



Analyzing university students' entrepreneurial intentions under the influence of the COVID-19 pandemic

Giuseppina Maria Cardella¹ · Virginia Barba-Sánchez² ·
Ángel Meseguer-Martínez² · Brizeida Hernández-Sánchez¹ ·
José Carlos Sánchez-García¹

Accepted: 3 January 2024 / Published online: 31 January 2024
© The Author(s) 2024

Abstract

This study examines the influence of psychological variables on university students' entrepreneurial intention during the current crisis. We argue that individuals use their psychological resources to cope with adverse situations such as the COVID-19 pandemic. We therefore investigate how the basic psychological needs satisfaction, proactivity and optimism positively influence the intentions of choosing an entrepreneurial career and, on the contrary, how the impact of COVID-19 pandemic perception on the future country's economy can negatively affect the student's career choice. Methodologically, we used structural equation modelling on a sample of 201 university students in Spain. Our findings support the idea that entrepreneurial intentions are hampered by the perception of COVID-19, but promoted by the basic psychological needs satisfaction, as a motivational factor, when driven by optimism and proactivity. Our research has important implications. From a theoretical point of view, it contributes to the little existing literature on the importance of factors that promote entrepreneurial intention in adverse conditions, demonstrating that students' psychological characteristics can support their performance and, therefore, the economic and social development of the community. From a practical perspective, the present work has important implications for educators and policymakers to introduce programs that encourage entrepreneurship in students by cultivating proactivity and optimism and by offering educational resources that help students reduce perceived risk and increase motivation towards an entrepreneurial career.

Keywords Entrepreneurial intention · COVID-19 · Basic psychological needs satisfaction · Proactivity · Optimism

✉ Giuseppina Maria Cardella
mariucardella@usal.es

¹ Department of Social Psychology, University of Salamanca, Avenida de la Merced, 109, 37005 Salamanca, Spain

² Department of Business Administration, Higher School of Computer Engineering, University of Castilla-La Mancha, Paseo de los Estudiantes s/n, 02071 Albacete, Spain

Introduction

Entrepreneurship is an important factor for economic growth and job creation (Aparicio et al., 2016; Meyer & de Jongh, 2018). It promotes social change through the creation of social value (Barba-Sánchez et al., 2021; Korsgaard & Anderson, 2011), increasing thus the well-being and quality of life of communities (Blanco-González et al., 2015). In recent years, it has received a lot of attention from researchers, as it is considered a useful tool to manage crises, through economic strengthening policies that generate structural changes (Parra-Miranda, 2014).

Despite the great importance given to entrepreneurship, the impact that an adverse situation -such as that caused by the COVID-19 pandemic- can have on the intention to start a business remains controversial. Many empirical contributions have analysed entrepreneurship in relation to crisis management, especially in small businesses (Cowling et al., 2012; Smallbone et al., 2012; Williams & Vorley, 2015). However, the COVID-19 pandemic and the consequent economic blockade have created a unique and unprecedented situation with consequences still visible today.

In general, fear of failure has been identified as a significant barrier to experimenting with an entrepreneurial career (Kollmann et al., 2017; Morgan & Sisak, 2016). Recent research has shown that the presence of obstacles in the nascent phase makes the future entrepreneur more likely to abandon the project (Lanivich et al., 2021). However, other studies find that entrepreneurial activity does not decrease under the circumstances of macroeconomic changes, and individuals are more attracted to starting a business (Lopes et al., 2021).

The literature has not yet been able to understand why and what factors may contribute to the development of entrepreneurial intention. For example, the theory of planned behaviour and the entrepreneurial event model recognize self-efficacy or component related to personal skills as a determinant of entrepreneurial intention (Krueger et al., 2000). Other studies have broadened the range of entrepreneurship-related skills by analysing different psychological variables and their combination with contextual factors such as economic opportunities and environmental factors (Al-Jubari et al., 2018; Boyd & Vozikis, 1994; Tantawy et al., 2021).

For these reasons, we consider it important to analyse the entrepreneurial intention of university students in the COVID-19 pandemic context. Based on data collected in the academic year 2020–2021, we aim to cover the gap in the literature improving our understanding of the factors that can mitigate the negative impact of COVID-19 to foster entrepreneurship and, thus, help the global economy.

Indeed, in addition to the humanitarian and health tragedy, the COVID-19 pandemic has also affected local and global economies, creating an environment of high uncertainty (Martínez & Bañón, 2020) -especially for small businesses (Pedauga et al., 2022)- regardless of geographic location (Chesbrough, 2020), and sectors (Hall et al., 2020). Despite institutions having taken a number of policies to increase the capacity of their economic systems and to support citizens and sectors, the post-pandemic climate for businesses remains bleak.

In this sense, given that insights from different disciplines can provide a clear understanding of how COVID-19 changed business landscapes, it is necessary to

increase research on entrepreneurship from an interdisciplinary perspective with a specific focus on value co-creation and ecosystems (Ratten, 2020).

Based on the results obtained by Hernández-Sánchez et al., (2020) analysing the entrepreneurial intention of Latin American university students during the second wave of COVID-19, and taking into account the authors' recommendations to investigate different cultures and contexts, we contribute to the extant literature analysing the entrepreneurial intention in the Spanish context.

Overall, this study takes up two of the future lines of research on entrepreneurial intentions developed by Fayolle and Liñán (2014). On the one hand, it attempts to shed light on how the intention to act entrepreneurially can be influenced by a situation of uncertainty and a perceived hostile environment (contextual factors), on the other hand, analyses the role of personal-level variables in the configuration of entrepreneurial intentions.

Therefore, this study has three specific objectives: a) to analyse entrepreneurial intentions in the unprecedented environment of the COVID-19 pandemic; b) to contribute to the literature with additional empirical evidence of the basic psychological needs satisfaction influence -as a motivational factor (see Ryan & Deci, 2011)- in entrepreneurial intention; and, c) to examine the mediating effect of optimism and proactivity.

The next section will further investigate the conceptual and theoretical basis of this study, through the development of the research hypotheses.

Theoretical framework and research hypotheses

The impact of the COVID-19 pandemic perception and basic psychological needs satisfaction on entrepreneurial intention

Recent studies have shown that a perceived adverse context can have a negative impact on entrepreneurial intention (Roy & Das, 2020) and self-employment (Kalenkoski & Pabilonia, 2022). Uncertain and negative events have the potential to influence the expectations and perceptions of an entire population and are associated with a decrease in investment since they lead to uncertain social, economic, and political scenarios (Doern et al., 2019; Obratzsova & Chepurensko, 2020).

According to a study by Hundt and Sternberg (2016), the rate of nascent entrepreneurship decreased significantly in the period 2008–2010 in the countries most affected by the crisis. In a comparative study on the creation of small businesses in Spain between 2005/2007 and 2008/2010, Devece et al. (2016) showed that the number of new businesses dropped from 400,000 in the first period to 300,000 in the second.

Among the few studies that have analysed entrepreneurial intention in the context of uncertain and adverse situations, research has addressed this topic in war scenarios (Bozzoli et al., 2013; Bullough et al., 2014), terrorist attacks (Branzei & Abdelnour, 2010; Ghosh, 2018), and natural disasters (Torres et al., 2019). The importance of these studies lies in the fact that the perceptions that are formed in unsafe and dangerous environments have a negative influence on individuals' entrepreneurial intentions and the future choice of an entrepreneurial career (Bergner

et al., 2023). For example, Bullough et al. (2014) showed that perceived danger during the war in Afghanistan affected students' entrepreneurial intentions. The findings of Baker et al. (2020), suggested that terrorist attacks, natural disasters, and unexpected political shocks have the potential to severely damage countries' growth and new business development activities.

However, the COVID-19 pandemic has created new social, political, and economic contexts around the world that poses an unprecedented situation because it combines the typical characteristics of a sudden adverse event with the fact of having to bear this adversity in the future (Belitski et al., 2022; Otrachshenko et al., 2022), dramatically changing society and current business practices, and requiring new approaches that influence entrepreneurial thinking (González-Tejero et al., 2022). For this reason, studying the long-term consequences of the COVID-19 pandemic becomes a topic of paramount importance for entrepreneurship scholars.

Li et al. (2022), showed that students' perceived risk, as a consequence of the COVID-19 pandemic, reduces their entrepreneurial intention. The study by Godswill Agu et al. (2022) showed that the COVID-19 pandemic had a negative influence on attitudes, subjective norms, perceived behavioural control, and entrepreneurial intention. In the same line, Gomes et al. (2021) highlighted that the environmental dimension had a negative impact on the entrepreneurial intention during the pandemic period, which corresponds to an aggravation or loss of positive influences, compared to the context before the pandemic.

Given this new type of social and economic post-pandemic environment, and taking into account the importance of an adverse context in studying entrepreneurial intentions, we introduce our first hypothesis:

H1a: The COVID-19 pandemic perception of the future country's economy is negatively associated with the entrepreneurial intentions.

