# Asymmetrical influence of personality on entrepreneurship

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**Abstract:** The objective of this study is to explore the antecedents of the formation of entrepreneurial intention from a linear, causal and asymmetrical perspective. We have combined the Ajzen model applied to entrepreneurship, including two personality variables (self-confidence and creativity). This study involves a structural equation model based on partial least squares (PLS) and fuzzy set qualitative comparative analysis (fsQCA). All of the hypotheses were supported except for the influence of the variables subjective norms and self-confidence on EI. The PLS model explains 68.7% of the variance of EI. According to the fsQCA results, four models explain 88.1% of the existence of EI. The two models with the greatest degree of coverage are: Self-Confidence × Attitude Towards Entrepreneurial Behaviour × Subjective Norms and Perceived Behaviour Control × Creativity × Subjective Norms.

**Keywords:** entrepreneurial intention; Ajzen theory; student; creativity; self-confidence; Chile; asymmetrical perspective; partial least squares; PLS; fuzzy set qualitative comparative analysis; fsQCA.

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# 1    Introduction

Entrepreneurship is a complex phenomenon that interrelates the characteristics and traits of personality (Villasana et al., 2016; Biraglia and Kadile, 2017), culture (Liñán et al., 2011; Noguera et al., 2013; Soria et al., 2016), family environment (Tarling et al., 2016), the role of the individual (Bosma et al., 2012), immigrant, ethnic and international entrepreneurs (Emontspool and Servais, 2017), gender (Smith et al.,  2016), corporate entrepreneurship (Ferreira et al., 2018) and education (Soria-Barreto et al., 2016; Walter and Block, 2016). Researchers have highlighted these personal and cultural characteristics throughout the study of entrepreneurship over the past 30 years, reaching a general consensus as to their importance in the permanent decision-making process to create a company (Leutner et al., 2014; Nouri and Ahmady, 2018) and generate labour opportunities.

Entrepreneurs are people who pursue their creative vision even in the face of overwhelming resistance from more conventional thinkers (Locke, 2000). The entrepreneur's personality is a variable that is clearly important due to the influence it has on the individual initiating a business (Zhao et al., 2010). Recent meta-analyses conclude that entrepreneurs have personality traits that facilitate this behaviour (Brandstätter, 2011). Various authors have found that entrepreneurs are more determined and goal-oriented (conscientiousness), have greater facility for identifying new business opportunities (openness to experience), and a greater tolerance to failure, taking on risks and being independent (emotional stability) (Zhao et al., 2010; Brandstätter, 2011; Leutner et al., 2014). Entrepreneurial culture in universities is not only reflected in the training of young students through the delivery of different tools and competences. As mentioned by Berbegal-Mirabent (2015a), there is an increase in the link between the universities and the business sector to jointly solve their productive problems. That is why Technology Transfer Offices (TTOs) have emerged to support this process through R&D contracts. Likewise, more and more, spin-offs in universities increase, that is, academic entrepreneurs are emerging (Berbegal-Mirabent et al., 2015b).

Among the models that explain entrepreneurial intention, Ajzen's (1991) Theory of Planned Behaviour (TPB) has become one of the most widely used theories in social psychology in general (Liñán and Fayolle, 2015). According to Armitage and Conner (2001), TPB accounted for 27% and 39% of the variance in behaviour and intention, respectively. For this reason, we employ entrepreneurial intention as a predictor of opting for a new business venture as a form of professional development.

This research combines two theoretical approaches in order to explore the antecedents to university students developing entrepreneurial intention. The first theoretical approach focuses on personal characteristics: the influence of creativity (openness to experience) and self-confidence (emotional stability). The second is based on the established Ajzen model.

The objective of this study is to explore the antecedents of the formation of entrepreneurial intention from a linear, causal and asymmetrical perspective. For this reason, we add two elements of personality (creativity and self-confidence) in order to analyse the interrelationships of the entrepreneurial intention model proposed by Ajzen (1991) in greater depth. With regard to creativity, some studies indicate that entrepreneurs are more creative than managers (Zhao and Seibert, 2006; Baron, 2007; Zhao et al., 2010), however, there are very few of these studies, and they do not apply to the university environment. Therefore, there is an opportunity to establish more antecedents regarding the influence of creativity on entrepreneurial intention (EI). There are also very few studies that measure the relationship between self-confidence and entrepreneurship (De Jorge Moreno et al., 2007; Villasana et al., 2016). Consequently, there is an interesting gap in the literature for research on the impact of potential entrepreneurs' creativity and self-confidence.

The research is based on Latin American students. The results allow us to establish antecedents and make comparisons between inter-regional students' behaviour. Studies of entrepreneurial intention are usually conducted in developed countries in the northern hemisphere, such as the USA (Biraglia and Kadile, 2017), the UK (Leutner et al., 2014) and Romania (Popescu et al., 2016). A very limited number of studies have been conducted in developing countries of Latin America, so there is a gap covered with this study.

It is noteworthy to mention that the case of Chile is interesting to study as entrepreneurial activity has been directly promoted over the last decade, a trend in which the creation of companies has been laid out as an instrument to promote local development (Atienza et al., 2016). During the last ten years, the Global Entrepreneurship Monitor (GEM) Project reports an increase in the rate of entrepreneurship from 13% of the adult population in 2008 to almost 24% in 2017 (Mandakovic and Serey, 2018). On the other hand, the Chilean Government highlights the creation of more than 100,000 new companies in a little less than three years (Gobierno de Chile, 2013). Furthermore, a package of reforms has been implemented to reduce the institutional obstacles in the creation of companies to one day, as well as multiple programs to strengthen new businesses. The government decreed the year 2012 as 'the year of entrepreneurship' and 2013 as 'the year of innovation' (Atienza et al., 2016). Between 2014 and 2018 public spending on entrepreneurship increased by more than 25 million dollars to 44 million dollars per year. That makes Chile one of the countries that most supports dynamic entrepreneurship in Latin America (CORFO, 2019).

