



Research article

Evaluating the relationship between social media use frequency and entrepreneurial perceptions and attitudes among students

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ABSTRACT

Despite studies published in the last decade linking entrepreneurship and the use of social media, to date, no study has analyzed in depth the relationship between the frequency of use among different social media sites and the intensity of entrepreneurial attitudes and perceptions. Due to the increasing use of social media as a teaching tool in higher education, this study seeks to address this knowledge gap. Consequently, the objective of this research is to analyze whether the frequency of social media use, among Twitter, Facebook, Instagram, WhatsApp and YouTube, is linked with perceptual discrepancies regarding entrepreneurial subjective norms, attitudes toward entrepreneurship and the intention to undertake, differentiating this relationship by gender and age group. A total of 246 business and engineering students from Chile were evaluated through online surveys, and Mann–Whitney and Spearman's correlation tests were performed. The findings highlight that higher exposure on these social media platforms is related to better entrepreneurial attitudes and perceptions, and this association differs according to students' gender and age group; in particular, Facebook shows more positive correlations in younger and male students, and WhatsApp and YouTube show more positive correlations in older and female students. This research extends the understanding of the relation between exposure to social media and variables with a considerable influence on undertaking entrepreneurship. Universities should integrate social media use as a teaching tool among students to aid in their entrepreneurial learning and strengthen new ventures. The main limitation of the study is that the sample includes business and engineering students in Chile. Future studies should ask students from different countries; likewise, it is important to use qualitative methodologies to determine why social media may affect entrepreneurial perceptions and attitudes.

1. Introduction

Entrepreneurship is defined as the process of identifying opportunities and implementing businesses to create wealth; from a more general perspective, entrepreneurship is the act and process by which societies, regions, organizations or individuals identify and pursue business opportunities to create wealth (George and Zahra, 2002). It is a topic that has been highlighted for its importance in developing Latin American countries because it promotes the economic and social improvement of the population, constituting a means to overcome poverty (Sarfaraz et al., 2014; Staub and Tekin, 2017); consequently, the governments in this region have implemented policies to support and foster entrepreneurship, which have been reinforced since the beginning of the COVID-19 pandemic (Heredia-Zurita and Dini, 2021). Moreover, due to the transformations of the labor markets in developing countries during recent decades, which have implied role changes and instability (Wyn and

Dwyer, 2000), students of higher education should acquire the competencies necessary to become independent workers and undertake new ventures; for this reason, a proportion of universities in the world have adapted their teaching strategies to strengthen entrepreneurial competencies in their future graduates (Kucel et al., 2016). Therefore, it is crucial to investigate the factors that favor entrepreneurial activities to strengthen higher education.

Higher education students currently spend a large proportion of their time using social media (Sampson et al., 2018). Social media is understood as "a group of internet-based applications that build on the ideological and technical foundations of Web 2.0 and that allow the creation and exchange of user-generated content" (Kaplan and Haenlein, 2010, p. 61). In this digital space, students are exposed to messages from other people, public and private organizations, and advertisements adjusted to their preferences (Yoo et al., 2016; Lewis, 2009). Social media content can influence people's thoughts, emotions, and behaviors in different life

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roles, such as citizens, consumers, and workers (Skoric et al., 2016; Thourungroje, 2014; Wang et al., 2016); therefore, depending on their preferences, students choose which social media sites to read and interact with according to the content of and interactions within these digital channels (Al-Bahrani et al., 2015). In this sense, a greater political and social connotation has been recognized on Twitter due to its status as a microblog with 140 characters (Abisheva et al., 2014; DeGroot et al., 2015); Facebook and Instagram are considered useful for relationship building with close people such as friends and family (Madge et al., 2009); YouTube is used for self-learning through videos (Yang and Lee, 2020); and WhatsApp is a collective infrastructure for social life based on an instant messaging application (Cruz and Harindranath, 2020).

The study of social media in entrepreneurship has been associated mostly with recognizing the benefits of social media for businesses and their uses for enterprise growth. It has been argued that social media allows the geographical barriers for the sale of products to be overcome, provides quick and cheap communication with customers, and facilitates the development of customer prospect data to increase sales (Jagongo and Kinyua, 2013); social media also improves business performance (Ahmad et al., 2018) and the survival chances of new ventures (Delacroix et al., 2019). Complementarily, the benefits of social media have been analyzed with a focus on specific groups of entrepreneurs, such as the generation of opportunities for women-owned businesses (Cesaroni et al., 2017; Datta et al., 2020), and specific industrial sectors, such as the promotion of heritage tourism (Surugiu and Surugiu, 2015).

Three topics of high interest in the field of entrepreneurship that have been studied for decades are subjective norms, attitudes toward entrepreneurship and entrepreneurial intention. These variables are of great importance in the field of entrepreneurship due to their recognized influence on entrepreneurial intention and business creation. They are embedded in Ajzen's (1991) Model of Planned Behavior and have been recognized as factors that foster sustainable venture creation, start-up development, and new business performance (Lee and Wong, 2003; Tajpour and Hosseini, 2021; Yasir et al., 2021). These effects have also been appreciated in research conducted with a focus on university students (Kritihika and Venkatachalam, 2014); hence, several universities around the world seek to develop favorable attitudes toward entrepreneurship and entrepreneurial intention in their students to transform them into successful business creators.

Despite the significant number of research studies published in the last decade linking entrepreneurship and social media use, to date, no study has analyzed in depth the relationship between the frequency of use among different social media sites and the intensity of subjective norms, attitudes toward entrepreneurship and entrepreneurial intention, distinguishing these relationships by gender and age group. There is currently a knowledge gap that needs to be addressed. This information should be relevant for higher education institutions because if their students allocate considerable time to using social media, institutional efforts to form entrepreneurial competencies can be positively or negatively affected by the content exposure on these digital channels. Hence, understanding perceptual differences in students by the use intensity of social media sites would allow better management of their integration into teaching processes according to students' gender and age.