On the other hand, according to the self-determination theory, basic psychological needs and satisfaction are considered essential nutrients for people to function optimally and grow psychologically (Ryan & Deci, 2011). These needs are universal (Milyavskaya & Koestner, 2011) and represent the underlying motivational mechanism that energizes and directs people's behaviour, even in adverse situations (Broeck et al., 2010; Ryan & Deci, 2011).

Specifically, the relevance of self-determination theory is rooted in the concept of intrinsic motivation, through the meeting of three fundamental needs for a healthy psychological and social functioning: the need for autonomy (i.e. the perception of being the source of one's own decisions and behaviours); the need for competence (i.e. perceiving oneself to be effective in social situations), and the need for relatedness (i.e. the sense of belonging).

In the literature, basic psychological needs satisfaction has been analysed mainly in the context of education and health, few studies have related it to entrepreneurship, preferring the better-known concept of self-efficacy to account for autonomous agent behaviour. As Richey et al. (2022) point out, basic psychological needs satisfaction differs from the concept of self-efficacy because it recognizes that a prolonged absence of autonomy, competence or relatedness, due to external causes,

drastically damages individuals' ability to lead their own lives (Ryan & Deci, 2017). Conversely, self-efficacy does not take into account problems deriving from contextual factors (Ryan & Deci, 2017).

However, a few studies in the literature have shown that individuals with higher levels of basic psychological needs satisfaction expressed a strong intention to start a business, as they were more motivated towards such behaviour (Al-Jubari et al., 2018), even in an adverse context, such as that of the COVID-19 pandemic (see Hernández-Sánchez et al., 2020). For example, Al-Jubari (2019) in a study conducted on 622 students from two distinct universities in Yemen, showed a close relationship between psychological needs satisfaction and the theory of planned behaviour. Specifically, basic psychological needs satisfaction has a positive effect on attitude toward entrepreneurship, subjective norms, and perceived behavioural control, and in turn, has a positive effect on entrepreneurial intention.

In light of this, we contribute to the existing literature by assuming that:

H1b: The basic psychological needs satisfaction is positively associated with entrepreneurial intentions.

The importance of proactivity

Proactivity refers to the active attempts made by the individual to effect changes in their environment (Zampetakis, 2008). According to Bateman and Crant (1993), proactive people tend to take the initiative to influence and even significantly change the environment. For this reason, we find it useful to analyse this variable in the present study.

In addition to the empirical evidence on environmental adaptability, some studies have confirmed a significant relationship between proactivity and entrepreneurial process (Al-Mamary & Alshallaqi, 2022; Kumar et al., 2020), even in perceived adverse situations (Brzozowski et al., 2019).

With specific regard to the COVID-19 pandemic, the results showed, on the one hand, the direct positive impact of proactivity on entrepreneurial intentions. For example, the study by Trif et al. (2022) highlighted that proactivity is positively related to students' entrepreneurial intention in a global framework, where the university entrepreneurial environment drives innovation. Also in this vein, Emami et al. (2022), suggested that risk-taking, proactivity, and innovation positively influenced entrepreneurs' confidence in the business opportunity. Most importantly, risk-taking and proactivity push entrepreneurs forward in their business projects helping them maintain confidence in their ability to exploit the opportunity presented and making them think it is feasible.

On the other hand, proactivity has also been studied as a construct capable of mitigating the negative effect of the pandemic perception on entrepreneurial intention. In this sense, explicit reference is made to the aforementioned study by Hernández-Sánchez et al. (2020), who underlined not only the direct influence of proactivity on entrepreneurial intention but also the mediating role of proactivity in the negative relationship between COVID-19 perception and entrepreneurial intention. Similar

results were obtained by Jiatong et al. (2022), who showed that the perception of COVID-19 has a negative and significant impact on student entrepreneurial intention/behaviour pattern, but that a proactive personality significantly mediates the relationship between COVID-19 perception and entrepreneurial intention.

Based on these premises, this study seeks to further clarify the role of proactivity in the entrepreneurial process, posing hence the following hypotheses:

H2: Proactivity is positively related to entrepreneurial intentions.

H3: Proactivity mediates the relationship between basic psychological needs satisfaction and entrepreneurial intention (H3a); and the relationship between COVID-19 pandemic perception on the future country's economy and entrepreneurial intention (H3b).

The role of optimism

The entrepreneurial event model (Shapero & Sokol, 1982), and the theory of planned behaviour (Ajzen, 1991) emphasize the importance of specific positive attitudes, assumptions and perceptions in determining the likelihood that an individual will be willing to initiate a new business.

Several studies have found that optimism is related to increased self-confidence among students (Gómez-Molinero et al., 2018), and entrepreneurial intention (Madar et al., 2019). It has also been shown that those with a positive view of the future appear to be more inclined to start a new business, even in high-risk and competitive environments, as they place more emphasis on business outcomes (Li et al., 2021; Lindblom et al., 2020).

Optimism plays a significant role in the entire business process: in the face of uncertainty and the likelihood of failure, optimistic entrepreneurs, unlike pessimistic ones, believe more in the feasibility of their initiatives, and may therefore be better able to establish new business success (Bernoster et al., 2018). Some authors have also shown that optimism is a predictive factor for business creation, as it is connected to the perception of individuals to consider their projects positively (Ozaralli & Rivenburgh, 2016), coping strategies and success in stressful situations (Chapman & Chi, 2017).

From the results of the study by Na et al. (2022), it emerged that students with a high level of job satisfaction have a higher level of entrepreneurial intention, with optimism increasing the influence of job satisfaction on entrepreneurial intention. Optimism and social responsibility were found to have a significant positive impact on entrepreneurial self-efficacy.

Some scholars have pointed out that COVID-19 has not only affected people physically but also psychologically, however, an optimistic attitude mitigates the negative effects of the pandemic (Cao et al., 2020; Wang et al., 2021; Zurlo et al., 2020). Through a survey of Chinese doctors who have worked closely with COVID-19-positive patients, Zhang et al. (2021) found that optimism has a positive impact on work participation. In addition, Arslan et al. (2021) also demonstrated the important effect of optimism in mitigating the negative impact of coronavirus stress on life satisfaction in young adults.

In this theoretical framework and referring to the few studies in the literature regarding contexts perceived as risky, we believe it is important to investigate the influence of optimism on students' perceptions and expectations for a better future. Therefore, this study proposes the following hypotheses:

H4: Optimism is positively related to entrepreneurial intentions.

H5: Optimism mediates the relationship between basic psychological needs satisfaction and entrepreneurial intention (H5a) and the relationship between the COVID-19 pandemic perception on the future country's economy and entrepreneurial intention (H5b).

Figure 1 shows an overview of all hypotheses and their presumed relationships.

Method

Dataset and analysis techniques

To examine the relationships between the COVID-19 pandemic perception on the future country's economy (PCvCountr), basic psychological needs satisfaction (BPNS), entrepreneurial intention (EI), and the role of proactivity (P) and optimism (Op) in these relationships, we gathered the information by means of self-report online questionnaires on a sample of 201 Spanish university students (87.6% men; 12.4% women – mean age: 19.96; SD=2.88) from the University of Castilla-La Mancha. The reason to choose this university is that this region is strongly characterized by a lack of entrepreneurial spirit; a condition that becomes even more evident during crises (Cantarero et al., 2017). Thus, due to the fact that the perceived opportunities

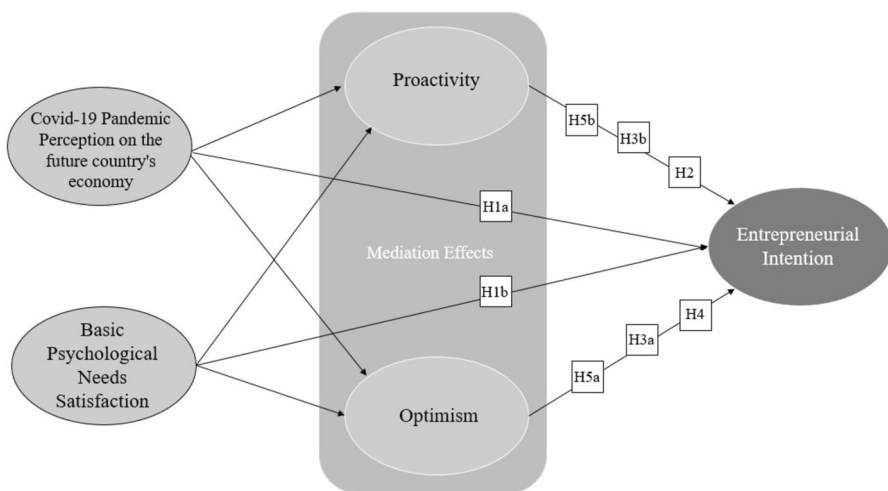


Fig. 1 Research model

remain a key factor in starting up a business, the region is particularly vulnerable during the pandemic (Neira Gómez et al., 2021). Such a condition makes this region a relevant object of study to analyse the influence of COVID-19 on entrepreneurial intention.