The methodology considers the inclusion of personality variables in the study of EI. So, we are incorporating a vision of complex causality analysis. This implies the need to use analytical methods that allow us to understand how different combinations of causal variables can lead to the same result (Woodside et al., 2018). In this regard, Zimmerman (2001) claims that the fsQCA method allows us to explore all of the possible combinations of variables and assume that the nature of said variables is asymmetrical and not uniform. The results from the fsQCA method corroborate the results obtained from another multivariable method known as PLS (partial least squares), which is a more conventional method that is more widely used in these kinds of studies.

This research paper is organised in the following sections: the first part presents the theoretical framework, while the second section includes the data and methodology used, followed by the study results, a discussion of said results, conclusions, limitations and, finally, the future research.

## 2    Theory and hypotheses

### 2.1    Entrepreneurial intention

Entrepreneurial intention (EI) is a recurring topic in the field of university education (Popescu et al., 2016). It is a relevant topic due to the decisions university students have to make about their future employment and professional development. One possibility is to join the job market as agents of employment creation. Many young people opt to create their own companies instead of looking for work and getting a job in existing companies. The academic literature shows that EI is a good indicator of entrepreneurial behaviour (action) (Zhao et al., 2005; Biraglia and Kadile, 2017; Fietze and Boyd, 2017). We define entrepreneurship as the action or future behaviour of creating a company; the precursor variable is EI. The formation of entrepreneurship has been approached from three different perspectives.

The first model to explain EI was proposed by Shapero and Sokol (1982). They believe that various factors motivate entrepreneurship and incorporate the concept of displacement or changing direction in the process of creating a company. The authors point out that it is much more probable for an individual to form a company in light of a negative event rather than a positive one. To specify this trigger, the authors identify two variables that support the decision to create a company: perceived desirability and perceived feasibility. Perceived desirability refers to the impact of the cultural and social environment on the future decision to create a company, while perceived feasibility is related to the abilities each individual perceives they possess, thereby determining their actions or future behaviours based on their skills.

Krueger and Brazeal (1994) combined the two previous models, with the only difference of measuring the variable perceived desirability through self-efficacy. The other two models (Shapero and Sokol, 1982; Ajzen, 1991) use the concept of the internal locus of control for said variable.

The most widely used model to explain EI is Ajzen's Theory of Planned Behaviour (1991). This analysis includes three factors that explain future entrepreneurial behaviour: Perceived Behaviour Control (PBC), Attitude Towards Entrepreneurial Behaviour (ATE) and Subjective Norms (SN). The three variables take into account both the environment and personal abilities.

PBC fundamentally refers to the skills a person feels they have in terms of being able to create a company. This variable is related to the internal locus of control (Popescu et al., 2016; Villasana et al., 2016). Krueger and Brazeal (1994) define self-efficacy as the personal skill that an individual receives to be able to carry out a determined conduct. Chen et al. (1998) point out that PBC is related with confidence and how capable a person is to successfully carry out diverse tasks in the area of entrepreneurship. PBC or self-efficacy has been found to be significant in explaining EI (St-Jean et al., 2014; Osorio and Londoño Roldán, 2015; Soria et al., 2016) to cite but a few. Based on these antecedents, we propose the first hypothesis under study about the first construct of the Ajzen model (1991).

*H1: Perceived behaviour control has a direct, positive, significant influence on entrepreneurial intention.*

Subjective norms refer to the importance of family and close friends in favouring or supporting an individual in developing entrepreneurial behaviour. Studies of Soria et al. (2016) and Osorio and Londoño Roldán (2015) found that SN for students from Colombia does not explain EI. On the other hand is St-Jean et al. (2014) whose study indicates that SN does explain EI. The analysed EI in students from Africa, Canada and Europe and found that PBC, SN and ATE explain 16.5% of the variance, controlling the model for gender, age and number of children being cared for. Because of this quandary in the literature, our hypothesis seeks to verify the relationship between SN and EI.

*H2: Subjective norms have a direct, positive, significant influence on entrepreneurial intention.*

ATE involves an individual's perception of whether there are favourable conditions for creating a company. For example, if entrepreneurial culture, government policies and programs, and access to financing create an environment that supports the creation of a new company. Nabi and Holden (2008) argue that, in TPC, attitude is the best predictor of entrepreneurial intention. Ajzen (1991) indicates that attitude, in turn, provides a useful conceptual framework to incorporate the complexity of human behaviour into the analysis. For García-Rodríguez et al. (2015) ATE is the main explicative variable for EI in Spain. To verify the effect of ATE on the EI of the students we propose the following hypothesis.

*H3: Attitude towards entrepreneurial behaviour has a direct, positive, significant influence on entrepreneurial intention.*

Due to the strengths of the Ajzen model identified in the literature for explaining entrepreneurial intention (Soria et al., 2016), the first three hypotheses directly relate each of the components of the Ajzen model (1991) to entrepreneurial intention. Consequently, the first three hypotheses are intended to confirm the direct, positive effect of SN, ATE and PBC on the students' intention to create a new company in the future.

## 2.2 Creativity

The incorporation of creativity in studies on entrepreneurship dates back to the1970s (Villasana et al., 2016). The literature shows evidence of the influence of creativity on EI in terms of the facility for identifying business opportunities, the ability to invent and create new products and services, in addition to coming up with original solutions to

problems and business innovations (Zampetakis et al., 2011). Innovation appears in the decisions of strategic growth, specifically strategies of vertical integration and horizontal diversification (McCarthy et al., 2018).