Consequently, the objective of this research is to analyze whether perceptions of entrepreneurial subjective norms, attitudes toward entrepreneurship and entrepreneurial intentions are linked with the frequency of reading messages or exposure to content such as videos or images on different online social channels, distinguishing these relationships between male and female students and between students who are part of the centennial generation and older. The social media sites Twitter, Facebook, Instagram, WhatsApp and YouTube have been selected for their high use as a source of information in Chile's population (Cadem, 2019). Students were assessed due to the current importance of teaching entrepreneurship in universities (Kucel et al., 2016), and engineering and business students were asked to participate because the development of entrepreneurial skills is highly valued in these areas (e.g.,

Herman and Stefanescu, 2017; Gautam et al., 2020). This research provides new insights for higher education institutions regarding the importance of students' exposure to social media content. Greater understanding could make it easier to incorporate these information channels into their teaching processes to take advantage of their positive aspects in the training of students. This perspective also has high value, since teachers and higher education institutions currently have not yet fully exploited online social media sites to support their activities (Zachos et al., 2018); in this sense, the pedagogical possibilities of social media have still been only partially applied (Manca, 2020), and many academics still do not use social media for teaching due mostly to lack of awareness of this emerging technology, as well as a lack of skills and confidence (Chugh et al., 2021). Moreover, the evidence presented in this research can guide the teaching of entrepreneurship while considering differences in the gender and age of the students.

2. Literature review

2.1. Social media in Chile

In January 2021, Chile had approximately 19.16 million inhabitants, and 16 million inhabitants had an active social media presence; the majority of them accessed social media through smartphones, specifically, 15.81 million people, representing 98.8% of the total population (Alvino, 2021). It is worth noting that Chile was ranked as the country with the highest social media penetration in Latin America and the Caribbean during January 2021 (Statista, 2021). In the context of the COVID-19 pandemic, in Chile, the number of messages on social media grew by 53% in March 2020 compared to the same month of the previous year; likewise, this country, together with Brazil, had the highest increase in the use of social media during that period (Pasquali, 2020). In relation to relevant social media sites in Chile, WhatsApp, Facebook, Instagram, YouTube and Twitter are important digital channels, as they are used by an important part of the population (Cadem, 2019).

According to these data, social media platforms are important information channels for this country, influencing the opinions of its inhabitants. However, despite their relevance, research in this country has mainly focused on the effects of social media on citizens' opinions regarding political and social issues (Puche et al., 2020; Ruiz and Ovando, 2021) and on their role in improving product marketing (Fernández and Guerrero, 2018). Few studies have analyzed the effect of social media on higher education and entrepreneurship. Recently, Cabero Almenara et al. (2019) analyzed the perceptions of Chilean university students regarding the use of social media for collaborative learning, and Verdugo and Villaruel (2021) studied the relationship between social media use and perceptions of sustainable entrepreneurship.

2.2. Subjective norms

Subjective norms are defined as the social pressure perceived by an individual to perform or not perform a behavior based on how influential people or groups, such as friends and family members, would feel about that behavior (Aleassa et al., 2011; Riemenschneider et al., 2011). From the perspective of the model of planned behavior (Ajzen, 1991), social norms' influence on entrepreneurial intention and attitudes is supported. Additionally, this effect on students has been validated; for example, Liñán et al. (2011) argued that the entrepreneurship valuation by students is related to their intention to undertake a start-up and that this valuation is positively affected by their perception of subjective norms. Regarding discrepancies by gender, previous research has shown differences in subjective norms between men and women. Villanueva-Flores et al. (2021) stated that the level of this variable is higher in women, and Maes et al. (2014) concluded that women show more influence from social norms. The analysis of social norms by age cohort has been addressed by a few studies. Sahut et al. (2015) showed that subjective

norms have a lower impact on entrepreneurial intention among older people than among younger people.

Studies on the relationship between exposure to social media and subjective norms are scarce. In the field of product purchasing, Pop et al. (2020) demonstrated that online social channels positively affect subjective norms in cosmetics consumption. In addition, Truong (2018) shows that social media exposure has a positive influence on the subjective norms of young people's purchases in Vietnam. From the perspective of shaping students' perceptions, previous studies admit that social media message exposure influences students' perceptions and actions in various domains, such as attitudes and intentions regarding smoking (Yoo et al., 2016), and students' academic performance (Mushtaq and Benraghda, 2018). Although the relationship between social media frequency of use and subjective norms in entrepreneurship has not been analyzed in depth, by considering these studies in other areas as a reference, this research argues that students who frequently use social media should demonstrate perceptual differences in entrepreneurial subjective norms. In this sense, Karamat and Farooq (2020) point out that social media can contribute to the creation and sharing of different ideas, information and images/videos; therefore, it should also affect entrepreneurial perceptions and attitudes.

Hence, it is argued that because of the differences in the types of content, forms of interaction and dominant themes of social media sites, perceptions about subjective norms should differ among users with a high or low use frequency. In a complementary sense, due to the perceptual and attitudinal differences recognized in the entrepreneurship literature by demographic conditions (Minniti, 2010; Bosma and Schutjens, 2011) and the gender and age discrepancies in the use of social media (Fietkiewicz et al., 2016; Karatsoli and Nathanail, 2020), it is reasonable to state that the relationship between social media use and perceived subjective norms should vary according to students' gender and age group. This approach is also supported in that the selection of content and the way people relate to their environment vary by age and gender (Kimbrough et al., 2013; Bowne and Wohn, 2015). Consequently, the following research hypotheses are proposed.

- H1: The relationship between the frequency of use of social media sites and perceptions of subjective norms differs by gender.
- H2: The relationship between the frequency of use of social media sites and perceptions of subjective norms differs by age group.

2.3. Attitudes toward entrepreneurship

Attitudes toward entrepreneurship are beliefs and perceptions regarding the personal desire to start a business, which are connected to expectations about the results and their effect on an individual (Ajzen, 1991). It is argued that attitudes toward entrepreneurship affect the propensity of individuals to become entrepreneurs, their personal ability to recover from entrepreneurial setbacks, and the support that individuals may receive from family members and the general public (Guerrero et al., 2008; Bobrowska and Conrad, 2017). Attitudes toward entrepreneurship are predictors of entrepreneurial potential (Ikhtiangung and Aji, 2019) because if people express favorable attitudes to entrepreneurship, their chances of creating new businesses are higher. An important line of research is the influence of education on entrepreneurial attitudes. In this area, comparative research has been conducted to analyze the effect of education on the development of positive attitudes toward entrepreneurship; mostly, the evidence collected argues that entrepreneurship education has a favorable impact (e.g., Mohamed et al., 2012).