A survey was carried out among Computer Engineering students in the academic year 2020–2021. The statistical power of the sample was determined using the G*Power 3.1.9.4 program (Faul et al., 2009). To determine the minimum sample size in the PLS-SEM context, the following parameters were used: An f^2 effect of 0.15, an error of 0.05, a power of 0.95 and four independent predictors. The suggested minimum sample size was 74 observations. In this case, we obtained a total of 201 valid questionnaires at the end of the semester 2020 (representing a response rate of 34,13%), which made up the final sample (sampling error 5.61%, confidence level 95%, $Z = 1.96$, $p = q = 0.5$).

Data obtained from the questionnaire responses were analysed using structural equation modelling (SEM), which is especially recommended to test mediation hypotheses (Nitzl et al., 2016). Specifically, we used the partial least square (PLS-SEM) technique with SmartPLS software in version 3.3.1. PLS-SEM is a multivariate data analysis technique used to estimate complex cause-effect relationship models with latent variables named composite (Cepeda-Carrion et al., 2018).

Measures

The variables in the model are latent variables of the composite type, given that all of them are constructs composed of indicators (Schuberth et al., 2018). In addition, the responses on all scales followed a 5-point Likert format ranging from strongly disagree (1) to strongly agree (5).

COVID-19 pandemic perception on the future country's economy (PCvCountr). This construct has been measured drawing on the sub-scale developed by Cardella et al. (2021) to measure COVID-19 pandemic perception. This sub-scale is comprised of 6 items related to the perception on how COVID-19 will affect the economy of one's country. An example of an item is: "COVID-19 will destroy many jobs in my country".

Basic psychological needs satisfaction (BPNS). This construct has been measured based on the scale proposed by Chen et al. (2014) in the Spanish validation proposed by Cardella et al. (2020) which measures the needs satisfaction. The 12 items are organized in a multidimensional structure made up of 3 dimensions (4 items for relatedness: For example, "I feel close and connected with other people who are important to me"; 4 items for competence: Example, "I feel I can successfully complete difficult tasks"; and 4 items for autonomy: For example, "I feel that my decisions reflect what I really want"). BPNS is a higher-order formative construct and is composed of these three dimensions, which are reflective (composite estimated in Mode A), i.e. the dimensions are combined to produce the construct (Edwards, 2001).

Proactivity (P). This construct has been measured by means of the Entrepreneurial Orientation Questionnaire (EOQ), developed by Sánchez-García (2010) and based on the work of Seibert et al. (1999). The scale has 10 items, which together measure the tendency to proactive behaviour. An example of an item is: "If I believe in an idea, no obstacle will prevent me from making it come true".

Optimism (Op). This construct has been measured through the optimism scale of the PROE questionnaire (Sánchez-García, 2016). The scale has 9 items and measures the individual's tendency to have positive expectations about the future. An example of an item is: "I think I will achieve the main goals of my life."

Entrepreneurial intention (EI) was measured with the Entrepreneurial Intention Questionnaire (EIQ), developed by Liñán and Chen (2009). This construct comprises 6 items, which cover different aspects of intention. An example of an item is: "I will make any effort to start and develop my own firm".

Table 1 shows the minimum, maximum, mean, and standard deviation values for all variables, along with a correlation matrix. The constructs are therefore calculated as mean indices.

Results

Before analysing the structural model, the reliability and validity of the measurement model were tested. Based on this, six items of the Proactivity scale (P) were discarded as their values were below the 0.709 threshold (Hair et al., 2019), namely, P2–5, P8, P10; also three items of the Optimism scale (Op), Op1, Op3, Op9; as well as three items of the scale of country-wise perception of COVID-19 (PCvCountr), PCvCountr1, PCvCountr5–6. This is because the original constructs did not meet the most conservative criterion of the convergent validity, the Average Variance Extracted (AVE). In line with Hair et al. (2021), items with a factor loading between 0.40 and 0.70 were retained because the explained mean variance (AVE) was equal to or greater than 0.50.

In order to assess the internal reliability of these simplified scales, a factorial analysis has been conducted using IBM SPSS 28.0. The results show that each construct is an indicator of a single variable: Proactivity (KMO=0.707, Eigenvalue=2.260, Fraction of variance in %=56.493); Optimism (KMO=0.702, Eigenvalue=2.844, Fraction of variance in %=47.396), and PCvCountr (KMO=0.713, Eigenvalue=2.278, Fraction of variance in %=75.940).

Additionally, following Marín García and Alfalla Luque (2019), the group of indicators can be considered valid to study the model without disturbances provided that the R^2 of the latent construct is close to or exceeds 0.26 -as is our case-.

Then, construct reliability was tested through the Cronbach's Alpha, Dijkstrqa Henseler's rho_A, and the Composite Reliability and confirmed as all values were

Table 1 Descriptive statistics and correlation matrix

Variables	Min	Max	Mean	SD	1	2	3	4
1 PCvCountr	2.33	5.00	4.47	0.66				
2 BPNS	2.67	5.00	4.04	0.49	.296**			
3 P	2.00	5.00	3.37	0.62	.160*	.374**		
4 Op	2.00	5.00	3.77	0.65	.131	.590**	.468**	
5 EI	1.00	5.00	2.87	0.97	.012	.233**	.497**	.366**

Significance levels: * $p < 0.05$; ** $p < 0.01$ (two-tailed)

Table 2 Reliability estimates and convergent validity of the measurement model

Construct	Cronbach's Alpha	Dijkstra-Henseler's rho_A	Composite reliability (CR)	Average variance extracted (AVE)
PCvCountr	0.841	0.885	0.903	0.757
Proactivity (P)	0.741	0.749	0.837	0.564
Optimism (OP)	0.814	0.824	0.865	0.517
EI	0.929	0.939	0.944	0.740
Autonomy	0.723	0.758	0.823	0.540
Relatedness	0.855	0.860	0.902	0.699
Competence	0.862	0.873	0.906	0.707

All constructs are estimated in Mode A. BPNS is excluded as it is a second-order formative construct

above the 0.7 threshold (Table 2). Subsequently, the convergent validity of the constructs was also verified through the Average Variance Extracted (AVE), with values above 0.5 in all cases (Table 2).

Finally, the discriminant validity of the constructs was also confirmed through the Heterotrait-Monotrait (HTMT) and Fornell-Lacker criteria (Table 3).

Regarding the BPNS, as a second-order composites estimated in Mode B, it is composed of three dimensions (autonomy, relatedness and competence) and, thus, it has been specified following the disjoint two-stage approach (Sarstedt et al., 2020). In the first stage, the model is represented considering only the first-order constructs (BPNS dimensions) in order to obtain their scores. Subsequently, in the second stage, the scores are used as indicators of BPNS. In this line, being a composite estimated in Mode B, the multicollinearity between the first-order variables poses a potential problem which should be addressed. The variance inflation factor (VIF) for the range of those scores is below 1.193, which shows that BNF has no multicollinearity issues among their individual items (Hair et al., 2019).

To evaluate the structural model, we first check for collinearity problems among the constructs through the VIF values. All the values are below 2, well below the maximum of 5 set in the literature (Hair et al., 2019). The goodness of fit has been

Table 3 Discriminant validity of the measurement model based on Fornell-Larcker and HTMT_{0.85} Criteria

Construct	PCvCountr	<i>P</i>	<i>Op</i>	<i>EI</i>	<i>Autonomy</i>	<i>Relatedness</i>	<i>Competence</i>
PCvCountr	0.870	0.270	0.126	0.077	0.232	0.077	0.115
Proactivity (P)	0.220	0.751	0.472	0.548	0.477	0.313	0.611
Optimism (Op)	0.064	0.381	0.719	0.365	0.643	0.529	0.698
EI	0.001	0.471	0.333	0.860	0.315	0.108	0.183
Autonomy	-0.005	0.377	0.540	0.276	0.735	0.578	0.674
Relatedness	-0.001	0.230	0.448	-0.045	0.424	0.836	0.568
Competence	0.083	0.490	0.590	0.129	0.540	0.490	0.841

Diagonal values in bold are the square root of the variance shared between the constructs and their measures (AVE). Italic values above the diagonal elements are HTMT_{0.85} values. Values below the diagonal elements are the correlations between constructs. Calculations not applicable to BPNS

verified through the Standardized Root Mean Square Residual (SRMR) index for the saturated model, achieving an SRMR value of 0.083, which is below the maximum threshold of 0.10 (Benitez et al., 2020); and so has been the significance of the path coefficients through the bootstrapping process (10,000 subsamples) based on the confidence interval percentiles (Aguirre-Urreta & Rönkkö, 2018).

As observed in Table 4, results show that PCvCountr does not influence Proactivity in a significant manner ($\beta=0.060$, $p=0.153$), although the effect on Optimism and Entrepreneurial Intention is negative and significant ($\beta=-0.144$, $p=0.003$; H1a: $\beta=-0.118$, $p=0.033$, respectively). Regarding the BPNS, results reveal that it has a positive and significant effect on both Proactivity and Optimism ($\beta=0.479$, $p<0.001$; $\beta=0.625$, $p<0.001$, respectively). However, the effect of BPNS on Entrepreneurial Intention is non-significant (H1b: $\beta=0.056$, $p=0.278$). Finally, the effects of Proactivity and Optimism on Entrepreneurial Intention are positive and significant (H2: $\beta=0.411$, $p<0.001$; H4: $\beta=0.152$, $p=0.038$).

