectively, all of them showing  $p < .01$ ). Furthermore, in Model 2 a positive and significant link is observed between entrepreneurial passion and creativity ( $B = .34$ ,  $p < .001$ ;  $B = .19$ ,  $p < .01$ , and  $B = .23$ ,  $p < .01$  respectively). Regarding the second condition, in Model 5 it can be seen that creativity is significantly linked to entrepreneurial alertness ( $B = .29$ ,  $p < .01$ ). Finally, the third condition may be observed in Models 4 and 5 of Table 3. The coefficients demonstrating the effect entrepreneurial passion has on entrepreneurial alertness decreased when the creative personality variable was added to the equation. Coefficients

decreased from  $.40$  ( $p < .01$ ) to  $.25$  ( $p < .05$ ) for feelings; from  $.34$  ( $p < .01$ ) to  $.21$  ( $p < .05$ ) for identity centrality, and from  $.31$  ( $p < .01$ ) to  $.18$  ( $p < .05$ ) for the combined effect. Therefore, and based on this research data, creativity partially mediates the link between entrepreneurial passion and entrepreneurial alertness.

## 5 Discussion

### 5.1 Key findings and contributions

This study analyzed the link between two important issues in the field of entrepreneurship: positive affect and opportunity identification. These issues were selected due to the increasing interest entrepreneurship research has shown for them and the importance they have in the entrepreneurial process (Baron, 2008; Cardon, Zietsma, Saporito, Matherne, & Davis, 2005; Cardon et al., 2009). The results of this study provide important contributions to the entrepreneurship field. The first is that positive affect was itemized within the concept of entrepreneurial passion (Cardon et al., 2009) as well as opportunity identification within entrepreneurial alertness (Kirzner, 2009). Furthermore, according to Cardon et al. (2013)'s and Tang et al. (2012)'s recommendations, who developed measurement scales for passion and entrepreneurial alertness, respectively, this study considered the most representative element of each scale for the addressed concepts: passion for inventing (entrepreneurial passion) and scanning and searching for information (entrepreneurial alertness).

On the other hand, this study demonstrates empirical evidence of the existing link between entrepreneurial passion and entrepreneurial alertness. However, this link is indirect, since creativity was found to be an intermediate variable. In other words, entrepreneurial passion is linked to creativity, which in turn is related to entrepreneurial alertness. Based on the results obtained from this study, evidence shows that passion for inventing is significantly linked

to creativity, coinciding with previous results (Cardon et al., 2013; Luh & Lu, 2012). However, these results cannot be considered definite, since previous research has found that negative affect also influences creativity (Bledow et al., 2013; Yang & Hung, 2015). Empirical evidence from different sources supports the assumption that negative affect can contribute to creativity. De Dreu et al. (2008) found that the induction of negative affect increased the number of new ideas participants generated because participants showed greater persistence. George and Zhou (2007) provided evidence that negative affect can contribute to creativity in work settings. They found the level of negative affect employees experienced was positively related to supervisor ratings of creativity if the level of positive affect was also high and the context was supportive.

Creativity also showed a significant relationship to scanning and searching for information. Ardichvili et al. (2003)'s research had already conceptually demonstrated the link between creativity and entrepreneurial alertness, an aspect that empirically validated this study. The basic rationale for the scanning and searching capability is that opportunity identification depends on a fit between entrepreneur's prior knowledge and a particular venture idea. This identification can be achieved passively, as shown by Kirzner (1979), or it can be achieved through a systematic search (Fiet & Patel, 2008). The result of this study does not indicate the way in which the individual identifies the opportunity, but it is possible to show that the search capability captures the individual's ability to seek information in order to further explore the newly associated concepts. Moreover, the result of this study contributes to the research on entrepreneurial cognition because it empirically demonstrates the relationship between two important cognitive processes in the entrepreneurial process, creativity and entrepreneurial alertness (Baron, 2008). This study demonstrates that creative people tend to perceive more applications for existing technologies and new ways to solve problems or

needs. This capability is an important input for entrepreneurial alertness.