Various personal and contextual conditions have been recognized as influencing attitudes toward entrepreneurship, such as the characteristics of the culture embedded by entrepreneurs (Huggins and Thompson, 2012), the teaching model of universities that educate about entrepreneurship (Hartsenko and Venesaar, 2017), and an innovative cognitive style that favors the development of better attitudes toward new ventures (Pejic Bach et al., 2018). Moreover, gender differences have been

analyzed, and previous results show that men express more favorable attitudes toward entrepreneurship (de la Cruz Sánchez-Escobedo et al., 2011; Packham et al., 2010). For example, Dabic et al. (2012) state that female students are less willing to start their own business due to significant gender discrepancies in the perceived feasibility and desirability of entrepreneurship. Regarding the characteristics by age range, Levesque and Minniti (2006) concluded that persons between 25 and 35 years old are significantly involved in entrepreneurship, as they tend to express a positive attitude toward creating ventures. Complementarily, Minola et al. (2014) argued that the younger generation of Romanians is more open to market conditions and has positive attitudes toward entrepreneurship and, conversely, that older East Germans have a socioeconomic heritage that negatively affects their entrepreneurial attitude. This evidence suggests that entrepreneurial attitude is a dynamic concept that develops throughout the life cycle and may vary according to the experiences of people in various age groups.

The relationship between media exposure and attitudes toward entrepreneurship has also been evaluated. Regarding mass media's incidence, Zampetakis et al. (2015) supported its influence on women's entrepreneurial attitudes, as mass media highlights role differences between men and women. The evidence linked with social media is limited; in this regard, Yunandar et al. (2019) argue that online social channels are a straightforward way to learn about agricultural entrepreneurship and promote attitudes toward new agribusiness. Instead, the influence of online social media on attitudes has mostly been analyzed in other domains; for example, Mitra et al. (2016) recognized the effect of social media exposure on the development of anti-vaccination attitudes; also, Charles (2019) mentioned the impact of social media on attitudes toward the work of the millennial generation.

Because previous studies have argued the effect of mass media on entrepreneurial attitudes and have supported the impact of social media on attitudes in other domains, such as food consumption, this research proposes that college students with high or low social media use should show perceptual discrepancies regarding their attitudes toward entrepreneurship. Moreover, as in the case of subjective norms, due to the perceptual and attitudinal differences regarding entrepreneurship that have been recognized by gender and age (Halvorsen and Chen, 2019; Roberts, 2016) and the discrepancies observed in the use of social media by these demographic variables (Shah et al., 2012; Perugini and Solano, 2021), this research proposes that the relationship between the use of social media and attitudes toward entrepreneurship should also differ by the gender and age group of students. Consequently, the following hypotheses are proposed:

- H3: The relationship between the frequency of use of social media sites and attitudes toward entrepreneurship differs by gender.
- H4: The relationship between the frequency of use of social media sites and attitudes toward entrepreneurship differs by age group.

2.4. Entrepreneurial intention

Entrepreneurial intention is defined as an individual's willingness to express entrepreneurial behavior and engage in activities associated with self-employment and the creation of new businesses (Dell, 2008; Dohse and Walter, 2010). Entrepreneurial intention is a concept of high importance in the literature on this discipline and is frequently analyzed in studies on entrepreneurial behavior (Bilgiseven, 2019). One reason for its relevance is that it is closely linked to effective business creation (Krueger et al., 2000) and consequently to the social and economic benefits of entrepreneurship. A significant amount of research has focused on recognizing determinants that impact entrepreneurial intention (see Ambad and Damit, 2016; Ferreira et al., 2012) and on measuring the effect of college education or training on the intention to create new businesses (see Lorz and Volery, 2011; Sun et al., 2017).

Personal and contextual differences that affect entrepreneurial intention have also been investigated. The previous research tends to

recognize a higher entrepreneurial intention in men (see Haus et al., 2013; Villanueva-Flores et al., 2021). Likewise, stereotypes affect these differences. Sandhu et al. (2021) argue that if a female student believes in a gender stereotype, the benefits of education on her entrepreneurial intentions are lower. In the case of age, few studies have compared entrepreneurial intention across age groups. Hatak et al. (2015) suggest that older people express lower entrepreneurial intention, and Kautonen (2013) argues that the older a person is, the less likely he or she is to delay his or her entrepreneurial intention because he or she has less time left to enjoy the benefits of a new business. Some research has studied the relationship between exposure to mass media, such as television and radio, and entrepreneurial intention. Lagua and Moriano (2021) have proposed that the perceived social legitimacy of famous entrepreneurs and the diffusion of entrepreneurship in the media positively influence the entrepreneurial intention of the population; in addition, they point out that television programs and other formats can be useful as teaching material in entrepreneurship education. In relation to the effect of social media, research supporting its positive link with entrepreneurial intention has been published in recent years. Lagua and Moriano (2021) pointed out that social media acts as a civic communication channel that encourages the public, especially virtual communities, to participate in entrepreneurial activities. Huang and Zhang (2020) have argued the role of social media as a predictor of students' entrepreneurial intention, incorporating the mediating role of self-efficacy. Abd Majid et al. (2020) stated that early networking through the use of social media develops entrepreneurial knowledge and entrepreneurial intention.

Moreover, because of the differences in entrepreneurial intention by gender and age range that have been recognized in previous research (Nikou et al., 2019; Zhao et al., 2021) and the differences in social media use by these demographic characteristics that have been evidenced in publications of recent years (Byrne, 2018; Deng et al., 2021), this research argues that the association between the use of each social media site and entrepreneurial intention should also be different depending on the gender and age of individuals. Consequently, the following hypotheses are proposed:

- H5: The relationship between the frequency of use of social media sites and entrepreneurial intention differs by gender.
- H6: The relationship between the frequency of use of social media sites and entrepreneurial intention differs by age group.

3. Materials and methods

3.1. Research design

This study seeks to measure the association between variables in the field of entrepreneurship and the use of social media, which corresponds to a correlational research design. A correlational design involves the evaluation of relationships between two or more variables without applying any manipulation or intervention as in experimental designs (Fraenkel et al., 2012). Likewise, this research is quantitative since it seeks to explain phenomena according to numerical data that are analyzed by means of mathematically based methods, especially statistics (Yilmaz, 2013), and is transactional, as it collects data only in a specific time without a longitudinal analysis (Sampieri, 2018).