As Table 4 shows, the R^2 values of all the endogenous constructs are above the 0.10 threshold (Falk & Miller, 1992). Regarding the individual contribution of the constructs, Proactivity is the one that contributes the most to explain the EI variance (0.194) and, in turn, BPNS is the one that contributes the most to explain P variance (0.239), as well as that of Op (0.360). The size of the effect of BPNS on Optimism ($f^2=0.536$) is relatively high according to Cohen (1992) ($f^2\geq 0.35$), but the size of the BPNS effects on Proactivity ($f^2=0.273$) and the Proactivity effects on Entrepreneurial Intention ($f^2=0.167$) respectively are moderate ($0.15\leq f^2<0.35$), while the rest are weak.

With regards to the mediation effects, Table 5 shows the total effects of the BPNS (H3a and H5a) and PCvCountr (H3b and H5b) on EI. In the first case,

Table 4 Direct effects on endogenous construct

Construct	Direct Effect	t-Value	PCI	Explained Variance	f^2
EI ($R^2=0.261$)					
H1a: PCvCountr	-0.118*	1.839	[-0.217, -0.009]	0.000	0.016
H1b: BPNS	0.056	0.588	[-0.114, 0.202]	0.017	0.002
H2: P	0.411***	5.504	[0.289, 0.534]	0.194	0.167
H4: Op	0.152*	1.776	[0.017, 0.297]	0.050	0.020
Op ($R^2=0.351$)					
PCvCountr	-0.144**	2.745	[-0.228, -0.054]	-0.009	0.029
BPNS	0.625***	12.428	[0.549, 0.713]	0.360	0.536
P ($R^2=0.253$)					
PCvCountr	0.060	1.025	[-0.032, 0.161]	0.014	0.004
BPNS	0.479***	7.619	[0.379, 0.584]	0.239	0.237

Paths from hypotheses assessed by applying a one tailed test at 5% of significance level [5%, 95%]. Bootstrapping based $n=10,000$ bootstrap samples

PCI Percentile Confidence Interval

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

the total effect is greater than the direct effects, which indicates the existence of mediation or indirect effects (Sarstedt et al., 2014). Following Nitzl et al. (2016), significant total mediation relationships are confirmed between BPNS and EI through Proactivity (H3a: $\beta = .197$; $p < 0.001$; PCI [.127, .283]) and through Optimism (H5a: $\beta = .095$; $p = 0.045$; PCI [.011, .194]). The assessment of the indirect effects of PCvCountr on EI through Proactivity (H3b: $\beta = .025$; $p = 0.165$; PCI [-.013, .071]) and Optimism (H5b: $\beta = -.022$; $p = 0.076$; PCI [-.050, .001]) confirm a partial mediation, given that, as commented, the direct effect is significant (H5: $\beta = -.118$; $p = 0.033$). Furthermore, according to Hair et al. (2014), the size of the indirect effects calculated through the variance accounted for index (VAF), explains more than 20% of the total effect in some cases (see Table 5), which ratifies the partial mediation.

In summary, the hypotheses proposed in our theoretical model were empirically supported with the exception of H1b. Figure 2 summarizes the standardized regression coefficients and the proportions of the explained variance (R^2) as a whole. In this case, the verified model explains more than 26% of the variance of Entrepreneurial Intentions.

Discussion

The purpose of the study is to analyse entrepreneurial intention under adverse conditions. Thus, we aim at explaining the importance of motivational factors (basic psychological needs satisfaction) and the mediating effects of psychological characteristics (proactivity and optimism) for entrepreneurial intentions in pandemic contexts (the perception of COVID-19). Despite most studies to date have supported the idea that entrepreneurial intention is the best predictor of behaviour (O’Kane et al., 2020), this theoretical hypothesis has not been fully demonstrated from an empirical point of view.

Table 5 Summary of mediating effect tests

Hypothesis	Total Effect Path	Direct Effect Path	Indirect Effect		
			Path	PCI	VAF (%)
H3a (+): BPNS→P→EI	0.348***	0.056	0.197***	[0.127, 0.283]	56.61
H5a (+): BPNS→Op→EI			0.095*	[0.011, 0.194]	27.29
H3b (-): PCvCountr→P→EI	-0.115	-0.118*	0.025	[-0.013, 0.071]	21.74
H5b (-): PCvCountr→Op→EI			-0.022	[-0.050, 0.001]	19.13

Paths from hypotheses assessed by applying a one-tailed test at 5% of significance level [5%, 95%]. Bootstrapping based $n = 10,000$ bootstrap samples

PCI Percentile Confidence Interval

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

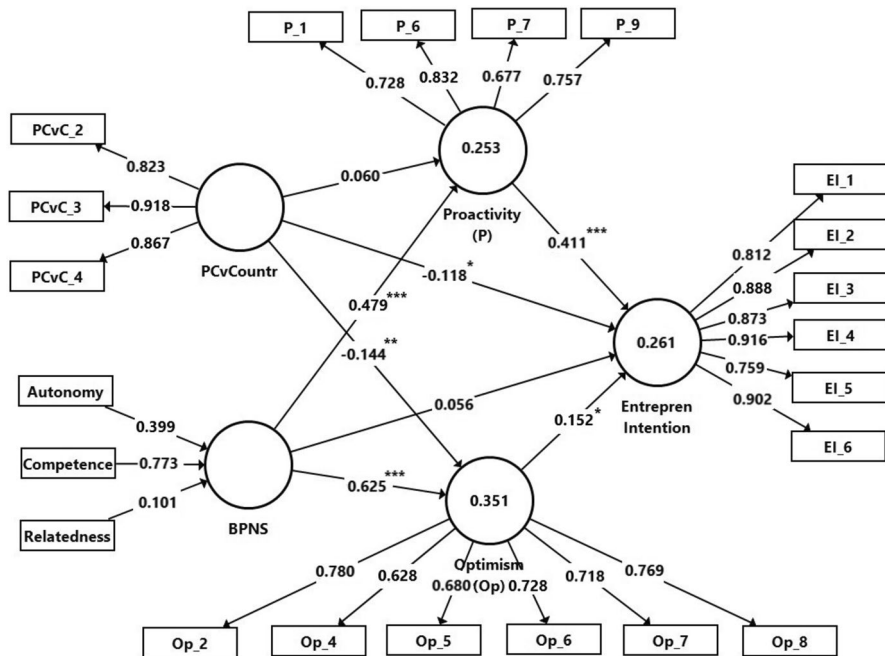


Fig. 2 Final PLS estimated model

As the global report GUESSS (Sieger et al., 2021) points out, there is a significant difference between students who express their intention to choose an entrepreneurial career, 5 years after completion of studies (32.3%) and those who actually become entrepreneurs (10.8%). This could represent a limit, especially in the COVID-19 pandemic context, which could have an impact on the intention to undertake entrepreneurial activities and on potential entrepreneurs in the creation of future businesses.

The social cognitive theory postulates that entrepreneurial intentions are more likely to transform into behaviours in the presence of beneficial environmental conditions than in hostile conditions. Furthermore, motivational variables work in concert with other psychological factors and environments to influence individuals' perceptions about their future work, such as those related to entrepreneurship. In support of this theoretical framework, we found that a context perceived as adverse (COVID-19 pandemic) inhibits entrepreneurial intentions (Abdelwahed & Soomro, 2023; Jiatong et al., 2022), but also, that optimism and proactivity partially mitigate the negative effects of the COVID-19 pandemic by improving intentions in such an adverse situation.

Furthermore, the study showed that basic psychological needs satisfaction positively influences proactivity and optimism, but not the entrepreneurial intention. This is a result that, although unexpected in this study, makes us reflect on the relationship between motivational factors and intention (Ryan & Deci, 2011; Vansteenkiste et al., 2020), and the direct influence between motivational factors and psychological variables. A possible explanation for this result could lie in the fact that the motivational

aspect, although important, is not essential in the choice of an entrepreneurial career, either if one does not also have specific entrepreneurial competence/skills or in uncertain and risky contexts (Godswill Agu et al., 2022; Gomes et al., 2021).

This explanation finds more support if we consider that the basic psychological needs satisfaction exerts, instead, a direct influence on proactivity and optimism and these, ultimately, positively influence the entrepreneurial intention. Our results, in line with previous studies, broaden the literature on the importance of psychological characteristics as antecedents of entrepreneurial intention, contributing significantly to international literature (Bernoster et al., 2018; Hmiesleski & Baron, 2009; Kumar & Shukla, 2019; Neneh, 2019).

The mediation analysis of the indirect effects of COVID-19 perception on entrepreneurial intention through proactivity and optimism confirms a partial mediation, given that—as previously commented—the direct effect is significant. These results may be due, for example, to anxiety about starting and running a business, perceiving little control over results, or rating the likelihood of receiving positive rewards as low. We found a marginally significant mediating effect of proactivity and optimism on the COVID-19 pandemic-entrepreneurial intention relationship. Previous research not related to entrepreneurship has described proactivity and optimism as assets that individuals are able to mobilize in times of stress or adversity, enabling them to overcome barriers in various areas of life (e.g. Arslan et al., 2021; Cao et al., 2020; Zhang et al., 2021). It appears that these variables may play a similar role in entrepreneurship. Thus, under conditions perceived as adverse, people who believe they can persevere through hardship thanks to their abilities and show an optimistic view of their future are better endowed to start a business. However, further research is needed to confirm this marginally significant moderate relationship.

