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## The Influence of Self-efficacy on Entrepreneurial Behavior Among K-12 Teachers

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## **The Influence of Self-efficacy on Entrepreneurial Behavior Among K-12 Teachers**

### ***Abstract:***

This study aimed to: (1) assess the unique contributions of self-efficacy to entrepreneurial behavior among teachers; (2) identify the best instrument(s) to measure such contributions by testing a domain-specific instrument (teacher self-efficacy) vs. a general (occupational self-efficacy) one; (3) identify the demographic characteristics associated with entrepreneurial behavior. A sample of 401 teachers from across the USA completed the online survey. The findings indicated that self-efficacy predicts entrepreneurial behavior and that occupational self-efficacy is a slightly better predictor of entrepreneurial behavior than teacher self-efficacy. The results also identified age and education as the demographic characteristics associated with entrepreneurial behavior.

***Keywords:*** competency-based, entrepreneurship, demographic characteristics, occupational self-efficacy, teachers' self-efficacy

## 1. Introduction

The first studies on entrepreneurship can be traced back to Europe in the early 18th century (Murphy, Liao, & Welsch, 2006). However, it was not until the second half of the 20th century that research into the topic of entrepreneurship took off (Carlsson et al., 2013; Katz, 2003). Interest in entrepreneurship as a field seems to have emerged from the development of management theory that arose in the post-World War II era. For example, Harvard first offered a course on entrepreneurship in 1947. Most famously, Peter Drucker, who would go on to be one of the primary thought leaders in management education, taught an entrepreneurship course at NYU in 1953 (Katz, 2003). While the first wave of entrepreneurial research was conducted primarily in the context of economics and management studies, the study of entrepreneurship expanded to include various approaches and emphases (Carlsson et al., 2013).

Beyond the domain of economic development and growth (Wennekers & Thurik, 1999), areas such as psychology and behavior (Chatterjee & Das, 2015; Van Gelderen et al., 2008), politics (Sheingate, 2003), and education (Van Dam, Schipper, & Runhaar, 2010), to cite a few, have turned their attention to the exploration of entrepreneurship.

The more recent body of knowledge emerging from these various domains has shied away from the trait-based approach to the study of entrepreneurship, which assumes that entrepreneurs are born with a stable set of personality characteristics that facilitates the emergence of entrepreneurial behavior (Chell, 2008; Van Dam et al., 2010). On the contrary, a competency approach to entrepreneurship is based on the assumption that professionals can develop core competencies relevant to entrepreneurial success (Van Dam et al., 2010). These competencies are more easily assessed, are germane to the profession, and can be developed through educational

processes (Hayton & Kelley, 2006).

While authors such as Hayton and Kelley (2006) have proposed a series of competencies that can lead to entrepreneurial success in corporations, Van Dam et al. (2010) tested a set of competencies that could predict entrepreneurial behavior among teachers. The competencies tested included, among others, career adaptability, education, creative thinking, and self-efficacy. The big surprise in this study was the fact that self-efficacy was not a predictor of entrepreneurial behavior. This is surprising for three reasons, which will be explored in detail in the next section of this paper. First, innovation is a core conceptual element in entrepreneurship (Van Dam et al., 2010), and according to Bandura (1997) those seeking innovation need an “unshakable sense of efficacy” (p. 73). Second, self-efficacy has been associated with entrepreneurial intentions, narrowly defined as the intention to start a business (Boyd & Vozikis, 1994; Zhao, Seibert, & Hills, 2005). Third, self-efficacy has consistently predicted work-related outcomes such as job satisfaction (AUTHOR, 2013; Judge & Bono, 2001), which is also associated with entrepreneurial behavior (AUTHOR, 2017).

In discussing this surprising finding, Van Dam et al. (2010) speculated that self-efficacy was not found to be a predictor of entrepreneurship because of the scale used. In their study, they used the occupational self-efficacy scale developed by Schyns and Von Collani (2002). The reason for their conjecture was that the scale used was not domain-specific, as it focused on general work-related efficacy.

To test this conjecture and shed light on whether or not self-efficacy predicts entrepreneurial behavior among teachers, this study aims to explore the influence of self-efficacy on teachers' entrepreneurial behavior by testing general and domain-specific self-efficacy scales, identifying the best instrument to measure such contributions, and investigating the demographic

characteristics associated with teachers' entrepreneurial behavior.