3.2. Measurement

The research's measurement instrument is a self-report survey that business and engineering students answered online. The online self-report survey method has been widely used in recent years to assess perceptions, attitudes and behaviors in entrepreneurship (Freeman et al., 2019; Cater et al., 2021), social media interactions (Harrigan et al., 2021; Wheaton et al., 2021) and teaching in higher education (Qashou, 2021; Teixeira et al., 2021). Consequently, this is a recognized method for researching these fields. The online survey included the statements and

the scales of subjective norms developed by Liñán and Chen (2009), attitudes toward entrepreneurship developed by Liñán and Chen (2009) and Lepoutre et al. (2011), and entrepreneurial intention developed by Liñán and Chen (2009) and Thompson (2009). These scales have been widely validated in research associated with entrepreneurial behavior (e.g., Aragon-Sanchez et al., 2017; Vamvaka et al., 2020).

The measurement considered a Likert scale with seven response levels ranging from "totally agree" to "totally disagree". The seven-point scale was selected since it facilitates measuring the changes of magnitudes by including more options than the five-point scale (Debets et al., 2020). Likewise, Finstad (2010) noted that seven-point scales are more effective in reflecting respondents' true subjective evaluation of a questionnaire item than five-point scales. Recent studies related to entrepreneurial perceptions (Goslin et al., 2021; Silva et al., 2021), social media behavior (Lin et al., 2021; Jennings et al., 2021), and higher education teaching (Jeno et al., 2021; Nicolaidou et al., 2021) have used a seven-point Likert scale.

The affirmations related to social norms and attitudes toward entrepreneurship and entrepreneurial intention were translated into Spanish and revised after the application of 25 surveys as a test. The online social channels selected for their high frequency of use in Chile were Twitter, Facebook, Instagram, WhatsApp and YouTube (Cadem, 2019). The scale of measurement for social media use considers eight levels from never to several times in a day. These levels were previously developed after consulting with students and academics in the instrument's testing stage; therefore, they are considered to be able to adequately measure the magnitudes of frequency in the exposure to online social media content. Both the seven-level Likert scale used to measure entrepreneurial perceptions and attitudes and the eight-level scale used to measure the frequency of using social networks are ordinal scales. The ordinal scale is a scale that uses labels to classify cases into ordered categories; specifically, the ordinal scale means that classes should be ordered so that each case in one class is considered to be greater (or less) than those in other classes (Liao et al., 2022). The questions included in the survey are shown in Table 1.

3.3. Sample

Due to the current importance of teaching entrepreneurship in universities around the world (Kucel et al., 2016), undergraduate students were asked to complete the online survey. In this sense, the promotion and dissemination of university entrepreneurial culture has become a key element to generate social and economic impact through graduates (Contreras-Velásquez et al., 2017). Engineering and business students were assessed in view of the fact that entrepreneurial skills are crucial in these study areas (Herman and Stefanescu, 2017; Gautam et al., 2020). An online survey was completed during the academic semesters of 2020 and 2021 by students matriculated in the Faculty of Engineering and Business of Universidad de Las Américas in Chile. A total of 246 students were evaluated using convenience sampling. Students were selected by the researchers of this study based on their access to the courses. Convenience sampling is widely used in the social sciences (Bryman, 2008) despite its limitations due to resource constraints in research.

The survey was distributed through the Survey Monkey platform. An access link was created and distributed to obtain answers. The survey responses were also automatically stored in this platform for later statistical analysis using STATA 16. The access link was sent via email to approximately 1,000 students; therefore, the response rate was close to 24%. The evaluated students, who were born after 1997, were classified as members of the Centennial generation, following the definition of this age cohort proposed by McGorry and McGorry (2017). All surveys included a request for informed consent that was defined by the Ethics Committee of Universidad de Las Américas (ethic committee code CEC_FP_2019022). Only responses of students who accepted informed consent were considered. When dividing the sample by gender, we found that 120 male students and 126 female students responded and that most

Table 1. Factors and variables observed.

Factor	Observed variable	Scale
Subjective norms (SN). Liñán and Chen (2009) .	I have some friends who have started or are starting a business.	Scale of 1–7, from completely disagree to completely agree.
	My close family think I should start a new company in the future.	
	My best friends think I should start a new company in the future.	
Attitude toward entrepreneurship behavior (ATE). Liñán and Chen (2009) and Lepoutre et al. (2011) .	Being an entrepreneur implies to me more advantages than disadvantages.	
	A career as entrepreneur is attractive for me.	
	Among various options, being an entrepreneur would entail great satisfaction for me	
Entrepreneurial intention (EI) Liñán and Chen (2009) , Thompson (2009) .	I am determined to create a firm in the future.	
	I will make every effort to start and run my own firm.	
	The likelihood that I will ever run my own business is very high.	
Frequency of using online social media	Read or review information on Twitter, Facebook, Instagram, WhatsApp, or YouTube.	1 = Never, 2 = Every six months, 3 = Every two to four months, 4 = Once a month, 5 = Once a week, 6 = Two to three times a week, 7 = Once a day, 8 = Several times a day.

of the responses were obtained from students enrolled in the commercial engineering program. The average age of the males was 27.24 years, and the average age of the females was 26.52 years. The gender proportion and the age of the participants adequately represent the characteristics of university students in Chile ([SIES, 2021](#)). [Table 2](#) describes the sample characteristics by gender.

Likewise, the sample was composed of 132 Centennials between 18 and 24 years old (mean = 20.74) and 114 older students between 25 and 45 years old (mean = 36.44). The majority of students were enrolled in the commercial engineering program; however, it can be observed that older students tend to enroll in shorter programs, such as the engineering in administration and the business technician programs. [Table 3](#) describes the sample characteristics by age group.

3.4. Statistical analysis

As previously stated, the research design is correlational since this study seeks to examine the relationship between variables. Consistent with that purpose, this research evaluates the link between those variables through Spearman's correlation coefficient and Spearman's rank order correlation test based on $Prob>|t|$. The Spearman correlation coefficient is a nonparametric method used to determine the strength and direction of the relationship between two variables measured on an

ordinal or continuous scale ([Abdullah, 2022](#)). The Spearman correlation test can be used if the normality assumption is not fulfilled ([Abdelhafez et al., 2021](#)), while Pearson's correlation coefficient is usually used with continuous variables whose data show a normal distribution ([Schober et al., 2018](#)).