Finally, due to the combination of results obtained in regression analysis, and according to the recommendations of Baron and Kenny (1986) as well as Preacher and Hayes (2008), it is not possible to completely affirm that creativity is an intermediate variable in the relationship between passion for inventing and scanning and searching for information. The results provide some elements to assume that passion for inventing seems to enhance individual creativity in the business environment, so that creative people tend to perceive a broader array of events and stimuli for entrepreneurial opportunities. Thus, it is important to consider McCaffrey's (2014) comments on the theory of entrepreneurial incentives. McCaffrey (2014) declares that incentives in Kirzner's work appear in two broad classes: incentives that motivate ordinary action and those that inspire entrepreneurial alertness. Incentives in the second sense describe how an individual can move from a passive state to one of alertness without possessing specialized knowledge or traits. Once in the alert state, the individual is capable of discovering and evaluating previously hidden profit opportunities, which for Kirzner is the essence of the entrepreneurial function (McCaffrey, 2014). These arguments make it possible to suggest the suitability of incorporating other factors or angles of creativity that could display a greater impact on entrepreneurial alertness. It is imperative to remember that the study of creativity is a complex issue, especially due to its interaction with other variables (Unsworth, 2001).

## 5.2 Suggestions for future research

Future research could focus on the study of passion and its influence on the entrepreneurial process. Regarding the variables analyzed in this paper, it is advisable that future researchers consider the effect of context, since it may provide a level of activation for creativity (Baas, et al., 2008; Kaufmann, 2015; Shalley, Zhou &

Oldham, 2004). Among the characteristics of context, dynamism, hostility, and technological sophistication may be highlighted (Baron & Tang, 2011; Lumpkin & Dess, 2001; Wiklund & Shepherd, 2005). It is important to know if context is a moderating variable in any of the relationships previously analyzed in this study.

On the other hand, interesting results may be obtained using an alternative approach within creativity itself. One of them could be the approach of relating the creative style the person prefers when identifying business opportunities. Kirton's (2003) proposal of adaptive or innovating creativity may contribute in this regard. Another approach could involve creative personality, as stated by Shane and Nicolau (2015). In this sense, Puccio and Grivas (2009) comment that personality traits can help uncover the emotional qualities associated with creativity, both in its style and its process.

From the results obtained in this study, it would also be possible to consider comparative studies. Future research could explore the differences among habitual (serial and portfolio), hybrid and novice entrepreneurs in terms of their passion and alertness for entrepreneurial activities. Previous studies have begun this research (Thorgren, Nordström, & Wincent, 2014; Thorgren & Wincent, 2015), but we need to continue studying these groups because they can provide relevant information for understanding the entrepreneurial process.

Finally, entrepreneurial alertness is presented as a variable that may be greatly nurtured by research in the entrepreneurship field. Entrepreneurial alertness as an individual variable may be directly related to other individual variables, such as entrepreneurial decision-making (Shepherd, Williams, & Patzelt, 2015), or to variables at the organizational level, such as a firm's entrepreneurial orientation (Covin & Wales, 2012). Future research could consider the possibility of multilevel studies (individual, organizational and contextual), which are important to the study of entrepreneurship (Baron

& Tang, 2011; Podoyntsyna, Song, Van der Bij, & Weggeman, 2013).

## 6 Conclusion

This study has dealt with entrepreneurial passion and alertness, which interact at the beginning of the entrepreneurial process. This interaction is important because it can be decisive in future actions. Our work stated initially that entrepreneurial passion within individuals can foster their creativity, and that this in turn was related to entrepreneurial alertness. Consequently, creativity was identified as an intermediate variable. The results of this study showed that entrepreneurial passion was related to creativity and entrepreneurial alertness. However, these findings are not conclusive in demonstrating that creativity is an intermediate variable in the passion-alertness relationship. While this study used recently developed scales, further confirmations of our findings are needed.

The study of entrepreneurial alertness in the field of entrepreneurship has not been an easy task, so few empirical studies exist on the topic. Opportunity is a core concept in the definition of the field of entrepreneurship (Shane & Venkataraman, 2000), therefore entrepreneurial alertness has greater relevance and impact for studying opportunities. Moreover, this research shows that individuals' emotions influence their creative abilities and give them the subjective insight needed to identify opportunities.

The results of this study contribute to research in the entrepreneurship field, particularly on the topics of entrepreneurial passion and alertness. However, future empirical research is needed along these lines of research in order to evaluate the results obtained in this study. The beginning of the entrepreneurial process is a complicated stage and there is a need to identify the variables which trigger entrepreneurial behavior. It is hoped that the results of our work will be useful for fellow researchers in the field of entrepreneurship.

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3. Theoretical foundation / Literature review	√
4. Definition of methodological procedures	√
5. Data collection	√
6. Statistical analysis	√
7. Analysis and interpretation of data	√
8. Critical revision of the manuscript	√
9. Manuscript writing	√