## **2. Theoretical background**

### **2.1. Entrepreneurship**

Entrepreneurial behavior is generally viewed as joining ideas, capital, and resources, along with elements of creativity and empowerment (Borasi & Finnigan, 2010; Foote, 2012). With a view to operationalizing the concept of entrepreneurial behavior, Van Dam et al. (2010) include three fundamental elements in their definition:

(i) opportunity recognition—the state of actively seeking and identifying the fit between needs and potential resources at hand;

(ii) initiative—the requirement to act upon opportunity recognition;

(iii) risk management—the assessment and tolerance of calculated risks.

Within the field of education, it is important to distinguish between entrepreneurship education and entrepreneurship *in* education. Entrepreneurship education is considered as “means of promoting the transformation of ordinary people into entrepreneurs who are aware of future opportunities to make a career by creating profitable mini-companies” (Carcamo-Solis, Arroyo-Lopez, Alvarez-Castanon, & Garcia-Lopez, 2017, p. 293). Entrepreneurship education is more likely to take place in higher education, especially in colleges of business and in vocational schools (e.g., Kuratko, 2005; Ruskovaara, Pinkala, Seikkula-Leino, & Jarvinen, 2015; Welsh, Tullar, & Nemati, 2016). Entrepreneurship in education has to do with teachers' ability to behave as entrepreneurs, rather than in the sense of leaving the profession and starting a new business. Teachers behave as entrepreneurs when planning and conducting technology-based lessons, finding creative ways to overcome the lack of resources, and partnering with others to increase student engagement and success (Van Dam et al., 2010). When teachers act as entrepreneurs,

independent of the subject or grade level taught, they become more than deliverers of instruction and assessment. They become role models of opportunity recognition, initiative, and risk management, promoting entrepreneurial behavior through their actions (Peltonen, 2014).

In the United States and other countries, where public K-12 schools face common challenges such as funding inequalities, racial divisions regarding student achievement, and teacher turnover (Mordechay & Orfield, 2017), teachers' entrepreneurial behavior is important because they are presented with the task of meeting the needs of their students in an ever-shifting landscape (Van Dam et al., 2010). To bring innovation into their classrooms, teachers need to seek opportunities and act. These opportunities can be in the form of funding, new partnerships, furthering their education, or simply developing an engaging way to deliver a history or math lesson. Seeking opportunities and taking initiative toward them is a core element of entrepreneurship (Onstenk, 2003; Van der Kuip & Verheul, 2003). Seizing new opportunities is usually accompanied by the need to manage risks. In general, schools tend to avoid risks. However, to order to innovate, teachers need to take calculated risks in simple things such as a class activity or trying a new technology tool. According to Rauch and Frese (2000), entrepreneurs learn how to manage risks to maximize their success.

Entrepreneurship in education is not limited by a curriculum focused on teaching entrepreneurship and/or new business management. It has to do with bringing into the classroom entrepreneurial behaviors that help teachers to be proactive, attuned to new developments in education, and managing the risks of the innovations they bring about. In this regard, behind the conceptual aspect of entrepreneurship in education lies the fundamental idea that educational entrepreneurs are typically less concerned with material gains and more inclined to manage several scarce resources (e.g. time, material, space) and creativity for superior learning outcomes in the

classroom (Maranto, 2015; Sharra, 2005; Webber & Scott, 2008).

In the scope of this study, it is important to discuss demographic characteristics such as age and work experience, educational background, and gender. These characteristics are important because according to the U.S. Department of Education, National Center for Education Statistics (2016) in 2015, females accounted for 76% of U.S. public school teachers, 56% of public school teachers were older than 40, and 56% had a master's degree or higher. In the next sections we explore the link between these characteristics and recent studies in entrepreneurship in various fields.

### *2.1.1. Age, work experience, and entrepreneurship*

Age largely influences a person's decision-making processes and might function as an important driver for entrepreneurial behavior. Age can be seen as a representation of other highly important individual characteristics, such as work experience, wealth, health, ambition, social network, and more (Lévesque & Minniti, 2006; Sahut et al., 2015). Attention to this subject has been increasing recently with the phenomenon of population aging (Kautonen, 2008). Specific efforts have been devoted to what is called "grey entrepreneurship" (Weber & Schaper, 2004), an area concerning individuals acting entrepreneurially after the age of 50 (Hatak, Harms, & Fink, 2015).