The Shapiro–Wilk test was performed to evaluate the normality of the distribution in each of the observed variables; this test has been frequently used in recent research for this purpose ([Toimbek, 2021](#); [Solarte et al., 2021](#)). The Shapiro–Wilk test showed that all the variables did not meet the requirements of a normal distribution since the p values obtained were lower than 0.05. In addition, recent research on entrepreneurship and teaching has used the Spearman correlation coefficient ([Zhao and Zhang, 2021](#); [Mack et al., 2021](#)).

In the first phase of the analysis, the arithmetic mean of the frequency of exposure to social networks by age group and gender was obtained. In addition, the Mann–Whitney Wilcoxon test was performed to compare the distribution of responses regarding social network use among those groups evaluated. The Mann–Whitney Wilcoxon test is a nonparametric statistical test that can be a useful alternative to parametric statistical tests, such as ANOVA, when the test assumptions about the normal data distribution are not met; it is also a method appropriated for analyzing ordinal data ([Ayadi and Ghorbel, 2018](#)). As previously mentioned, the Shapiro–Wilk test showed the absence of a normal distribution of the variables (p value < 0.05). Moreover, recent research on entrepreneurship and teaching has used the Mann–Whitney Wilcoxon test ([Nusrat and Sultana, 2019](#); [Moletta et al., 2021](#)).

Additionally, Cronbach's alpha was used to determine the internal consistency of the scales. The Cronbach's alpha coefficient values indicated good consistency for subjective norms (0.78) and attitude toward entrepreneurship (0.76) and very good consistency for entrepreneurial intention (0.90), according to criteria defined by [Sekaran and Bougie \(2019\)](#). Cronbach's alpha analysis was performed only to corroborate the internal consistency, since the scales used in the research have already been validated and incorporated in several previous studies ([Aragon-Sanchez et al., 2017](#); [Vamvaka et al., 2020](#)).

4. Results

4.1. Frequency of social media use

[Figure 1](#) shows the frequency distribution of the sample regarding social media use in each online social channel analyzed. A higher frequency can be observed for Instagram and WhatsApp; on the other hand, Twitter content is read or observed less frequently. The distribution presented is consistent with the study's findings conducted by [Cadem \(2019\)](#) in Chile, which supports a higher frequency of exposure to WhatsApp and Instagram content, and also with the findings of [Statista \(n.d.\)](#), which state that Facebook and Instagram are among the most popular online social media channels.

[Table 4](#) presents the arithmetic means related to the frequency of exposure to social media, differentiated by gender and age generation. The Wilcoxon-Mann–Whitney test supports significant differences by gender, which are higher in women with respect to Instagram (p value < 0.01) and are higher in men with respect to YouTube. In relation to age differences, the Centennial generation showed lower exposure to Facebook (p value < 0.01) and WhatsApp (p value < 0.05) and higher exposure to Instagram (p value < 0.01) and YouTube (p value < 0.10).

Table 2. Description of the sample by age.

	Average age	Age S.D.	Commercial Engineering	Engineering in Administration	Industrial engineering	Business Technician	Other careers	Total
Men	27.24	8.12	68	18	11	15	8	120
Women	26.52	7.34	66	25	4	18	13	126
Total	26.87	7.72	134	43	15	33	21	246

Note: S.D. represents standard deviation.

Table 3. Description of the sample by age group.

	Men	Women	Commercial Engineering	Engineering in Administration	Industrial engineering	Business Technician	Other careers	Total
Centennial	64	68	80	18	7	12	15	132
Olders	56	58	54	25	8	21	6	114
Total	120	126	134	43	15	33	21	246

Note: S.D. represent standard deviation.

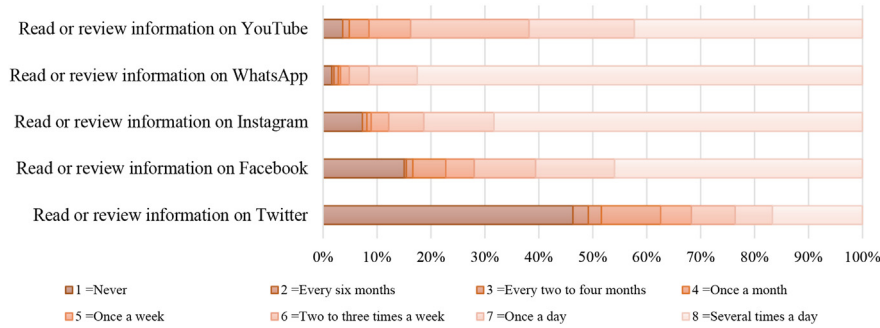


Figure 1. Frequency of social media exposure.

Table 4. Median frequency of social media exposure by gender and age group.

	Centennials		Older		p value age group	Men		Women		p value generation
	Media	S.D.	Media	S.D.		Media	S.D.	Media	S.D.	
Read or review information on Twitter	3.55	2.83	3.70	2.79	0.59	3.73	2.79	3.52	2.82	0.99
Read or review information on Facebook	5.70	2.52	6.53	2.41	0.00	5.97	2.53	6.20	2.47	0.31
Read or review information on Instagram	7.48	1.39	6.57	2.32	0.00	6.73	2.29	7.37	1.46	0.02
Read or review information on WhatsApp	7.43	1.42	7.78	0.85	0.01	7.52	1.32	7.67	1.07	0.44
Read or review information on YouTube	6.82	1.56	6.50	1.72	0.08	6.89	1.64	6.46	1.62	0.00

Note: S.D. represents the standard deviation. A p value < 0.01 represents a significant difference with 99% confidence, a p value < 0.05 represents a significant difference with 95% confidence, and a p value < 0.10 represents a significant difference with 90% confidence. Significant differences are highlighted in bold.

4.2. Correlations by gender

Table 5 compares correlations between men and women, evaluating the significance of Spearman's correlation coefficients through Spearman's rank order correlation test, which is based on the $\text{Prob} > |t|$ parameter. The results show that the correlations linking the frequency of social media use and the phrases associated with subjective norms are different for men and women. The correlation between the use of Twitter and statements measuring perception of subjective norms, such as “my best friends think I should start a new company in the future” and “my close family think I should start a new company in the future”, are significant only in the men's group. In contrast, in the group of women, no significant correlations between subjective norm statements and frequency of Twitter use were found. This evidence supports the validation of Hypothesis 1, which states that the relationship between the frequency of use of social media sites and perceptions of subjective norms differs by gender.