Zampetakis et al. (2011) analysed the relationship between entrepreneurial intention and four types of creativity. The results, similar to those discovered by Lee et al. (2004), establish that more creative individuals are more prone to creating a new business. Ribeiro-Soriano (2003) shows that creativity appears as one of the attributes that characterises the entrepreneur and explains the success of small and medium-sized European companies. However, the results of Popescu et al. (2016) did not validate the notion that creativity plays a relevant role in determining EI. Bogdan et al. (2018) also fail to find the correlation between the creative capacity of an individual and the call to creative accounting practices so relevant in all economic activity that generates utility.

There is another line of research regarding the choice of degree program, which postulates that individuals with greater perceived creativity tend to develop greater EI (Feldman and Bolino, 2000). Considering these antecedents, the idea is to determine whether creativity has a direct impact on EI (Smith et al., 2016) and, therefore, confirm the following hypothesis:

*H4: Creativity has a direct, positive, significant influence on entrepreneurial intention.*

A high level of skill in finding innovative solutions is an adequate predecessor for generating greater EI (Biraglia and Kadile, 2017). PBC in the Ajzen model (1991) reflects individuals' abilities to achieve their goals. In this model, PBC implies that people have the conviction that they can achieve their goals and that their success or failure depends entirely on their own efforts. This fact can be related to and/or complemented with creativity. The ability to imagine and invent new solutions to problems can reinforce PBC and, consequently, EI. Creativity can be linked to prior experiences either lived or observed by an individual. These experiences turn into vast personal knowledge that is specific to each human being. Creative people combine their divergent thoughts with their prior experiences. This combination allows them to better face the challenges involved in creating a company. Rajapathirana and Hui (2018) indicate that knowledge sharing, motivation and creative thinking would lead to defining clear and effective innovation strategies. The results of Ribeiro and Peris-Ortiz (2011) indicate that prior experience allows the success for the approval of the postulated funds in the small and medium-sized industries (Spain). Rita et al. (2018) included creativity as a component of entrepreneurship and found that it was significant for Indonesian entrepreneurs as an explanatory variable of future market anticipation. In short, creativity is a variable that is used to analyse the entrepreneurial process and, in our case, we will link it with EI through PBC.

In other words, creativity reinforces PBC since the individual will feel that they have more tools and skills in order to successfully create their company. Individuals with an innovative cognitive style are more creative (Pejic et al., 2018). This favourable perception increases EI (Zhao and Seibert, 2006; Leutner et al., 2014). This study proposes that creativity may promote PBC. Generating new ideas, identifying opportunities and solving problems make creativity an indicator of influence on PBC and EI (Biraglia and Kadile, 2017). We therefore propose the following hypothesis.

*H5: Creativity has a direct, positive, significant impact on perceived behaviour control.*

## 2.3 Self-confidence

The literature shows that self-confidence has been studied since the 1960s as a dimension that influences entrepreneurial capacity (Villasana et al., 2016). The concept of self-confidence used in this study includes the state of positive motivation, individuals' capacity for overcoming adverse or traumatic events and their positive vision for explaining both good and bad events (De Jorge Moreno et al., 2007). An individual with high self-confidence reflects security and the conviction of achieving the goals they set out for themselves, even if they have to try repeatedly. In other words, said individuals feel confident and sure of their ability to carry out the action of creating a company in the future. Along the same lines, Zølner (2019) points out that the self-esteem of the workers can strengthen the construction of identity with their workplace.

We also believe that there could be a direct relationship between self-confidence and EI. A positive attitude in facing challenges and the ability to overcome setbacks reinforces individuals' attitudes towards creating a company.

*H6: Self-confidence has a direct, positive, significant impact on entrepreneurial intention.*

The last hypothesis considers that a positive attitude in facing challenges and the ability to overcome setbacks reinforces individuals' self-confidence in creating a company (De Jorge Moreno et al., 2007). In other words, having self-confidence favours ATE (Macko and Tyszka, 2009; Kakouris, 2016). Considering these antecedents, we propose the following hypothesis.

*H7: Self-confidence has a direct, positive, significant impact on attitude towards entrepreneurial behaviour.*

Figure 1 shows the seven hypotheses analysed in this paper.

**Figure 1** Proposed model of seven hypotheses
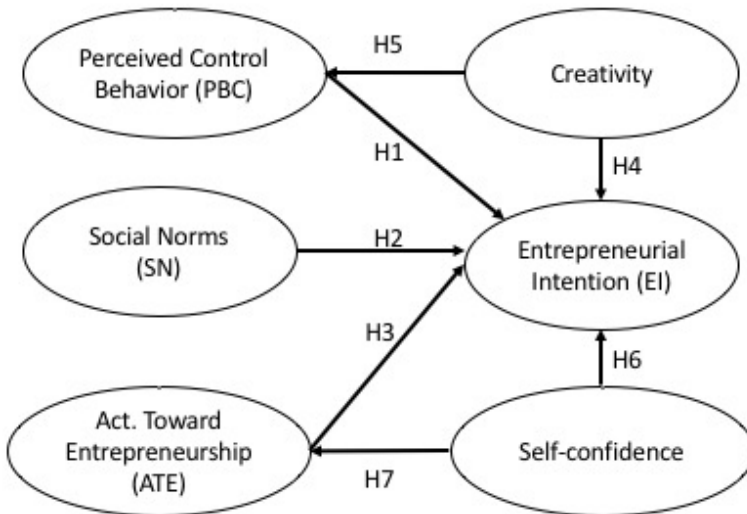
## 3    Method

### 3.1    Sample and data collection

The sample was obtained from October to December 2016 using a self-administered online survey through the Lime Survey system. The sample was not a probability sample, as the subjects were fourth-year business engineering students from two Chilean universities. The Universidad Católica de la Santísima Concepción and Universidad Católica del Norte are located 600 miles (968 km) apart, which allowed for a more heterogeneous sample. The study plans of both university institutions place emphasis in the development of entrepreneurial attitudes and the detection of business opportunities. It is important to highlight that the students who took part in this research have studied at least two courses of entrepreneurship. Thus, it is interesting to measure their level of entrepreneurial intention once their cycle of formation is finished.