As a fairly recent area of interest, the debate over the influence of age in entrepreneurship is still quite open, with contrasting findings. On one hand, there is an understanding that older individuals are less likely to invest time in activities with returns that are uncertain and may take too long to be received (Fung, Lai, & Ng, 2001). Such activities include steps in entrepreneurship, such as starting a venture or developing new business activities (Hatak et al., 2015). On the other hand, seniors are more capable of developing new ways of doing customary activities, as they



might possess improved mechanisms, means, and opportunities for doing so (Hatak et al., 2015; Weber & Schaper, 2004). These include stronger professional networks, accumulated professional and personal experiences, better access to financial and non-financial resources, and other elements.

Liang, Wang, and Lazear (2014), for instance, pulled data from the Global Entrepreneurship Monitor on entrepreneurship activity across countries and found that countries displaying lower median ages are associated with higher levels of entrepreneurship, whereas older societies exhibit lower entrepreneurship levels. Complementarily, based on an investigation of the Austrian workforce, Hatak, Harms, and Fink (2015) found that as age increases, employees are less inclined to act entrepreneurially, with their entrepreneurial intention becoming lower as they identify more with their profession. Therefore, the relationship between age and entrepreneurship might have job identification as a moderating factor (Hatak et al., 2015).

Furthermore, based on Becker's (1965) theory of time allocation, Lévesque and Minniti (2006) argue threshold age exists, at which the distribution of an individual's working time between entrepreneurship activities and paid work is critical. After reaching this threshold, individuals are less likely to invest time and resources in new ventures. Kautonen, Down, and Minniti (2014) show entrepreneurial activity growing almost linearly with age for individuals preferring self-employment. Complementarily, for individuals who intend to hire others, the relationship was an inverted U-shaped curve, reaching the peak in the late 40s. Kautonen et al. (2014) particularly challenge the idea that entrepreneurial activities decline with age and emphasize the role of entrepreneurial preferences.

In contrast, Thorgren, Sirén, Nordström, and Wincent (2016) show that both younger and older entrepreneurs tend to regard it as very attractive to leave paid employment and put efforts

towards full-time entrepreneurship. The authors state that entrepreneurial choices are directly influenced by the individual's identification and activation of the entrepreneurial role. This role is then based on expectations and meanings that the person creates in relation to other existing roles, such as the one represented by the current job (employee role). It is argued that those who move to entrepreneurial activity when they are more mature might have better skills to cope with interferences and overlaps from other roles (Arenius & Minniti, 2005; Thorgren et al., 2016).

Analyzing data from 839 small companies in Finland, Kautonen (2008) found that around 16% of these firms were founded by individuals aged 50 or over, suggesting that third-age entrepreneurship cannot be seen as irrelevant. However, entrepreneurs also face discrimination, and older entrepreneurs have found difficulties in adapting to a cultural context which views entrepreneurship as an activity for young people (Kibler, Wainwright, Kautonen, & Blackburn, 2015). Furthermore, if norms are perceived as nonjudgmental regarding entrepreneurial activities for older ages, they have a strong positive influence on entrepreneurial intentions for older people. This strong influence is also mediated by individuals' attitudes towards entrepreneurship, their perception of their abilities, and support from family and friends (Kautonen, Tornikoski, & Kibler, 2011).

Similarly, since age can be a proxy for work and life experience, some researchers used age to gauge the effects of experience in entrepreneurial inclinations, while others looked at how the type of work context influenced entrepreneurial and risk-related behaviors (Miralles, Giones, & Riverola, 2016; Zapkau, Schwens, Steinmetz, & Kabst, 2015). In general, evidence describing how individual experience relates to entrepreneurial inclinations has been noticeably low (Miralles et al., 2016), with some authors arguing that work experience does not relate to developing an entrepreneurial career, irrespective of context (Kautonen et al., 2011).