Table 5 also shows that Spearman's correlations between Facebook use and the statements associated with attitudes toward entrepreneurship, including “Being an entrepreneur implies to me more advantages than disadvantages”, “A career as entrepreneur is attractive for me” and “Among various options, being an entrepreneur would entail great satisfaction for me” are significant only in the group of men, with 99% (p -value < 0.01), 95% (p -value < 0.05) or 90% (p -value < 0.10) confidence. Additionally, only in the group of women are there positive and significant correlation coefficients, with 99%, 95% or 90% confidence, linking the use of YouTube and Twitter with the statements “A career as entre-

preneur is attractive for me” and “Among various options, being an entrepreneur would entail great satisfaction for me”. These differences allow us to validate Hypothesis 3, which states that the relationship between frequency of use of social media sites and attitudes toward entrepreneurship differs by gender.

Moreover, Table 5 supports that only in women were significant correlation coefficients obtained with 99%, 95% or 90% confidence between the use of Instagram, WhatsApp, and YouTube and the statements associated with entrepreneurial intention, including “I will make every effort to start and run my own firm” and “The likelihood that I will ever run my own business is very high”. In the case of men, no significant correlation coefficients were obtained through the statistical test. These differences allow us to validate Hypothesis 5, which states that the relationship between the frequency of use of social media sites and entrepreneurial intention differs by gender.

4.3. Correlations by age group

The Spearman's correlations and Spearman's rank order correlation test presented in Table 6 show that in the centennial generation, all three correlation coefficients between Facebook usage frequency and the following statements related to subjective norms are significant: “I have some friends who have started or are starting a business”, “My best friends think I should start a new company in the future” and “My close family think I should start a new company in the future”. The group of older people presents only one positive and significant correlation coefficient between the use of Facebook and subjective norms, which is

Table 5. Spearman correlation coefficients by gender.

		Men					Women				
		Twitter	Facebook	Instagram	WhatsApp	YouTube	Twitter	Facebook	Instagram	WhatsApp	YouTube
I have some friends who have started or are starting a business.	Coefficient	0.09	0.28	0.21	0.22	0.14	0.03	0.28	0.17	0.18	-0.06
	p value	0.35	0.00	0.02	0.02	0.13	0.76	0.00	0.06	0.04	0.48
My best friends think I should start a new company in the future.	Coefficient	0.17	0.10	0.01	0.10	-0.07	0.07	0.03	0.06	0.14	0.00
	p value	0.07	0.26	0.90	0.27	0.42	0.46	0.78	0.48	0.13	0.98
My close family think I should start a new company in the future.	Coefficient	0.20	0.09	0.07	0.06	-0.02	0.10	0.05	0.04	0.08	0.08
	p value	0.03	0.35	0.46	0.55	0.79	0.29	0.58	0.67	0.38	0.35
Being an entrepreneur implies to me more advantages than disadvantages.	Coefficient	0.12	0.16	0.07	0.08	0.13	0.00	0.06	0.08	0.10	0.14
	p value	0.21	0.08	0.42	0.40	0.17	0.97	0.50	0.40	0.29	0.11
A career as entrepreneur is attractive for me.	Coefficient	0.15	0.16	0.14	0.11	0.03	0.23	0.02	0.09	0.12	0.30
	p value	0.10	0.07	0.13	0.21	0.73	0.01	0.86	0.29	0.17	0.00
Among various options, being an entrepreneur would entail great satisfaction for me	Coefficient	0.20	0.21	0.09	0.07	0.15	0.17	0.08	0.19	0.11	0.15
	p value	0.03	0.02	0.33	0.46	0.11	0.06	0.36	0.03	0.23	0.09
I am determined to create a firm in the future.	Coefficient	0.00	0.05	0.04	0.07	0.07	0.11	0.09	0.12	0.09	0.07
	p value	1.00	0.56	0.69	0.43	0.43	0.22	0.32	0.20	0.29	0.43
I will make every effort to start and run my own firm.	Coefficient	-0.06	0.09	-0.08	0.11	0.04	0.11	0.10	0.23	0.16	0.23
	p value	0.55	0.36	0.38	0.24	0.67	0.22	0.28	0.01	0.08	0.01
The likelihood that I will ever run my own business is very high.	Coefficient	-0.03	-0.07	-0.01	0.03	0.06	0.03	0.07	0.15	0.21	0.26
	p value	0.71	0.47	0.89	0.73	0.53	0.76	0.46	0.09	0.02	0.00

Note: p value < 0.01 represents a significant correlation with 99% confidence, p value < 0.05 represents a significant correlation with 95% confidence, and p value < 0.10 represents a significant correlation with 90% confidence. The significance of the correlation coefficients was evaluated using Spearman's rank order correlation test. Significant correlations are highlighted in bold.

Table 6. Spearman correlation coefficients by age group.

		Centennials					Olders				
		Twitter	Facebook	Instagram	WhatsApp	YouTube	Twitter	Facebook	Instagram	WhatsApp	YouTube
I have some friends who have started or are starting a business.	Coefficient	0.02	0.34	0.14	0.19	-0.10	0.10	0.22	0.27	0.22	0.19
	p value	0.81	0.00	0.11	0.03	0.25	0.29	0.02	0.00	0.02	0.04
My best friends think I should start a new company in the future.	Coefficient	0.10	0.25	0.07	0.12	-0.08	0.14	-0.17	0.00	0.11	0.05
	p value	0.27	0.00	0.42	0.18	0.36	0.15	0.08	0.98	0.25	0.60
My close family think I should start a new company in the future.	Coefficient	0.10	0.20	0.01	0.07	-0.04	0.20	-0.03	0.07	0.07	0.12
	p value	0.23	0.02	0.94	0.42	0.69	0.03	0.76	0.43	0.43	0.22
Being an entrepreneur implies to me more advantages than disadvantages.	Coefficient	0.03	0.18	0.13	0.14	0.07	0.10	0.03	0.04	-0.03	0.23
	p value	0.76	0.04	0.13	0.12	0.43	0.31	0.78	0.67	0.78	0.01
A career as entrepreneur is attractive for me.	Coefficient	0.14	0.19	0.04	0.10	0.12	0.26	0.02	0.18	0.19	0.22
	p value	0.10	0.03	0.61	0.27	0.18	0.01	0.81	0.06	0.04	0.02
Among various options, being an entrepreneur would entail great satisfaction for me	Coefficient	0.16	0.16	0.08	0.07	0.04	0.19	0.11	0.22	0.08	0.29
	p value	0.06	0.06	0.34	0.46	0.66	0.04	0.26	0.02	0.39	0.00
I am determined to create a firm in the future.	Coefficient	0.00	0.14	0.08	0.03	-0.03	0.12	0.04	0.07	0.17	0.17
	p value	1.00	0.12	0.38	0.70	0.72	0.19	0.64	0.46	0.07	0.07
I will make every effort to start and run my own firm.	Coefficient	0.01	0.16	0.09	0.07	0.04	0.06	0.06	0.05	0.26	0.24
	p value	0.90	0.07	0.32	0.44	0.65	0.51	0.56	0.63	0.01	0.01
The likelihood that I will ever run my own business is very high.	Coefficient	-0.10	0.06	0.10	0.08	0.19	0.12	-0.06	0.03	0.19	0.15
	p value	0.28	0.51	0.25	0.37	0.03	0.21	0.52	0.77	0.04	0.12