On the other hand, the use of students as subjects meant that they would not be affected by the influence of possible prior entrepreneurship experiences in the job market (Ruizalba Robledo et al., 2015). The complete sample consisted of 210 students. The database purging system included the elimination of missing data using the Listwise technique and filtering atypical values using the Mahalanobis index (1936). The final sample was composed of 45% men and 55% women ($n = 194$).

With regard to the measurement system, the creativity and self-confidence scales were adapted and translated from the study by Villasana et al. (2016). The scales for measuring ATE, SN, EI and PBC were adapted from Liñán et al. (2011), which were previously used by Maes et al. (2014). All of the scales used in the questionnaire were based on a five-point Likert system.

### 3.2    Data analysis procedure

The data analysis procedure was conducted in three steps. First, we applied a structural equation model. Second, we implemented importance-performance map analysis. Third, we applied a qualitative methodology based on fuzzy sets. In the first step, the structural equation system was based on partial least squares (PLS) in order to validate the measurement instruments and later corroborate the hypotheses using the Smart PLS program (Ringle et al., 2015). The advantages of PLS have been widely described in the academic literature (Henseler et al., 2016; Rigdon, 2016; Rönkkö et al., 2016).

In the final step, we used fuzzy-set qualitative comparative analysis. The main advantage of fsQCA is that it permits the analysis of complex patterns of causality as fsQCA operates the analysis based on set relations (Kraus et al., 2018). According to Berbegal-Mirabent et al. (2015b), this tool is adequate to extend the conclusions and implications to the total population, despite working with small samples. The reality is not reflected in isolated influences, but rather combinations of variables, and their interaction can be finalised in the same result.

This study identifies different combinations of causal variables that would lead to the same result after exploring all the possible combinations of variables. This method overturns the presumption of uniformity and symmetry, meaning that different variables and different combinations of said variables could lead to the same result. Furthermore, the presence or absence of a certain result may require different explanations. The intermediate solution was selected for this study using fsQCA 2.0 software to perform fsQCA.

## 3.3 Calibration

The raw data from the surveys in Likert format are transformed into fuzzy-set variables before carrying out the fsQCA method. The first step consists of refining the database, eliminating missing values, for which we used the Listwise method (Llanos Contreras and Alonso Dos Santos, 2018). Then we treated the extreme values using the Mahalanobis distance (1936). The calibration process for the dimensions with several items is based in three anchorage points between 0 and 1 (Villanueva et al., 2017): low agreement or full non-membership (0.05), intermediate level of agreement or neither inside nor outside the set (0.5) and high agreement or full membership (0.95). For continual variables or variables coming from the surveys, the fsQCA 2.0 software (Department of Sociology, Tucson, Arizona) transforms the values of the variables into fsQCA variables automatically between 0 and 1. The values of the percentiles can be extracted by multiplying the values of the constructs among themselves (Alonso Dos Santos et al., 2016; Villanueva et al., 2017), or according to our choice, using mean values of the items of the constructs (Leischnig et al., 2015; Wu, 2015; Felício et al., 2016; Gonçalves et al., 2016). This procedure was proposed by the author of this methodology (Ragin, 2008) and is habitually used in academia (Alonso Dos Santos et al., 2016; Rey-Martí et al., 2016; Mikalef and Pateli, 2017). The detail of the procedure is shown in Table 1.

**Table 1** Descriptive analysis and calibration values

|  |  | Creativity | PBC | ATE | Self-conf | SN | EI |
|---|---|---|---|---|---|---|---|
| N | Valid | 194 | 194 | 194 | 194 | 194 | 194 |
|  | Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean |  | 3.45 | 3.37 | 4.32 | 4.32 | 4.53 | 3.56 |
| SD |  | 0.89 | 0.77 | 0.62 | 0.59 | 0.66 | 0.95 |
| Min |  | 1 | 1 | 1 | 1 | 1 | 1 |
| Max |  | 5 | 5 | 5 | 5 | 5 | 5 |
| *Calibration values* |  |  |  |  |  |  |  |
| Percentile 5 |  | 2 | 2 | 3 | 3 | 3.33 | 1.8 |
| Median |  | 3.4 | 3.4 | 4.57 | 4.43 | 5 | 3.8 |
| Percentile 95 |  | 5 | 4.85 | 5 | 5 | 5 | 5 |

## 4 Results

### 4.1 Evaluation of the measurement model

With regard to data processing, first we evaluated the measurement scales in order to confirm the reliability of the measurement instruments (reliability of the items and variables) and the validity of the constructs to examine their capacity to show real differences in terms of the characteristic being measured (discriminant and convergent validity).

The individual reliability was examined by analysing the coefficients of the items' loadings for their respective variables, and the reliability of the construct by the composite reliability index and Cronbach's alpha (Henseler et al., 2014a, 2014b). The minimum acceptable threshold is between 0.7 and 0.8, respectively. All of the reliability and validity indicators shown in Table 2 present coefficients that exceed the minimum cutoff established in the academic literature (Henseler et al., 2016). Therefore, Cronbach's alpha, composite reliability index and AVE present coefficients that exceed the values of 0.79, 0.875 and 0.545, respectively. All of the items' loadings for their respective variables are significant.