### *2.1.2. Educational Background and Entrepreneurship*

Numerous studies have focused on the role of education in entrepreneurship (e.g., Al-Zubeidi, 2005; van der Sluis, van Praag, & Vijverberg, 2004; Wu & Wu, 2008), many of them indicating a positive relationship between education and entrepreneurial success (Dickson, Solomon, & Weaver, 2008). Take for example the study conducted by Crant (1996) with 181 undergraduate and graduate students of a university in the USA. His study found that education, along with gender, was significantly associated with entrepreneurial intentions. Ertuna and Gurel (2011) found similar relationship in a study including 767 business and engineering students from five universities in Turkey. AUTHOR (2017) also found such significant association between education and entrepreneurial behavior among Brazilian teachers, suggesting that the higher the education, the higher the likelihood of teachers to engage in entrepreneurial behaviors.

Despite this body of evidence, the research into the relationship between educational background and entrepreneurship is not conclusive. For instance, in their study with Dutch teachers, Van Dam et al. (2010) found that general education did not make a unique contribution to entrepreneurial behavior. However, the authors suggest that education may still play a role in entrepreneurial behavior. They did demonstrate a significant relationship between education and entrepreneurial knowledge, as well as between education and creative thinking. Entrepreneurial knowledge refers to particular knowledge in each of the three fundamental elements of entrepreneurial behavior as defined by Van Dam et al. (2010): opportunity recognition, initiative, and risk management. Since entrepreneurial knowledge and creative thinking showed a strong relationship with entrepreneurial behavior, the authors suggest that these attributes mediate the relationship between educational level and entrepreneurial behavior. These different results indicate that the relationship between education and entrepreneurship is complex and requires

further study.

### *2.1.3. Gender and entrepreneurship*

Economic development gains are closely tied to female entrepreneurship and gender equality, since women constitute on average 50% of the world's population (Sarfaraz, Faghieh, & Majd, 2014). The importance of gender equality is demonstrated in the commitment of worldwide organizations such as the United Nations and the World Bank to allow greater access to funding and resources needed to increase female entrepreneurship (Sarfaraz et al., 2014). However, men in the United States are almost twice as likely as women to engage in entrepreneurial activities such as starting a business (Wilson, Kickul, Marlino, Barbosa, & Griffiths, 2009).

Gender differences in entrepreneurship are evident across industries and across countries (Allen, Elam, Langowitz, & Dean, 2008; Maes, Leroy, & Sels, 2014; Marlow & Patton, 2005). To explore these gender differences, Goktan and Gupta (2013) collected data from 1,575 undergraduate business students in Hong Kong, Turkey, India, and the United States. The results show that entrepreneurial orientation was significantly higher among men than women in each of these countries. A similar study conducted with college students from Fiji, Korea, Malaysia, and the United States also found that men's scores on entrepreneurial orientation were greater than women's (Lim & Envick, 2013).

This gender difference can also be found in the field of education. AUTHOR (2017) conducted a study with 385 K-12 Brazilian teachers from public and private schools. The goals of the study were to explore demographic characteristics associated with entrepreneurial behavior and job satisfaction, and to explore the relationship between both variables. Their study found that male teachers reported higher entrepreneurial behavior than their female counterparts. In discussing their findings, the researchers argue that while females comprise the majority of the

teaching workforce in Brazil, female teachers are less likely to engage in entrepreneurial behaviors (i.e. opportunity recognition, initiative, and risk management) due to long-lasting consequences of gender inequality. Those who do are subjected to undermining difficulties (AUTHOR, 2017).

Despite this historical difference in entrepreneurship between men and women, there have been some signs of progress towards equality. Findings from Mueller and Dato-On (2011) suggest that in the United States the stereotype of entrepreneurs as males is slowly being replaced by understanding entrepreneurship as a balance between stereotypically masculine characteristics such as competitiveness and assertiveness, and stereotypically feminine characteristics such as caring and cooperation (Mueller & Conway Dato-On, 2011). This is important because, as shown by Dzisi (2008) in a study of African women, when women engage in entrepreneurial activities their activities have a positive impact in reducing poverty and improving the social environment.

## 2.2. Self-efficacy

Self-efficacy, a key element in Bandura's (1997) social learning theory, encompasses individuals' beliefs in their ability to perform a task successfully (Wood & Bandura, 1989). According to Bandura (1986), "[w]hat people think, believe, and feel affects how they behave" (p. 25). In the context of this study, self-efficacy can be understood as teachers' beliefs regarding their ability to plan and conduct their professional activities auspiciously.