Note: p value < 0.01 represents a significant correlation with 99% confidence, p value < 0.05 represents a significant correlation with 95% confidence, and p value < 0.10 represents a significant correlation with 90% confidence. The significance of the correlation coefficients was evaluated using Spearman's rank order correlation test. Significant correlations are highlighted in bold.

linked to the statement "I have some friends who have started or are starting a business". Additionally, there is evidence of a positive and significant correlation between Instagram and YouTube usage frequency and the affirmation "I have some friends who have started or are starting a business" only in older persons. These differences in the statistical significance of the correlation coefficients by age group allow us to validate Hypothesis 2, which states that the relationship between the frequency of use of social media sites and perceptions of subjective norms differs by age group.

Complementarily, the results in Table 6 support that only in the Centennial generation are the correlation coefficients between the frequency of Facebook use and the three statements related to attitudes toward entrepreneurship significant with 95% or 90% confidence. In contrast, the group of older people shows positive and significant correlation coefficients between the use of YouTube and the three statements of attitudes toward entrepreneurship with 99% or 95% confidence. Moreover, in the older group, the frequency of use of Twitter and Instagram correlates positively in a statistically significant way with

the statements "A career as entrepreneur is attractive for me" and "Among various options, being an entrepreneur would entail great satisfaction for me". Additionally, only in the older group the frequency of WhatsApp use correlate positively and significantly with the statement "A career as entrepreneur is attractive for me". These differences in the statistical significance of the correlation coefficients support Hypothesis 4, which states that the relationship between the frequency of use of social media sites and attitudes toward entrepreneurship differs by age group.

Finally, Table 6 shows that the positive correlation coefficients between the use of WhatsApp and the three statements of entrepreneurial intention are only significant, with 95% or 90% confidence, in older people. In the case of the Centennial generation, a positive and significant correlation coefficient is obtained between the frequency of use of Facebook and the statement "I will make every effort to start and run my own firm" and between the frequency of exposure on YouTube and the sentence "The likelihood that I will ever run my own business is very high". These differences in the statistical significance of the correlation coefficients support Hypothesis 6, which states that the relationship between the frequency of use of social media sites and entrepreneurial intention differs by age group.

4.4. Comparison of correlation coefficients

Table 7 represents the correlation coefficients with the highest magnitude. The graph shows that five of these correlations are included in the analysis of the older group and three in the analysis of women. Only two correlations are included from the centennial group and one from the analysis of men. These results suggest that exposure to social media shows a higher correlation with entrepreneurial perceptions and attitudes in older and female students.

5. Discussion

The objective of this research is to analyze whether the frequency of social media use is associated with discrepancies in perceptions of

Table 7. Higher correlation coefficients with significance of 99% or 95% confidence.

Group	Social media	Statement	Correlation	p-value
Centennials	Facebook	I have some friends who have started or are starting a business	0.34	0.00
Women	YouTube	A career as entrepreneur is attractive for me	0.30	0.00
Olders	YouTube	Among various options, being an entrepreneur would entail great satisfaction for me	0.29	0.00
Men	Facebook	I have some friends who have started or are starting a business	0.28	0.00
Women	Facebook	I have some friends who have started or are starting a business	0.28	0.00
Olders	Instagram	I have some friends who have started or are starting a business	0.27	0.00
Women	YouTube	The likelihood that I will ever run my own business is very high	0.26	0.00
Olders	Twitter	A career as entrepreneur is attractive for me	0.26	0.01
Olders	WhatsApp	I will make every effort to start and run my own firm	0.26	0.01
Centennials	Facebook	My best friends think I should start a new company in the future	0.25	0.00
Older	YouTube	I will make every effort to start and run my own firm	0.24	0,01

Note: The significance of the correlation coefficients is evaluated using Spearman's rank order correlation test.

entrepreneurial subjective norms, attitudes toward entrepreneurship and the intention to undertake entrepreneurship, differentiating this relation by gender and age group. The overall results, among the analyzed groups, showed that there are significant differences in the levels of correlation between the frequency of use of the selected social media platforms and the magnitudes of these entrepreneurial variables. The findings contribute to the understanding of the role of social media in promoting student participation in entrepreneurship and in entrepreneurship development centers that are financed by governmental organizations.

The results presented in Table 5 highlight that men show more positive and significant correlations between attitudes toward entrepreneurship and the frequency of Facebook use, and in the case of women, more positive and significant correlations are recognized between attitudes toward entrepreneurship and the frequency of YouTube and Twitter use. Likewise, it is relevant that positive and significant correlation coefficients were only found between the use of social media and entrepreneurial intention in women, particularly associated with the frequency of Instagram, WhatsApp and YouTube use. Al-Skaf et al. (2021) suggest that students' intentions to adopt social media to learn depends on the social influence, perceived usefulness and ease of use of social media applications; thus, one interpretation of these results is that males and females make different judgments regarding social media information based on their evaluations of those attributes. Complementarily, studies have recognized that women face disadvantages as entrepreneurs and have lower levels of entrepreneurial intention than men (Díaz-García and Jiménez-Moreno, 2010; Malmström et al., 2017); therefore, a possible explanation for the higher correlation between social media use and entrepreneurial intention in women is that women with greater exposure to social media are more likely to be involved in entrepreneurship and stand out compared to other women who use social media less frequently.