**Table 2**    Evaluation of the measurement model: composite reliability (CR), extracted variance (AVE)

| Construct | Cronbach's alpha | CR | AVE | Factorial loads |
|---|---|---|---|---|
| Creativity | 0.916 | 0.937 | 0.749 | 0.96 – 0.96*** |
| PBC | 0.873 | 0.907 | 0.663 | 0.718 – 0.861*** |
| ATE | 0.864 | 0.895 | 0.555 | 0.636 – 0.901*** |
| Self-conf | 0.854 | 0.887 | 0.545 | 0.77 – 0.903*** |
| SN | 0.790 | 0.875 | 0.702 | 0.733 – 0.912*** |
| EI | 0.877 | 0.913 | 0.684 | 0.882 – 0.942*** |

Note:    *** $p < 0.001$.

For the validity analysis, we used the average variance extracted (AVE) (cutoff 0.5), Fornell-Larcker's criterion (Fornell and Larcker, 1981) (correlations between the dimensions below the square root of the AVE on the diagonal) and HTMT (heterotrait-monotrait ratio of correlations), which has an upper threshold of 0.9 (Henseler et al., 2014). The discriminant validity analysis is summarised in Table 3. According to Fornell-Larcker's criterion and HTMT, the results confirm the discriminant validity of the constructs.

**Table 3**    Discriminant validity. Fornell-Larcker criterion, above the diagonal confidence intervals Heterotrait-Monotrait Ratio (HTMT)

| | Creativity | PBC | ATE | Self-conf | SN | EI |
|---|---|---|---|---|---|---|
| Creativity | **0.865** | 0.582 | 0.544 | 0.391 | 0.276 | 0.611 |
| PBC | 0.529 | **0.814** | 0.672 | 0.526 | 0.339 | 0.653 |
| ATE | 0.490 | 0.596 | **0.815** | 0.405 | 0.455 | 0.882 |
| Self-conf | 0.372 | 0.481 | 0.365 | **0.836** | 0.371 | 0.346 |
| SN | 0.233 | 0.289 | 0.379 | 0.324 | **0.838** | 0.301 |
| EI | 0.563 | 0.597 | 0.798 | 0.339 | 0.264 | **0.893** |

Note:    Discriminant validity; HTMT above the diagonal; square root of the AVE in the diagonal (bold) and correlations between the dimensions under the diagonal (Fornell–Larcker criterion).

## 4.2   Evaluation of the structural model

The model's fit was determined through SRMR (Standardised Root Mean Square Residual), which allowed us to compare the difference between the observed correlation

and the predicted correlation of the model's fit measurement (Henseler et al., 2014). Values of less than 0.08 are considered to be acceptable. We added the study of the indicators of the standardised regression weights, $Q^2$, $f^2$ and $R^2$ in order to examine the model's predictive capacity in greater detail. Table 4 summarises the model's indicators and the solutions to the hypotheses.

Values over 0.3 are recommended for the standardised regression weights (Chin, 1998). However, values over 0.2 are acceptable for exploratory studies. The negative values of the norms and confidence are not significant. It is not possible to confirm the impact of SN on EI (Hypothesis 2) or the link between self-confidence and EI in a direct way (Hypothesis 6). However, the rest of the relationships were confirmed.

The $R^2$ coefficient indicates the model's high predictive power for the variable being explained (EI), and a relevant predictive power for the other endogenous variables (Falk and Miller, 1992).

Through the blindfolding procedure (Omission Distance = 7), the Stone-Geisser indicator or $Q^2$ (Stone, 1974; Geisser, 1975) analyses the model's predictive capacity based on the endogenous variables. The entrepreneurial intention variable has a high coefficient, greater than 0.5. The effect size ($f^2$) verifies the impact of the independent variable on the latent dependent variable (Liébana-Cabanillas et al., 2017). ATE is the variable with the greatest impact on EI (Chin, 1998; Gefen et al., 2000). Lastly, the coefficient of the SRMR indicates that the model's fit is adequate.

**Table 4**     Evaluation of the structural model (bootstrapping = 5000)

| Relationship-construct | Path | $R^2$ | $f^2$ | $Q^2$ | SRMR |
|---|---|---|---|---|---|
| H1 PBC – EI | 0.181* | | 0.048 | | |
| H2 SN – EI | −0.058 | | 0.008 | | |
| H3 ATE – EI | 0.584* | | 0.545 | | |
| H4 Creativity – EI | 0.213* | | 0.085 | | |
| H5 Creativity – PBC | 0.529* | | 0.388 | | |
| H6 Self-conf – EI | 0.014 | | 0.000 | | |
| H7 Self-conf – ATE | 0.37* | | 0.159 | | |
| Creativity | | | | | |
| PBC | | 0.279 | | 0.169 | |
| ATE | | 0.133 | | 0.083 | |
| Self-conf | | | | | |
| SN | | | | | |
| EI | | 0.687 | | 0.511 | |
| Common Factor Model | | | | | 0.065 |

Notes:     *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

## 4.3   Importance-performance map analysis (IPMA) of path modelling results

Importance-performance map analysis is appropriate for a more in-depth analysis of the results of the structural model using the PLS methodology (Hock et al., 2010). This analysis allows us to study the performance and relative importance of the explanatory variables of EI in order to later guide management activities and entrepreneurship policies towards the student body, with emphasis on the most advisable variables.

According to Völckner et al. (2010) and Hock et al. (2010), the importance-performance map is based on the index value-based model assessment procedure. The result includes two axes: the X-axis represents the importance (structural model total effects) and the Y-axis represents performance (the average values of the latent variable scores). It is therefore advisable to guide management actions towards variables with relatively high importance (high path coefficient) and relatively low performance.

The results of the analysis show a negative importance for the SN variable and a set of variables with low importance: PBC, creativity and self-confidence. The attitude variable shows a high level of importance. In regard to the variables' performance, PBC and creativity have the lowest levels of performance. The management focus should therefore be channelled towards the variables that have a relatively high importance and relatively low performance: creativity and PBC. These two variables have a relatively high importance, lower importance than the ATE variable, but with a more extensive pathway.