Like entrepreneurship, self-efficacy has been studied in a variety of fields, such as business and management (e.g., Rapp, Baker, Bachrach, Ogilvie, & Beitelspacher, 2015), health (e.g., Sleath et al., 2015), psychology (e.g., Azizli, Atkinson, Baughman, & Giammarco, 2015) and education (e.g., Wang, Hall, & Rahimi, 2015). In the field of education specifically, studies on self-efficacy have been conducted across the globe, providing an international perspective on self-efficacy among pre- and in-service teachers (Kleinsasser, 2014). While the concept can be applied

to research in different areas, Bandura (1997) warns about problems with assessment that can come from what he calls a mismatch between self-efficacy and the performance domain. This mismatch happens when the ability measured through self-efficacy, even though it may overlap in certain ways, differs from the abilities assessed in the performance outcome. To avoid partial overlap between self-efficacy and performance outcome, Bandura (1997) recommends the use of domain-specific tools over general assessment ones. He states, “particularized domain-related measures of perceived self-efficacy surpass global measures in explanatory and predictive power” (p. 63).

To provide an example of the difference between a general and a domain-specific measure of self-efficacy, consider the instruments used in this study, the Occupational Self-Efficacy Scale (Schyns & Von Collani, 2002), and the short form of the Ohio State Teacher Efficacy Scale (OSTES) by Tschannen-Moran and Woolfolk Hoy (2001). The Occupational Self-Efficacy Scale, with items such as “I feel prepared to meet most of the demands in my job,” can be considered a global measure, as it is general enough to be used for any profession. The OSTES is domain-specific because it measures elements specific to the teaching profession, with items such as “How well can you implement alternative strategies in your classroom?” One can expect the OSTES to have a stronger predictive power than the Occupational Self-Efficacy Scale toward a performance outcome in the teaching profession.

### *2.2.1. Self-efficacy and work-related outcomes*

Researchers have looked at self-efficacy when exploring positive work-related outcomes such as job satisfaction (AUTHOR, 2013; Caprara, Barbaranelli, Borgogni, & Steca, 2003; Judge & Bono, 2001; Sargent & Hannum, 2005), work performance (Su et al., 2016), and low absenteeism (Borgogni, Dello Russo, Miraglia, & Vecchione, 2013; Busch, Göransson, & Melin,

2007). Consider, for example, the meta-analysis of Judge and Bono (2001). This meta-analysis included 135 studies exploring the relationship between job satisfaction and elements such as self-esteem, emotional stability, locus of control, and self-efficacy. While all these elements had a positive relationship with job satisfaction, self-efficacy showed the strongest correlation (Judge & Bono, 2001). More recently, a study conducted by AUTHOR (2013) looked at identifying professional characteristics of Brazilian teachers that predict job satisfaction. A total of 1,194 Brazilian teachers were assessed. Results showed teachers' self-efficacy was the strongest predictor of job satisfaction (AUTHOR, 2013). Consider also a recent study with 326 government auditors in Taiwan (Su et al., 2016). The results of that study indicated that self-efficacy significantly influenced work performance.

In the field of entrepreneurship, self-efficacy has been associated with entrepreneurial intentions (Boyd & Vozikis, 1994). An underlying assumption supporting this area of research is that intention can accurately predict a given behavior (Ajzen, 1991). In addition, this line of research narrowly defines entrepreneurial intention as the intention to create a new business. In a study with 265 graduate business administration students from five U.S. universities, Zhao, Seibert, and Hills (2005) found that self-efficacy not only predicted entrepreneurial intention, but also mediated the impact of perceived learning from courses on entrepreneurship, entrepreneurial experience, and risk propensity. Similarly, a recent study involving 114 graduate and undergraduate business students at a British university found a significant correlation between self-efficacy and entrepreneurial intentions (Piperopoulos & Dimov, 2015).

As illustrated above, many studies show the association of self-efficacy with work-related outcomes and entrepreneurial intentions. This should be expected because people's self-efficacy beliefs have a direct influence on their behavior and environment. Furthermore, Bandura (1997)

maintains that independent of their occupational area, innovators need self-efficacy and a strong belief in the value of what they are trying to accomplish to overcome outside skepticism and early rejection aimed at their innovations. It stands to reason that someone with a high sense of self-efficacy is more likely to take initiatives and bigger risks, which can lead to bigger payoffs. Conversely, when people have little belief in their ability to accomplish a task, they tend to avoid situations they deem challenging (Piperopoulos & Dimov, 2015).