Moreover, there were differences in the correlation coefficients and their statistical significance by age group. Particularly, the results in Table 6 highlight the positive relationship between the frequency of exposure to Facebook and subjective norms and attitudes toward entrepreneurship in the centennial generation. In older people, the positive and significant correlations between entrepreneurial intention and the use of WhatsApp and YouTube are noteworthy. This higher relationship in the older group could be explained by a greater impact of the information of these social media platforms due to their ease of use, since it has been recognized that the simplicity of social media is a key condition that affects the usefulness of this tool in learning (Naveh and Shelef, 2020). In this sense, Francis and Hoefel (2018) concluded that centennials are the digital native generation; therefore, centennials dominate online communication and disseminate information through hashtags and mentions on social media platforms such as Twitter. In contrast, WhatsApp allows quick and easy communication with any person (Jabbar et al., 2021), similar to mobile phone text messaging services, and YouTube is also an easily accessible platform (Tella et al., 2020) to search videos using channels similar to traditional television.

From a theoretical perspective, the findings support that exposure to social media content can affect how entrepreneurship is appreciated and influenced by the environment and that this situation varies by gender and age group. That is, the magnitudes of important variables in entrepreneurship, which are incorporated in models that explain entrepreneurial behavior (Ajzen and Fishbein, 1980; Ajzen, 1991), change according to the intensity of exposure to social media and to the gender and age of individuals. Such findings are relevant based on the ample evidence that relates these three factors to the creation and development of entrepreneurship in countries (e.g., Amine and Staub, 2009; Soria et al., 2016). Moreover, the differences in correlations obtained by gender and age are consistent with previous research that evidenced perceptual and attitudinal discrepancies in entrepreneurship by gender and age group (Minniti, 2010; Bosma and Schutjens, 2011) and with studies that have concluded differences in behavior on social media by gender and age (Byrne, 2018; Perugini and Solano, 2021). In this sense, Levie et al. (2011) stated

discrepancies regarding the media influences on the entrepreneurial process according to age and gender. Additionally, Table 7 of this research suggests that the highest correlations between entrepreneurial perceptions and attitudes and the use of social media tend to be in older individuals and women; precisely, these groups have been shown to have disadvantages in entrepreneurship and self-employment (Malmström et al., 2017; Meliou and Mallett, 2021).

In the education framework, the findings show the potential broader and promising use of social media in higher education. Social media has been recognized to provide clear benefits for career development, research, and teaching, including improved communication with various interested parties, increased opportunities and contacts, and increased student learning and satisfaction (Chugh et al., 2021). Samuels-Peretz et al. (2017) argued that social media supports deep learning both directly and indirectly, promotes long-term content retention, and fosters a more engaging and enjoyable learning environment. Complementarily, Balakrishnan (2017) noted that students are receptive to the use of social media for learning. Most recently, Barton et al. (2021) demonstrated that social media affects the academic performance of undergraduates, and Masserini and Bini (2021) found that social media reduces the dropout rate of students. As practical implications in the learning process, lecturers and managers of tertiary institutions should take advantage of these benefits and encourage policies that incorporate social media as part of teaching activities, according to the gender and age of the student.

Moreover, universities are currently adopting active methodologies that promote student participation and facilitate the development of attitudes and skills that are useful for entrepreneurship (Neck and Corbett, 2018). Entrepreneurship demands high creativity to solve problems through innovative products (Weinberger et al., 2018; Youssef et al., 2018); in this sense, the ability to work as a team is an essential element, as it facilitates creativity through divergent thinking by convening different points of view (Pusca and Northwood, 2018). Recent research has highlighted the role of social media in promoting these qualities. Gulzar et al. (2021) concluded that social media promotes greater student engagement and creativity, Dirin et al. (2021) argued that social media enhances students' social connections and Zabidi and Wang (2021) stated that social media plays an indispensable role in supporting collaborative learning. Because of such benefits, social media should be considered a fundamental tool to support entrepreneurship teaching and learning. The evidence from this research supports the importance of social media by recognizing that the frequent use of social media is related to perceptions and attitudes that favor undertaking entrepreneurship.

Complementarily, the academic literature has indicated that the use of social media as a teaching tool in higher education is currently limited (Manca and Ranieri, 2016). The pedagogical possibilities of social media have only been partially applied (Manca, 2020). However, some publications have developed methodologies for the application of social media in education. Sinprakob and Songkram (2015) propose a learning model based on problem solving using social media to strengthen students' critical thinking, including the following phases: 1) problem presentation, 2) problem understanding, 3) problem analysis, 4) study and implementation, and 5) collection and summary. Moreover, Greenhow and Galvin (2020) point out that lecturers should use social networks to learn about students' profiles, to build online relationships among students and to encourage cocreation of content by fostering regular interactions and information sharing between students. Despite these guidelines, it is still necessary to extend the study of strategies and methods for incorporating social media in the teaching of entrepreneurship in higher education. Hence, there is a need for research to provide more information in this regard to guide the adoption of new teaching strategies and lecturers' training. This research contributes to this area by providing new evidence that guides the selection of social networks in teaching entrepreneurship according to the age and gender of students.

6. Conclusion

This research analyzes whether the frequency of social media use is associated with differences in entrepreneurial perceptions and attitudes, thus providing new insights into how university administrators and lecturers can use this tool for teaching more effectively according to the profile of their students. The incorporation of social media should be guided by lecturers or the course syllabus, since selecting relevant content published by reliable and valid sources is necessary; likewise, lectures must be trained in the use of social media for higher education teaching. Therefore, the evidence of this study delivers useful guidance for the selection of social media as a tool for teaching entrepreneurship to adult learners according to the gender and age of the students.

7. Limitations and future research

The sample includes business and engineering students in Chile; therefore, it is necessary to consider this restriction. Perceptual relations according to social media reading frequency are evaluated without corroborating causality using an experimental design. Future studies should examine the relationship between the frequency of social media use and perceptions of entrepreneurship using larger samples and incorporating students from universities in different countries. Likewise, it is important to involve qualitative methodologies, which provide a better understanding of the content reviewed by students and explain why it may affect perceptions and entrepreneurial attitudes. Finally, future studies should design and evaluate new teaching methodologies that describe stages and specific ways of applying social media to strengthen entrepreneurial perceptions and attitudes. Despite these limitations, the information presented in this research is valuable as a first approximation that can be extended in future studies.

Declarations

Author contribution statement

Gustavo Barrera-Verdugo: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Antonio Villarroel-Villaruel: Performed the experiments; Contributed reagents, materials, analysis tools or data.

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Data will be made available on request.

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The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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