**Figure 2**     IPMA for EI (see online version for colours)
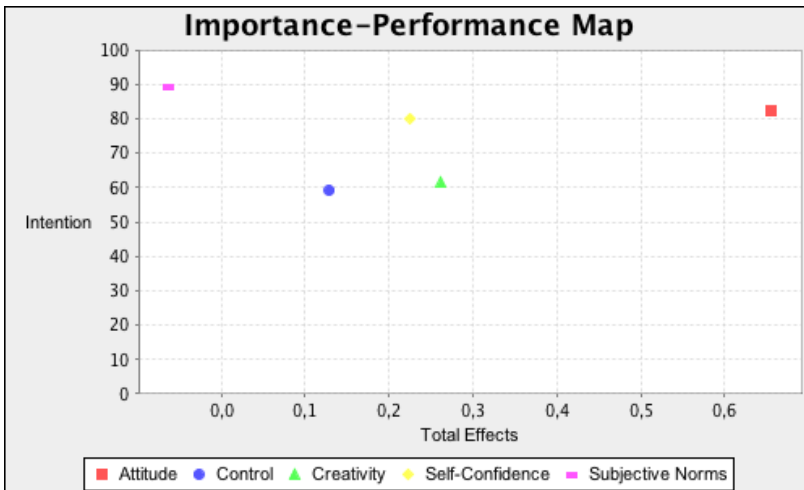


### 4.4   *Fuzzy-set qualitative comparative analysis (fsQCA)*

In order to proceed with the fsQCA, we first had to confirm that none of the model's variables constituted a necessary condition. A condition is necessary when it must always be present for a particular result to occur (Villanueva et al., 2017). It is important to determine its presence as a necessary condition is an indispensable minimum requirement for the occurrence of a result. With this objective in mind, we examined, following the indications of Eng and Woodside (2012), the consistency coefficients shown in Table 5, which are under the cutoff of 0.9 established in the literature (Ragin, 2009).

**Table 5** Necessary conditions for fsQCA to identify the relationships between control, attitude, self-confidence, norms and creativity for the occurrence (and non-occurrence) of entrepreneurial intention

|  | *Entrepreneurial intention* | | *~ Entrepreneurial intention* | |
|---|---|---|---|---|
|  | *Consistency* | *Coverage* | *Consistency* | *Coverage* |
| Creativity | 0.761 | **0.831** | 0.551 | 0.504 |
| ~ Creativity | 0.545 | 0.591 | **0.814** | 0.741 |
| PBC | 0.766 | **0.807** | 0.574 | 0.508 |
| ~ PBC | 0.533 | 0.598 | 0.783 | 0.737 |
| ATE | **0.863** | 0.786 | 0.583 | 0.446 |
| ~ ATE | 0.393 | 0.529 | 0.721 | **0.815** |
| Self-conf | 0.778 | 0.717 | 0.666 | 0.511 |
| ~ Self-conf | 0.464 | 0.623 | 0.623 | 0.702 |
| SN | 0.787 | 0.641 | 0.724 | 0.495 |
| ~ SN | 0.381 | 0.621 | 0.475 | 0.652 |

Note: *The highest values for the necessary conditions are shown in bold.

The minimum level of consistency threshold is set at 0.85 in order to obtain the causal configurations, with a frequency cutoff of 1. The intermediate solution offers a series of causal relationships resulting in entrepreneurial intention. The informative models have a minimum consistency of the solution of 0.74 (Woodside, 2013) and a raw coverage with values between 0.25 and 0.65 (Ragin, 2008). Our model meets the described values. The results (Table 6) indicate that 83% of the empirical evidence is explained thanks to four sufficient conditions: ~ self-confidence × creativity (raw coverage: 0.387; consistency: 0.882), PBC × ATE ~ SN (raw coverage: 0.286; consistency: 0.895), self-confidence × ATE × SN (raw coverage: 0.621; consistency: 0.834) and PBC × creativity × SN (raw coverage: 0.551; consistency: 0.899). The ~ symbol indicates the absence of the variable it precedes. According to the coverage coefficients, the most important causal combination is self-confidence × ATE × SN since it explains 62% of the positive cases of entrepreneurial intention. This shows that Ajzen's traditional model (1991) has been modified in terms of the PBC variable, which has been replaced by self-confidence.

**Table 6** fsQCA analysis results. All of the variables are present

| *Frequency cutoff: 1; consistency cutoff: 0.881; all variables are present* | *Raw coverage* | *Unique coverage* | *Consistency* |
|---|---|---|---|
| ~ Self-confidence × creativity | 0.387 | 0.044 | 0.882 |
| PBC × ATE ~ SN | 0.286 | 0.065 | 0.895 |
| Self-confidence × ATE × SN | 0.621 | 0.128 | 0.834 |
| PBC × creativity × SN | 0.551 | 0.025 | 0.899 |

Notes: *Solution coverage: 0.838; solution consistency: 0.819.

## 5    Discussion

Regarding the results, the PLS method confirms that both PBC and ATE have positive, significant impacts on entrepreneurial intention. On the other hand, the SN variable is not significant enough to explain entrepreneurial intention in the sample of students analysed in this study (Hypothesis 2). These results match the results obtained by Ruizalba Robledo et al. (2015), García-Rodríguez et al. (2015) and Tsordia and Papadimitriou (2015). In this regard, García-Rodríguez et al. (2015) have determined that the results of their study conducted in Senegal indicate that the role of SN in creating a company does not affect EI within a context of less economic development. It is likely that there are other indirect relationships in Chile that favour EI through SN. García-Rodríguez et al. (2015) indicate that the main explanatory variable of EI in Spain was attitude towards behaviour (ATE), while in Senegal it was PBC. Besides, in Slovenia, Pejic et al. (2018) show that ATE, PBC and SN are positively related to one's entrepreneurial intentions.