Based on the fact that self-efficacy has been a strong predictor of positive work-related outcomes, and the assumption that the theoretical grounds of socio-cognitive theory lend support to the drive of innovators, the association of self-efficacy and entrepreneurial intentions, it only makes sense to expect that self-efficacy can also predict entrepreneurial behavior, as Van Dam et al. (2010) expected.

### 2.3. Contributions to the Literature

This study is driven by three research questions:

- (1) To what extent does self-efficacy contribute to entrepreneurial behavior among teachers?
- (2) Is a domain-specific self-efficacy instrument (teacher self-efficacy) better at predicting entrepreneurial behavior than a general instrument (occupational self-efficacy)?
- (3) Which are the demographic characteristics associated with entrepreneurial behavior?

By addressing these three research questions, this study provides several contributions to the literature.

First, it provides further evidence of the extent to which teachers' entrepreneurial behavior is influenced by their self-efficacy. Such evidence adds to the ongoing debate on the association between self-efficacy and entrepreneurial development, as well as initiative (Frese et al., 1997;



Luthans, Stajkovic, & Ibrayeva, 2000; Van Dam et al., 2010). This body of evidence can underpin the establishment of specific organizational and developmental strategies towards fully exploring the positive outcomes of improved teachers' self-efficacy.

Second, the study directly tackles the open discussion posed by Van Dam et al. (2010) on the levels of specificity for the self-efficacy scale. The authors speculate that the occupational self-efficacy used in their study was not specific enough. Along those lines, the authors suggest that a domain-specific one might capture important specificities of the job and therefore be a better predictor of entrepreneurial behavior.

Third, the study reinforces the investigation of the influence of personal and professional characteristics (i.e. age, gender, grade level taught, highest degree achieved, and teaching experience) on entrepreneurial behavior. Such an investigation is particularly relevant in supporting a deeper understanding of the entrepreneurial phenomenon among teachers, as well as providing evidentiary basis for the proper design of public and institutional policies aimed at reaping the benefits of enhanced entrepreneurial behavior in schools.

### **3. Method**

#### **3.1. Procedures and Participants**

Data were collected through an online survey. An electronic invitation to participate in this study was sent to public school teachers teaching in any grade level from kindergarten to high school across the United States. Participants were randomly assigned to one of two study groups. In addition to responding to demographic questions and to the Entrepreneurial Behavior scale, participants assigned to group A responded to the short form of the Ohio State Teacher Efficacy Scale and those in group B responded to the Occupational Self-Efficacy Scale. All instruments are described under Measures.

A total of 518 records were collected. However, 117 were eliminated due to the small number of items answered. Group A had 188 (46.9%) participants and group B 213 (53.1%). To investigate whether the random assignment of participants to the two groups worked well, Pearson chi-square analyses were conducted. The results indicate that groups A and B are not significantly different in any of the demographic characteristics collected. Table 1 shows details of the composition of groups A and B, and the chi-square results. These results indicate that the random assignment of participants to groups A and B worked well.

Table 1

*Demographic characteristics of groups A and B and chi-square results*

Demographic	Group A	Group B	Total (%)	$\chi^2$	df	p
Age				3.31	4	.51
20-29	32	46	78 (19.5%)			
30-39	51	63	114 (28.4%)			
40-49	50	46	96 (23.9%)			
50-59	43	41	84 (20.9%)			
60 or older	12	17	29 (7.2%)			
Gender				.05	1	.83
Female	136	152	288 (71.8%)			
Male	52	61	113 (28.2%)			
Grade level				4.76	3	.19
K-2	18	33	51 (12.7%)			
3-5	22	30	52 (13%)			
6-8	42	49	91 (22.7%)			
9-12	106	101	207 (51.6%)			
Highest degree achieved				1.14	2	.57
Bachelors	78	97	175 (43.6%)			
Masters	103	111	214 (53.4%)			
Doctoral	7	5	12 (3%)			
Teaching experience (years)				2.38	4	.67
1 to 5	44	59	103 (25.7%)			
6 to 10	32	41	73 (18.2%)			
11 to 15	34	39	73 (18.2%)			

16 to 20	31	32	63 (15.7%)
More than 20	47	42	89 (22.2%)

### 3.2. Measures

#### *Demographics*

Participants provided information regarding their age, gender, grade levels taught, highest degree achieved, and years of teaching experience.