On the other hand, the relationships of total mediation between basic psychological needs satisfaction and entrepreneurial intention are confirmed to be significant through proactivity and optimism, emphasizing, once again, the close relationship between motivational and psychological factors.

These results underline the importance of psychological variables in the entrepreneurial process, which, beyond a context that could be perceived as negative and uncertain, help the subject to develop coping strategies and cope with adverse situations (Hernández-Sánchez et al., 2020; Jiatong et al., 2022).

Furthermore, since the psychological characteristics associated with entrepreneurship are not only beneficial for an entrepreneurial career, but also for other careers in general, they should be encouraged in young people regardless of their career path. A social context that encourages the development and strengthening of such resources helps people—especially young adults—to develop a coherent and satisfactory self-profile as well as to be competent and take a leading role in their own future, even in adverse times.

Limitations and future research directions

This study has some limitations that can be overcome by future research. The first limitation refers to the way of recruiting the sample which can be considered as not representative of the population. However, multicollinearity did not represent a

problem in this study, which is why it can be stated that, according to Siemsen et al. (2010), it should not inflate the significance of interaction effects. Furthermore, only one Spanish region was analysed, this could be a limitation as different contexts would lead to more robust results. We, therefore, believe that future research could extend this study, taking into consideration other Spanish regions, as well as other different countries, useful for analysing any differences strictly related to different cultural contexts.

Furthermore, only the entrepreneurial intention was analysed in this study. This could represent a limitation for those who are specifically interested in the analysis of entrepreneurial behaviour. Although the link between intention and behaviour has been extensively documented in the literature (Kong et al., 2020), we consider that future research should also focus on entrepreneurial behaviour, using a sample other than university students (e.g., nascent or active entrepreneurs). This could contribute to the literature on the intention-behaviour relationship, especially in critical and uncertain conditions, such as the pandemic situation.

Additionally, there currently exists a need for further empirical evidence to fine-tune the measurement instruments of the COVID-19 perception in the country, as extant research has faced challenges to validate the existing ones (Cardella et al., 2021). Finally, in this analysis, we have not considered the influence of other relevant variables according to the literature, such as gender or media and information literacy. In the future, it might be useful to analyse how men and women face uncertain situations and whether there are differences between the two groups. In the literature, many studies have focused on gender differences in relation to entrepreneurial intention, unveiling a more relevant role of men (Nguyen, 2018; Zhao et al., 2005), however, little is known about the gender issue in adverse situations. Recently, Guerola-Navarro et al. (2023) have highlighted the need to investigate media and information literacy in the field of entrepreneurship to determine their importance in entrepreneurial intention and decision-making processes during the early years of business creation. Different levels of media and information literacy could moderate the relationships between optimism, proactivity, or satisfaction of basic psychological needs and individuals' entrepreneurial intention in adverse situations.

Implication for practice

Through the present study and in line with the research hypotheses, we have demonstrated the negative influence of the COVID-19 pandemic perception and the indirect influence, through a partial mediation of the psychological variables optimism and proactivity, on entrepreneurial intentions. Furthermore, the positive influence of basic psychological needs satisfaction on entrepreneurial intentions has not been demonstrated. This result, although unexpected, takes on an important significance if we consider that basic psychological needs satisfaction positively influences optimism and proactivity, which in turn mediate the relationship between psychological needs and entrepreneurial intentions.

These results may have practical implications of great interest for governments and educational centres for the development of training programs that promote

entrepreneurial activity and that are effective in overcoming the current crisis. Such programs can promote greater prosocial behaviours, cooperation and solidarity, which strengthen the expectations of young people and guide their performance in times of crisis. Social support, employment, security and education, in fact, are socioeconomic factors that represent about 40% of an individual's health (Wang et al., 2020), which, if not satisfied, negatively affect the economy and well-being of society.

In this sense, given the important role of entrepreneurship in the current economy, we believe that policymakers and universities must work together to promote a greater entrepreneurial culture through a pluralist approach that takes into account the various aspects related to entrepreneurship. Universities, on the one hand, have the fundamental task of transferring knowledge and skills, influencing actions, thinking and allowing young people to have the ability to choose their own future, and solving society problems with a scientific approach (Tajpour et al., 2020); while governments, on the other hand, should support education through public policies that guarantee the quality of entrepreneurship training programs (McGregor & Pouw, 2016).

Indeed, despite countless efforts, the effects of entrepreneurship education programs have often been inconsistent, partly due to a lack of effective institutional support, partly due to the inadequacy of training programs, often focused on "teaching in the classroom" rather than on-field practice (Jiatong et al., 2021).

For this reason, we believe that universities need to be aware of their vital role in contributing to the future of students, for example by collaborating with stakeholders (e.g. politicians, senior student-entrepreneurs and business organizations) to promote useful programs for developing entrepreneurial intentions. Likewise, relevant institutions should set up mentoring services, especially those related to access to financial resources, to help students obtain the necessary skills and resources and develop their vocations. They must, in particular, ensure that the proactive efforts of stakeholders minimize the barriers faced by students. These interventions will raise students' entrepreneurial intentions and encourage them to become future entrepreneurs.

Our study, in this sense, adds to the growing literature on the understanding of entrepreneurial intentions through two interesting aspects: the direct influence of psychological variables in orienting the professional future of university students; and the importance of effective entrepreneurship programs, and therefore the need for joint action between governments and educational institutions to support and encourage the development of resources, skills and knowledge that can implement entrepreneurial intentions. In other words, while some individuals are predisposed to an entrepreneurial career more naturally, others may need more support to form similar levels of entrepreneurial intention. These results take on a different meaning if we consider the importance of motivational factors in the development of psychological characteristics (useful for the development of entrepreneurial intentions).

As far as the authors know, this was the first study to investigate the importance of the basic psychological needs satisfaction as a pre-determinant of entrepreneurial intention of Spanish students, in a context perceived as adverse. Previous studies of predictors of entrepreneurial intentions have limited their attention

to social context as a source of behavioural guidance based on perceived social norms, entrepreneurship education, and role models. Furthermore, the motivation to become an entrepreneur has mostly been associated with different constructs that have analysed it according to two perspectives: instrumental aspects (such as money) or relational aspects (independence) (see Francoise et al., 2017). This study proposes another research perspective based on the role of society in cultivating entrepreneurship and stimulating entrepreneurial intentions, nurturing and catalysing autonomy, competence and relatedness. This contributes to the development of the literature about the importance of a second source through which people acquire entrepreneurial traits. In line with this study, and in addition to the personality characteristics (considered innate characteristics), people can acquire the important traits associated with entrepreneurship from the strengthening of their environment and support. This is an interesting aspect, especially today, where uncertainty and fear of failure could block the aspirations of young people, who could consider any future career choice inadequate.

Conclusions

Our study makes important contributions to entrepreneurship research in an under researched, yet adverse context. In addition to contributing to the literature on entrepreneurial intentions through an examination of novel antecedents (basic psychological needs satisfaction and COVID-19 pandemic perception), we expect this research to provide guidance for educators and policy makers who are trying to increase productive entrepreneurship in a variety of adverse environments. We also believe that continued behavioural research in adverse contexts, builds the understanding of how and why people engage in entrepreneurial activities. This study specifically helps us better understand why some are able to grow rather than retreat when faced with intense obstacles. With increased understanding of the importance of optimism and proactivity, educators can use this information to help more people who might otherwise have shied away from becoming involved in the economy. The men and women who believe in their abilities and are tough enough to persevere are transformational examples who can inspire and motivate others to engage in businesses that grow and develop their communities.

Furthermore, supporting the development of specific psychological resources can help people to perceive themselves as capable of changing the environment, improving the perception of one's future.

Authors' contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Cardella Giuseppina Maria, Virginia Barba-Sánchez, Ángel Meseguer-Martinez, Brizeida Hernández-Sánchez and José Carlos Sánchez-García. The first draft of the manuscript was written by Giuseppina Maria Cardella, Virginia Barba-Sánchez and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding Open Access funding provided thanks to the CRUE-CSIC agreement with Springer Nature. No funding was received for conducting this study.

Data availability The datasets generated analysed during the current study are available from the corresponding author (mariucardella@usal.es) on reasonable request.

Declarations

Ethics approval and consent The study was performed in accordance with the 1964 Helsinki Declaration and its subsequent amendments, or with comparable ethical standards. Written informed consent was obtained from each student prior to participating in the study. Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements, as no intervention was carried out. Every precaution has been taken to protect the privacy of the research subjects and the confidentiality of their personal information.