The fsQCA method also helps demonstrate that the variables proposed by Ajzen are relevant, but that they must be present in conjunction with other personality variables in order to explain a high percentage of positive cases of entrepreneurial intention. The three variables in the Ajzen model form a construct that explains nearly 30% of entrepreneurial intention. However, this combination takes into account the presence of PBC and ATE along with the 'absence' of SN. The latter compounded with the lack of validation of SN as a predictor of EI, using the PLS method, could lead to the conclusion that SN is not relevant in explaining the phenomenon in the case of the Chilean students at the two universities considered. These results are contrary to the results obtained by Soria et al. (2016). According to the importance-performance map, SN has a very high level of performance, which means that there is a relatively low potential for a minimum increase.

With regard to the results using the fsQCA model, the SN variable, together with self-confidence and ATE, form the combination with the greatest coverage of positive cases of EI. Similarly, SN in conjunction with PBC and creativity form another model that explains the second highest percentage of EI. Therefore, the SN variable for the case of the analysed students affects entrepreneurial intention through other interrelationships and is not relevant in an isolated manner.

In accordance with the results of PLS, the main variable of the Ajzen model for the context of the analysed Chilean students is ATE, which coincides with the results obtained by García-Rodríguez et al. (2015) for the case of Spain.

Regarding the personality variables, the results of the PLS model show that creativity has a direct influence on entrepreneurial intention. This is consistent with studies conducted by Lee et al. (2004) and Zampetakis et al. (2011), therefore confirming Hypothesis 4 of this study. Creativity also reinforces the effect of PBC on EI, as determined by Biraglia and Kadile (2017), who found that the relationship between creativity and EI is mediated by self-efficacy (proxy of PBC) in the USA. Leutner et al. (2014) found that creativity and proactivity, along with other variables, adequately predict the entrepreneurial behaviour of people in the UK with an average age of 33 years (the sample includes workers, students and unemployed people). In Slovenia, Pejic et al. (2018) found that innovative cognitive style, which affects creativity, showed more intention towards entrepreneurship.

Additionally, the study by Popescu et al. (2016) on Romanian youth showed that there is no clear influence of creativity in reinforcing the development of EI. They point out that this effect could be explained by the educational system, which is focused on acquiring knowledge rather than being dedicated to developing skills, such as creativity. It is important to note this fact, since in the case of Chilean youth, creativity is perceived as having an impact on EI. It is therefore relevant to establish learning strategies that are focused on reinforcing the development of personality traits such as creativity, which motivate business management students to be attentive to the creation of business opportunities (Popescu et al., 2016).

On another note, the results obtained from the fsQCA method show that creativity exists in two of the constructs (of the four total constructs) that explain entrepreneurial intention, but it is not part of the most important causal combination (which explains 62% of the positive cases) consisting of self-confidence, ATE and SN. This last result shows a certain degree of consistency with the conclusion made by Popescu et al. (2016), which claims that creativity in and of itself is not relevant enough to explain EI. With regard to self-confidence, the hypothesis referring to its direct impact on EI has not been confirmed (Hypothesis 6).

Regarding the results of the fsQCA method, the first model shows that the absence of the self-confidence variable in addition to the presence of the creativity variable explains 38.7% of the positive cases of EI. However, in the third model (which explains the greatest number of positive cases), the presence of the self-confidence variable is necessary to explain EI. This variable along with ATE and SN do produce EI. Consequently, self-confidence is a determinant of EI. This coincides with the findings of Villasana et al. (2016), which establish that self-confidence is an entrepreneurial trait of Latin American students, regardless of gender. As these authors mention, their results differ from those found in developed countries, where males demonstrate higher levels of self-confidence.

Macko and Tyszka (2009) found that, out of the three groups of Polish students they analysed, the group of students that had incorporated companies had higher levels of self-confidence. This backs up the fact that self-confidence is a determinant of EI. Along these lines, our study shows that ATE is reinforced by self-confidence. The two methods used allow us to confirm this interrelationship. Self-confidence appears in the model that explains EI with greater coverage. Nevertheless, we must not forget that creativity, along with PBC and SN, is the second-best model to explain the motivation for creating a business (55.1%). We can see that SN tends to be a variable that reinforces the EI of young people in conjunction with other variables, but not directly as an isolated variable.

## 6 Conclusions

This paper confirms the complexity of entrepreneurship as a research phenomenon, particularly in terms of the theory on entrepreneurial intention. This research shows the importance of individuals' personal characteristics in entrepreneurial intention, in accordance with the ideas proposed by Leutner et al. (2014). Our study introduced two personality variables (creativity and self-confidence) to the Ajzen model in order to analyse their interrelationships and impact on entrepreneurial intention. Two methods were applied: a linear method (PLS) and fsQCA, a complex causality method.

This study shows that Ajzen's model partially explains the EI of university students. The variables in the Ajzen model form a construct that explains nearly 30% of entrepreneurial intention. Both methods indicate that only ATE and PBC significantly explain the EI of the sample. ATE is the main explanatory variable for explaining EI. The results point to the fact that independent SN is not a construct that affects the EI of the students analysed. That is to say that the opinion of those close to them (family and friends) does not condition them in a radical manner to take the decision to create some business in the future. These results coincide with Ruizalba Robledo et al. (2015), García-Rodríguez et al. (2015) and Tsordia and Papadimitriou (2015).

According to the methods used in this study, the results confirm that the personality variables analysed (creativity and self-confidence) are determinants of EI, although with clear nuances. Creativity alone has a direct effect as well as in conjunction with other constructs, while self-confidence contributes to EI when combined with other variables, but it is not enough in and of itself to explain EI. Based on the fsQCA results, the main causal combination that explains 62% of the cases that exhibit EI are formed by self-confidence, ATE and SN. In terms of the IPMA results, actions to increase entrepreneurship from intention should be focussed on the variable of attitude as it shows a very different relative importance to the rest of variables with similar performances.