Competing interests All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Abdelwahed, N. A. A., & Soomro, B. A. (2023). The COVID-19 Crises: The threats, uncertainties and risks in entrepreneurial development. *Risks*, 11(5), 89. <https://doi.org/10.3390/risks11050089>
- Aguirre-Urreta, M. I., & Rönkkö, M. (2018). Statistical inference with PLSc using bootstrap confidence intervals. *MIS Quarterly: Management Information Systems*, 42(3), 1001–1020. <https://doi.org/10.25300/MISQ/2018/13587>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Al-Jubari, I. (2019). College students' entrepreneurial intention: Testing an integrated model of SDT and TPB. *SAGE Open*, 9(2), 1–15. <https://doi.org/10.1177/2158244019853467>
- Al-Jubari, I., Hassan, A., & Liñán, F. (2018). Entrepreneurial intention among university students in Malaysia: Integrating self-determination theory and the theory of planned behavior. *International Entrepreneurship and Management Journal*, 15(4), 1323–1342. <https://doi.org/10.1007/S11365-018-0529-0>
- Al-Mamary, Y. H., & Alshallaqi, M. (2022). Impact of autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness on students' intention to start a new venture. *Journal of Innovation & Knowledge*, 7(4), 100239. <https://doi.org/10.1016/j.jik.2022.100239>
- Aparicio, S., Urbano, D., & Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: Panel data evidence. *Technological Forecasting and Social Change*, 102, 45–61. <https://doi.org/10.1016/J.TECHFORE.2015.04.006>
- Arslan, G., Yıldırım, M., Tanhan, A., Bulus, M., & Allen, K. A. (2021). Coronavirus stress, optimism-pessimism, psychological inflexibility, and psychological health: Psychometric properties of the coronavirus stress measure. *International Journal of Mental Health Addiction*, 19, 2423–2439. <https://doi.org/10.1007/s11469-020-00337-6>
- Baker, S. R., Bloom, N., & Terry, S. J. (2020). *Using disasters to estimate the impact of uncertainty*. NBER Working Papers 27167. National Bureau of Economic Research Inc. <https://people.bu.edu/stephent/files/BBT.pdf>

- Barba-Sánchez, V., Salinero-Martin, M. Y., & Jiménez-Estévez, P. (2021). Monetising the social value of inclusive entrepreneurship: The case of the Abono Café social economy enterprise. *CIRIEC-España, Revista De Economía Pública, Social y Cooperativa*, 101, 115–141. <https://doi.org/10.7203/CIRIEC-E.101.18158>
- Bateman, T. S., & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, 14(2), 103–118. <https://doi.org/10.1002/JOB.4030140202>
- Belitski, M., Guenther, C., Kritikos, A. S., & Thurik, S. (2022). Economic effects of the COVID-19 pandemic on entrepreneurship and small businesses. *Small Business Economics*, 58, 593–609. <https://doi.org/10.1007/s11187-021-00544-y>
- Benitez, J., Henseler, J., Castillo, A., & Schuberth, F. (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information & Management*, 57(2), 103168. <https://doi.org/10.1016/j.im.2019.05.003>
- Bergner, S., Auburger, J., & Paleczek, D. (2023). The why and the how: A nexus on how opportunity, risk and personality affect entrepreneurial intention. *Journal of Small Business Management*, 61(6), 2656–2689. <https://doi.org/10.1080/00472778.2021.1934849>
- Bernoster, I., Rietveld, C., Thurik, R., & Torrès, O. (2018). Overconfidence, optimism and entrepreneurship. *Sustainability*, 10, 2233. <https://doi.org/10.3390/su10072233>
- Blanco-González, A., Díez-Martín, F., & Prado-Román, A. (2015). Entrepreneurship, global competitiveness and legitimacy. In M. Peris-Ortiz & J. M. Sahut (Eds.), *New challenges in entrepreneurship and finance: Examining the prospects for sustainable business development, performance, innovation, and economic growth* (pp. 57–69). Springer.
- Boyd, N. G., & Vozikis, G. S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice*, 18(4), 63–77. <https://doi.org/10.1177/104225879401800404>
- Bozzoli, C., Brück, T., & Wald, N. (2013). Self-employment and conflict in Colombia. *Journal of Conflict Resolution*, 57(1), 117–142. <https://doi.org/10.1177/0022002712464849>
- Branzei, O., & Abdelnour, S. (2010). Another day, another dollar: Enterprise resilience under terrorism in developing countries. *Journal of International Business Studies*, 41(5), 804–825. <https://doi.org/10.1057/jibs.2010.6>
- Brzozowski, J., Cucculelli, M., & Peruzzi, V. (2019). Firms' proactiveness during the crisis: Evidence from European data. *Entrepreneurship Research Journal*, 9(3), 1–14. <https://doi.org/10.1515/ERJ-2017-0215>
- Bullough, A., Renko, M., & Myatt, T. (2014). Danger zone entrepreneurs: The importance of resilience and self-efficacy for entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 38(3), 473–499. <https://doi.org/10.1111/etap.12006>
- Cantarero, S., González-Loureiro, M., & Puig, F. (2017). Efectos de la crisis económica sobre el emprendimiento en empresas de economía social en España: Un análisis espacial. *REVESCO: Revista De Estudios Cooperativos*, 125, 24–48. <https://doi.org/10.5209/REVE.56133>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>
- Cardella, G. M., Hernández-Sánchez, B. R., & Sánchez-García, J. C. (2020). Basic psychological needs as a motivational competence: Examining validity and measurement invariance of Spanish BPNSF scale. *Sustainability*, 12(13), 5422. <https://doi.org/10.3390/su12135422>
- Cardella, G. M., Hernández-Sánchez, B. R., & Sánchez-García, J. C. (2021). Development and validation of a scale to evaluate students' future impact perception related to the coronavirus pandemic (C-19FIPS). *PLoS ONE*, 16(11), e0260248. <https://doi.org/10.1371/journal.pone.0260248>
- Cepeda-Carrion, G., Cegarra-Navarro, J. G., & Cillo, V. (2018). Tips to use partial least squares structural equation modelling (PLS-SEM) in knowledge management. *Journal of Knowledge Management*, 23(1), 67–89. <https://doi.org/10.1108/JKM-05-2018-0322>
- Chapman, T., & Chi, T. C. (2017). Perceived social support mediates the link between optimism and active coping. *Journal of Behavioral and Social Sciences*, 4, 57–65.
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M., Soenens, B., Van Petegem, S., & Verstuyf, J. (2014). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, 39(2), 216–236. <https://doi.org/10.1007/S11031-014-9450-1>

- Chesbrough, H. (2020). To recover faster from Covid-19, open up: Managerial implications from an open innovation perspective. *Industrial Marketing Management*, 88, 410–413. <https://doi.org/10.1016/j.indmarm.2020.04.010>
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Cowling, M., Liu, W., & Ledger, A. (2012). Small business financing in the UK before and during the current financial crisis. *International Small Business Journal*, 30(7), 778–800. <https://doi.org/10.1177/0266242611435516>
- den Broeck, A. V., Vansteenkiste, M., Witte, H. D., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the work-related basic need satisfaction scale. *Journal of Occupational and Organizational Psychology*, 83(4), 981–1002. <https://doi.org/10.1348/096317909X481382>
- Devece, C., Peris-Ortiz, M., & Rueda-Armengot, C. (2016). Entrepreneurship during economic crisis: Success factors and paths to failure. *Journal of Business Research*, 69(11), 5366–5370. <https://doi.org/10.1016/j.jbusres.2016.04.139>
- Doern, R., Williams, N., & Vorley, T. (2019). Special issue on entrepreneurship and crises: Business as usual? An introduction and review of the literature. *Entrepreneurship and Regional Development*, 31(5–6), 400–412. <https://doi.org/10.1080/08985626.2018.1541590>
- Edwards, J. R. (2001). Multidimensional constructs in organizational behavior research: An integrative analytical framework. *Organizational Research Methods*, 4(2), 144–192. <https://doi.org/10.1177/109442810142004>
- Emami, A., Ashourizadeh, S., Sheikhi, S., & Rexhepi, G. (2022). Entrepreneurial propensity for market analysis in the time of COVID-19: Benefits from individual entrepreneurial orientation and opportunity confidence. *Review of Managerial Science*, 16, 2413–2439. <https://doi.org/10.1007/s11846-021-00499-0>
- Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. University of Akron Press.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Fayolle, A., & Liñán, F. (2014). The future of research on entrepreneurial intentions. *Journal of Business Research*, 67(5), 663–666. <https://doi.org/10.1016/j.jbusres.2013.11.024>
- Francoise, U., Donghong, D., & Janviere, N. (2017). Psychological need satisfaction as a pre-determinant of entrepreneurial intentionality. *Journal of Entrepreneurship & Organization Management*, 6(1), 1–6. <https://doi.org/10.4172/2169-026X.1000210>
- Ghosh, S. (2018). Uncertainty, economic growth its impact on tourism, some country experiences. *Asia Pacific Journal of Tourism Research*, 24(1), 83–107. <https://doi.org/10.1080/10941665.2018.1542324>
- Godswill Agu, A., Okwara, O. O., Okocha, E. R., & Madichie, N. O. (2022). COVID-19 pandemic and entrepreneurial intention among university students: A contextualisation of the Igbo Traditional Business School. *African Journal of Economic and Management Studies*, 13(1), 89–104. <https://doi.org/10.1108/AJEMS-05-2021-0227>
- Gomes, S., Sousa, M., Santos, T., Oliveira, J., Oliveira, M., & Lopes, J. M. (2021). Opening the “Black Box” of university entrepreneurial intention in the era of the COVID-19 pandemic. *Social Sciences*, 10(5), 181. <https://doi.org/10.3390/socsci10050181>
- Gómez-Molinero, R., Zayas, A., Ruíz-González, P., & Guil, R. (2018). Optimism and resilience among university students. *Revista INFAD de Psicología Internacional: Journal of Developmental and Educational Psychology*, 1(1), 147–154. <https://doi.org/10.17060/IJODAEP.2018.N1.V1.1179>
- González-Tejero, C. B., Ulrich, K., & Carrilero, A. (2022). The entrepreneurial motivation, Covid-19, and the new normal. *Entrepreneurial Business and Economics Review*, 10(2), 205–217. <https://doi.org/10.15678/EBER.2022.100212>
- Guerola-Navarro, V., Stratu-Strelet, D., Botella-Carrubi, D., & Gil-Gomez, H. (2023). Media or information literacy as variables for citizen participation in public decision-making? A bibliometric overview. *Sustainable Technology and Entrepreneurship*, 2(1), 100030. <https://doi.org/10.1016/j.stae.2022.100030>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.

- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM): an emerging tool in business research. *European Business Review*, 26, 106–121. <https://doi.org/10.1108/EBR-10-2013-0128>
- Hair, J. F., Sarstedt, M., & Ringle, C. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, 53(4), 566–584. <https://doi.org/10.1108/EJM-10-2018-0665>
- Hall, C. M., Scott, D., & Gössling, S. (2020). Pandemics, transformations and tourism: Be careful what you wish for. *Tourism Geographies*, 22(3), 577–598. <https://doi.org/10.1080/14616688.2020.1759131>
- Hernández-Sánchez, B. R., Cardella, G. M., & Sánchez-García, J. C. (2020). Psychological factors that lessen the impact of COVID-19 on the self-employment intention of business administration and economics' students from Latin America. *International Journal of Environmental Research and Public Health*, 17(15), 5293. <https://doi.org/10.3390/IJERPH17155293>
- Hmieleski, K. M., & Baron, R. A. (2009). Entrepreneurs' optimism and new venture performance: A social cognitive perspective. *Academy of Management Journal*, 52(3), 473–488. <https://doi.org/10.5465/amj.2009.41330755>
- Hundt, C., & Sternberg, R. (2016). Explaining new firm creation in Europe from a spatial and time perspective: A multilevel analysis based upon data of individuals, regions and countries. *Papers in Regional Science*, 95(2), 223–257. <https://doi.org/10.1111/PIRS.12133>
- Jiatong, W., Murad, M., Bajun, F., Tufail, M. S., Mirza, F., & Rafiq, M. (2021). Impact of entrepreneurial education, mindset, and creativity on entrepreneurial intention: Mediating role of entrepreneurial self-efficacy. *Frontiers in Psychology*, 12, 724440. <https://doi.org/10.3389/fpsyg.2021.724440>
- Jiatong, W., Murad, M., Bajun, F., Syed, N., & Munir, M. (2022). From COVID-19 pandemic to entrepreneurial behavior: The mediating effect of proactive personality and the moderating role of anticipated regret. *Frontiers in Psychology*, 13, 838779. <https://doi.org/10.3389/fpsyg.2022.838779>
- Kalenkoski, C. M., & Pabilonia, S. W. (2022). Impacts of COVID-19 on the self-employed. *Small Business Economics*, 58(2), 741–768. <https://doi.org/10.1007/s11187-021-00522-4>
- Kollmann, T., Stöckmann, C., & Kensbock, J. M. (2017). Fear of failure as a mediator of the relationship between obstacles and nascent entrepreneurial activity - An experimental approach. *Journal of Business Venturing*, 32(3), 280–301. <https://doi.org/10.1016/J.JBUSVENT.2017.02.002>
- Kong, F., Zhao, L., & Tsai, C. H. (2020). The relationship between entrepreneurial intention and action: The effects of fear of failure and role model. *Frontiers in Psychology*, 11, 229. <https://doi.org/10.3389/fpsyg.2020.00229>
- Korsgaard, S., & Anderson, A. R. (2011). Enacting entrepreneurship as social value creation. *International Small Business Journal: Researching Entrepreneurship*, 29(2), 135–151. <https://doi.org/10.1177/0266242610391936>
- Krueger, N., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intention. *Journal of Business Venturing*, 15(5–6), 411–432. [https://doi.org/10.1016/S0883-9026\(98\)00033-0](https://doi.org/10.1016/S0883-9026(98)00033-0)
- Kumar, R., & Shukla, S. (2019). Creativity, proactive personality and entrepreneurial intentions: Examining the mediating role of entrepreneurial self-efficacy. *Global Business Review*, 23(1), 101–118. <https://doi.org/10.1177/0972150919844395>
- Kumar, S., Paray, Z. A., & Dwivedi, A. K. (2020). Student's entrepreneurial orientation and intentions: A study across gender, academic background, and regions. *Higher Education, Skills and Work-Based Learning*, 11(1), 78–91. <https://doi.org/10.1108/HESWBL-01-2019-0009>
- Lanivich, S. E., Lyons, M. L., & Wheeler, A. R. (2021). Nascent entrepreneur characteristic predictors of early-stage entrepreneurship outcomes. *Journal of Small Business and Enterprise Development*, 28(7), 1095–1116. <https://doi.org/10.1108/JSBED-08-2019-0283>
- Li, S., Wu, D., & Sun, Y. (2021). The impact of entrepreneurial optimism and labor law on business performance of new ventures. *Frontiers in Psychology*, 12, 697002. <https://doi.org/10.3389/fpsyg.2021.697002>
- Li, Z., Zhang, W., Zhou, Y., Kang, D., Feng, B., Zeng, Q., Xu, L., & Zhang, M. (2022). College students' entrepreneurial intention and alertness in the context of the COVID-19 pandemic. *Sustainability*, 14(13), 7713. <https://doi.org/10.3390/su14137713>
- Lindblom, A., Lindblom, T., & Wechtler, H. (2020). Dispositional optimism, entrepreneurial success and exit intentions: The mediating effects of life satisfaction. *Journal of Business Research*, 120, 230–240. <https://doi.org/10.1016/J.JBUSRES.2020.08.012>
- Liñán, F., & Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33, 593–617. <https://doi.org/10.1111/j.1540-6520.2009.00318.x>