In definite terms, these results indicate to us that the decision to create a company is complex and non-linear and that there is a relationship between personality traits and the surroundings the young people face. Therefore, it is necessary to contemplate the process of entrepreneurship not only from an economic point of view, but also from a personal and inter-relational one from university formation. As a consequence, entrepreneurial education programs for university students in the areas of business management should include the development and strengthening of self-confidence, self-efficacy and creativity as key skills for them to have more interest in becoming entrepreneurs instead of opting for a job as a dependent worker. In the same way, entrepreneurial attitude is a key variable for students to strengthen their interest in being entrepreneurs and this should not be lost from sight in the formation process of university institutions with an entrepreneurial seal.

On the other hand, the results of this study also allow a contribution to the process of assigning resources of government programs destined for new entrepreneurs. The study allows us to see that there are competencies and skills that foster entrepreneurial intention. Therefore, the process of adjudicating public funds should, in addition to analysing the relevance of the Project, include measurement of the competences and skills of the entrepreneurs. In this particular case the variables are relevant in validating and evaluating the young people interested in obtaining public funds to support the creation of their company are: entrepreneurial attitude, self-confidence, self-efficacy and creativity.

EI and its predictive variables in Chile as well as other Latin American countries (De Jorge Moreno et al., 2007; Villasana et al., 2016) follow certain global trends. These findings call for further research into the phenomenon of entrepreneurship in the context of Latin America. Delving further into these topics by considering gender and/or including other personality traits could compensate for some of the limitations of this study, for example, working with a larger sample of students that includes different types of universities, as well as using quantitative analysis methods that facilitate the incorporation of control variables, in order to see how the environment can affect entrepreneurship.

This study also contributes to establishing practical implications, for example, for university level training in entrepreneurial skills. The findings indicate that, in order to reinforce entrepreneurial intention, it is important to understand that this can only be achieved through the joint development, as well as in different combinations, of aspects such as creativity, self-confidence, internal locus of control and ATE. It is therefore important to focus efforts on supporting the development of these personality traits in youth, in order to increase their enthusiasm and motivation for creating a company as an alternative form of professional development.

In terms of the limitations of this study, the extrapolation of the results should be taken with caution as the university institutions chosen do not represent the educational variety found in Chile. The university institutions chosen have similar formative programs under the same religious lens. In addition, the students are from the same area (business administration) and thus it is complex to extrapolate the results to other areas of study.

The subject of entrepreneurial intention in university and college students has an important amount of publications in different countries. So, an interesting research alternative would be to perform a bibliometric analysis. According to Albort-Morant and Ribeiro-Soriano (2016) it is pertinent that this analysis should include Google Scholar database and not only citations in journals available at the ISI Web of Science. Measurement by means of self-reported scales supposes a limitation and at the same time an opportunity to increase understanding in this field. We propose the application of neuro-physiological techniques to measure the emotional and cognitive differences in students when facing economic decisions related with entrepreneurship. Finally, the emphasis of future studies in EI should also consider different areas of formation of the students, as the students who usually participate are from areas linked to business sciences.

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# Appendix A

| Scale description | Cronbach's α | CR |
|---|---|---|
| *Entrepreneurial intention – EI* | 0.877 | 0.913 |
| EI1. I will try to create a business in the future | | |
| EI2. I am saving money to start a business | | |
| EI3. My professional objective is to become a businessman/business woman | | |
| EI4. I am going to do everything posible to create and direct my own business | | |
| EI5. As soon as I finish my program, I would like to work in a consolidated company | | |
| EI6. The probability that I will create my own company is very high | | |
| *Attitude towards entrepreneurial behaviour – ATE* | 0.864 | 0.895 |
| ATE1. Being an entrepreneur implies more advantages than disadvantages for me | | |
| ATE2. Being a business man/woman or entrepreneur is attractive for me | | |
| ATE3. If I had the opportunity and the resources, I would love to start a company | | |
| ATE4. Being an entrepreneur would bring me enormous satisfaction | | |
| ATE5. I have a favourable perception of entrepreneurs | | |
| ATE6. Entrepreneurs generate employment | | |
| ATE7. Entrepreneurs are the basis of wealth creation that benefits all off us | | |
| *Perceived behaviour control – PBC* | 0.873 | 0.907 |
| PBC1. To start a firm and for it to continue functioning would be easy for me | | |
| PBC2. I can control the process of creating a company | | |
| PBC3. I know the practical details necessary to start a company | | |
| PBC4. For me, to develop a business idea would be very easy | | |
| PBC5. If it were about starting a company, I would have a great probability of success | | |
| *Creativity* | 0.916 | 0.937 |
| C1. Frequently I have new ideas and I put them into practice | | |
| C2. I see creative and innovative alternatives in everything I do | | |
| C3. When I face a problem, I like to find innovative alternatives to resolve it | | |
| C4. I see myself as an innovative person, especially in difficult situations | | |
| C5. I enjoy searching for new points of view for known ideas or concepts | | |
| *Subjetive norms – SN* | 0.790 | 0.875 |
| SN1. Closest family | | |
| SN2. Friends | | |
| SN3. Classmates | | |
| *Self-confidence* | 0.854 | 0.887 |
| SC1. I make mistakes, but I know I can reach my goals | | |
| SC2. I strongly believe I will be successful in each thing I decide to do | | |
| SC3. I am convinced of my capabilities and skills and I know very well how to make the most of them | | |
| SC4. I have confidence in my own ideas and their potential | | |
| SC5. When I want to reach a goal, I insist until I carry it out | | |
| SC6. I really believe that I will not triumph on the first try, but that I must try over and over | | |
| SC7. I believe perseverance is very important to be able to triumph | | |