- Lopes, J. M., Gomes, S., Santos, T., Oliveira, M., & Oliveira, J. (2021). Entrepreneurial intention before and during COVID-19: A case study on Portuguese university students. *Education Sciences*, 11(6), 273. <https://doi.org/10.3390/educsci11060273>
- Madar, N. K., Teeni-Harari, T., Ickson, T., & Sela, Y. (2019). Optimism and entrepreneurial intentions among students: The mediating role of emotional intelligence. *Journal of Entrepreneurship Education*, 22(4), 1–19.
- Marín García, J. A., & Alfalla Luque, R. (2019). Protocolo: Cómo abordar las investigaciones con Partial Least Squares (PLS) en Dirección de Operaciones. Una guía para envíos a revistas académicas. *Working Papers on Operations Management*, 10(1), 29–69. <https://doi.org/10.4995/wpom.v10i1.10802>
- Martínez, C. N., & Bañón, A. R. (2020). Entrepreneurship in times of crisis: An exploratory analysis of the COVID-19's effects. *Small Business International Review*, 4(2), 53–66. <https://doi.org/10.26784/SBIR.V4I2.279>
- McGregor, J. A., & Pouw, N. (2016). Towards an economics of well-being. *Cambridge Journal of Economics*, 41(4), 1123–1142. <https://doi.org/10.1093/cje/bew044>
- Meyer, N., & de Jongh, J. (2018). The importance of entrepreneurship as a contributing factor to economic growth and development: The case of selected European countries. *Journal of Economics and Behavioral Studies*, 10(4), 287–299. [https://doi.org/10.22610/jeb.v10i4\(J\).2428](https://doi.org/10.22610/jeb.v10i4(J).2428)
- Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personality and Individual Differences*, 50(3), 387–391. <https://doi.org/10.1016/j.paid.2010.10.029>
- Morgan, J., & Sisak, D. (2016). Aspiring to succeed: A model of entrepreneurship and fear of failure. *Journal of Business Venturing*, 31(1), 1–21. <https://doi.org/10.1016/j.jbusvent.2015.09.002>
- Na, B., Ahmad, N. H., Zhang, C., & Han, Y. (2022). Entrepreneurial intention and delayed job satisfaction from the perspective of emotional interaction: The mediating of psychological capital. *Frontiers in Psychology*, 13, 925460. <https://doi.org/10.3389/fpsyg.2022.925460>
- Neira Gómez, I., Guerrero, M., Calvo, N., del Fuentes Fuentes, M., & M., Fernández-Laviada, A., Leporati, M., & Torres, A. J. (2021). *Global Entrepreneurship Monitor. Informe GEM España 2020–2021*. Editorial de la Universidad de Cantabria.
- Neneh, B. N. (2019). From entrepreneurial intentions to behavior: The role of anticipated regret and proactive personality. *Journal of Vocational Behavior*, 112, 311–324. <https://doi.org/10.1016/j.jvb.2019.04.005>
- Nguyen, C. (2018). Demographic factors, family background and prior self-employment on entrepreneurial intention - Vietnamese business students are different: Why? *Journal of Global Entrepreneurship Research*, 8(10), 1–17. <https://doi.org/10.1186/s40497-018-0097-3>
- Nitzl, C., Roldan, J. L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. *Industrial Management & Data Systems*, 116(9), 1849–1864. <https://doi.org/10.1108/IMDS-07-2015-0302>
- Obratsova, O., & Chepurensko, A. (2020). Entrepreneurial activity in Russia and its cross-regional differences. *Journal of the New Economic Association*, 46(2), 198–210. <https://doi.org/10.31737/2221-2264-2020-46-2-12>
- O’Kane, C., Mangematin, V., Zhang, J. A., & Cunningham, J. A. (2020). How university-based principal investigators shape a hybrid role identity. *Technological Forecasting and Social Change*, 159(C), 120179. <https://doi.org/10.1016/j.techfore.2020.120179>
- Otrachshenko, V., Popova, O., Nikolova, M., & Tyurina, E. (2022). COVID-19 and entrepreneurship entry and exit: Opportunity amidst adversity. *Technology in Society*, 71, 102093. <https://doi.org/10.1016/j.techsoc.2022.102093>
- Ozaralli, N., & Rivenburgh, N. K. (2016). Entrepreneurial intention: Antecedents to entrepreneurial behavior in the U.S.A. and Turkey. *Journal of Global Entrepreneurship Research*, 6(1), 1–32. <https://doi.org/10.1186/s40497-016-0047-X>
- Parra-Miranda, M. S. (2014). Emprender en tiempos de crisis. *Observatorio Económico*, 80, 2–3. <https://doi.org/10.11565/oe.vi80.130>
- Pedauga, L., Sáez, F., & Delgado-Márquez, B. (2022). Macroeconomic lockdown and SMEs: The impact of the COVID-19 pandemic in Spain. *Small Business Economics*, 58, 665–688. <https://doi.org/10.1007/s11187-021-00476-7>
- Ratten, V. (2020). Coronavirus and international business: An entrepreneurial ecosystem perspective. *Thunderbird International Business Review*, 62(5), 629–634. <https://doi.org/10.1002/tie.22161>

- Richey, M., Brooks, J., & Ravishankar, M. N. (2022). Building self-determination of disadvantaged groups: Insights from an entrepreneurship focused program for refugees. *International Journal of Entrepreneurial Behavior & Research*, 28(7), 1828–1850. <https://doi.org/10.1108/IJEBR-10-2021-0806>
- Roy, R., & Das, N. (2020). Exploring entrepreneurial intention among engineering students in India: A multiple basket approach. *International Journal of Technology and Design Education*, 32, 555–584. <https://doi.org/10.1007/S10798-020-09596-9>
- Ryan, R. M., & Deci, E. L. (2011). A self-determination theory perspective on social, institutional, cultural, and economic supports for autonomy and their importance for well-being. In V. I. Chirkov, R. M. Ryan, & K. M. Sheldon (Eds.), *Human autonomy in cross-cultural context: Perspectives on the psychology of agency, freedom, and well-being* (pp. 45–64). Springer Science + Business Media.
- Ryan, R. M., & Deci, E. L. (2017). *Self determination theory: Basic psychological needs in motivation*. Guildford Press Publications.
- Sánchez-García, J. C. (2010). Evaluación de la Personalidad Emprendedora: Validez Factorial de Cuestionario de Orientación Emprendedora (COE). *Revista Latinoamericana De Psicología*, 42(1), 41–52.
- Sánchez-García, J. C. (2016). *El Cuestionario PROE-Documento Interno*. Universidad de Salamanca-Cátedra de emprendedores.
- Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105–115. <https://doi.org/10.1016/j.jfbs.2014.01.002>
- Sarstedt, M., Ringle, C. M., Cheah, J. H., Ting, H., Moisesco, O. I., & Radomir, L. (2020). Structural model robustness checks in PLS-SEM. *Tourism Economics*, 26(4), 531–554. <https://doi.org/10.1177/1354816618823921>
- Schuberth, F., Henseler, J., & Dijkstra, T. K. (2018). Confirmatory composite analysis. *Frontiers in Psychology*, 9, 2541. <https://doi.org/10.3389/fpsyg.2018.02541>
- Seibert, S., Crant, J. M., & Kraimer, M. L. (1999). Proactive personality and career success. *Journal of Applied Psychology*, 84(3), 416–427. <https://doi.org/10.1037/0021-9010.84.3.416>
- Shapero, A., & Sokol, L. (1982). *The social dimensions of entrepreneurship*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. <https://ssrn.com/abstract=1497759>
- Sieger, P., Raemy, L., Zellweger, T., Fueglistaller, U., & Hatak, I. (2021). *Global Student Entrepreneurship 2021: Insights from 58 Countries 2021*. St. Gallen/Bern: KMU-HSG/IMU-U.
- Siemens, E., Roth, A., & Oliveira, P. (2010). Common method bias in regression models with linear, quadratic, and interaction effects. *Organizational Research Methods*, 13(3), 456–476. <https://doi.org/10.1177/1094428109351241>
- Smallbone, D., Deakins, D., Battisti, M., & Kitching, J. (2012). Small business responses to a major economic downturn: Empirical perspectives from New Zealand and the United Kingdom. *International Small Business Journal: Researching Entrepreneurship*, 30(7), 754–777. <https://doi.org/10.1177/0266242612448077>
- Tajpour, M., Kawamorita, H., & Demiryurek, K. (2020). Towards the third generation of universities with an entrepreneurial approach. *International Journal of Technoentrepreneurship*, 4(2), 122–133. <https://doi.org/10.1504/IJTE.2020.10036599>
- Tantawy, M., Herbert, K., McNally, J. J., Mengel, T., Piperopoulos, P., & Foord, D. (2021). Bringing creativity back to entrepreneurship education: Creative self-efficacy, creative process engagement, and entrepreneurial intentions. *Journal of Business Venturing Insights*, 15, e00239. <https://doi.org/10.1016/J.JBVI.2021.E00239>
- Torres, A. P., Marshall, M. I., & Sydnor, S. (2019). Does social capital pay off? The case of small business resilience after Hurricane Katrina. *Journal of Contingencies and Crisis Management*, 27(2), 168–181. <https://doi.org/10.1111/1468-5973.12248>
- Trif, S. M., Noja, G. G., Cristea, M., Enache, C., & Didraga, O. (2022). Modelers of students' entrepreneurial intention during the COVID-19 pandemic and post-pandemic times: The role of entrepreneurial university environment. *Frontiers in Psychology*, 13, 976675. <https://doi.org/10.3389/fpsyg.2022.976675>
- Vansteenkiste, M., Ryan, R., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, 44, 1–31. <https://doi.org/10.1007/s11031-019-09818-1>

- Wang, W., Cao, Q., Zhuo, C., Mou, Y., Pu, Z., & Zhou, Y. (2021). COVID-19 to Green entrepreneurial intention: Role of green entrepreneurial self-efficacy, optimism, ecological values, social responsibility, and green entrepreneurial motivation. *Frontiers in Psychology, 12*, 732904. <https://doi.org/10.3389/fpsyg.2021.732904>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*, 1729. <https://doi.org/10.3390/ijerph17051729>
- Williams, N., & Vorley, T. (2015). The impact of institutional change on entrepreneurship in a crisis-hit economy: The case of Greece. *Entrepreneurship and Regional Development, 27*, 28–49. <https://doi.org/10.1080/08985626.2014.995723>
- Zampetakis, L. A. (2008). The role of creativity and proactivity on perceived entrepreneurial desirability. *Thinking Skills and Creativity, 3*(2), 154–162. <https://doi.org/10.1016/J.TSC.2008.07.002>
- Zhang, W., Zheng, Z., Pylypchuk, R., Zhao, J., Sznajder, K. K., Cui, C., & Yang, X. (2021). Effects of optimism on work satisfaction among nurses: A mediation model through work-family conflict. *Frontiers in Psychiatry, 12*, 779396. <https://doi.org/10.3389/fpsyg.2021.779396>
- Zhao, H., Seibert, S. E., & Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *The Journal of Applied Psychology, 90*(6), 1265–1272. <https://doi.org/10.1037/0021-9010.90.6.1265>
- Zurlo, M. C., Volta, C. D., & M. F., & Vallone, F. (2020). COVID-19 student stress questionnaire: Development and validation of a questionnaire to evaluate Students' stressors related to the coronavirus pandemic lockdown. *Frontiers in Psychology, 11*, 576758. <https://doi.org/10.3389/fpsyg.2020.576758>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.