#### *Entrepreneurial Behavior Scale*

Entrepreneurial behavior was measured with 13 items of the Entrepreneurial Behavior Scale. The items on this scale were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Examples of items are “I actually implemented plans I had made” and “I took initiative even when others did not”. In this study Chronbach’s alpha was .84.

#### *Occupational Self-Efficacy Scale*

Schyns and Von Collani’s (2002) Occupational Self-Efficacy Scale was used to assess occupational self-efficacy. This Likert scale is comprised of six items such as “I meet the goals that I set for myself in my job” and “I feel prepared to meet most of the demands in my job”. The scale ranges from 1 (not at all true) to 6 (completely true). In the present study Chronbach’s alpha was .89.

#### *Ohio State Teacher Efficacy Scale*

Teachers’ self-efficacy was measured with the short form of the OSTES developed by Tschannen-Moran and Woolfolk Hoy (2001). The short form of the OSTES is comprised of 12 items, rated on a 9-point Likert scale ranging from 1 (none at all) to 9 (great deal). This scale includes items such as “How much can you assist families in helping their children do well in

school?” and “How well can you implement alternative strategies in your classroom?” (Tschannen-Moran & Woolfolk Hoy, 2001). In this study, the Cronbach’s alpha was .89.

### 3.3. Analyses

We performed a regression analysis to assess the unique contributions of occupational self-efficacy and teacher self-efficacy to entrepreneurial behavior. We also performed analysis of frequency, *t*-test, analysis of variance (ANOVA), and factorial ANOVA to identify the demographic characteristics associated with entrepreneurial behavior.

## 4. Results

### 4.1. Unique contributions of occupational self-efficacy and teachers’ self-efficacy

Regression analyses were conducted to assess the unique contributions of occupational self-efficacy and teachers’ self-efficacy to entrepreneurial behavior. With group A (N = 188) the regression analysis examined teachers’ self-efficacy (M = 7.24, SD = .91) predicting entrepreneurial behavior (M = 3.73, SD = .51). The results were statistically significant,  $F(1, 186) = 37.98, p < .001$ . The  $R^2$  value was .17, indicating that 17% of the variance in entrepreneurial behavior can be explained by teachers’ self-efficacy. With group B (N = 213) the analysis tested occupational self-efficacy (M = 4.56, SD = .75) as a predictor of entrepreneurial behavior (M = 3.62, SD = .47). The results were also significant,  $F(1, 211) = 48.68, p < .001$ . The adjusted  $R^2$  value was .187, meaning that 18% of the variance in entrepreneurial behavior can be explained by occupational self-efficacy. These findings also suggest that occupational self-efficacy is a slightly better predictor of entrepreneurial behavior than teachers’ self-efficacy is.

### 4.2. Demographic characteristics associated with entrepreneurial behavior

To identify the demographic characteristics of public school teachers associated with entrepreneurial behavior, independent sample *t*-tests, analysis of variance (ANOVA), and factorial

ANOVA were performed.

### *Independent sample t-test*

Independent sample *t*-tests examined mean differences for entrepreneurial behavior between the two independent gender groups of females vs. males and between the two independent degree-achieved groups of bachelor vs. graduate. The results presented in Table 2 show significant mean differences for highest degree achieved, indicating that teachers with a graduate degree had significantly higher mean scores than those with a bachelor's degree.

Table 2

### *Results of Independent Samples T-tests*

Variable/Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Mean Diff.</i>	<i>SE Mean Diff</i>	<i>t</i>	<i>d</i>
Gender				-0.02	0.05	-0.38	0.04
Female	288	3.66	0.49				
Male	113	3.68	0.47				
Highest degree				-0.16	0.04	-3.32***	0.33
Bachelors	175	3.58	0.48				
Graduate	226	3.74	0.48				

Note. \*\*\* $p < .001$ . *M* = Mean; *SD* = Standard Deviation.

### *Analysis of Variance (ANOVA)*

A series of one-way between-group ANOVA tests was performed on three sets (age, grade level taught, and years of teaching experience) for entrepreneurial behavior.

The first series of ANOVA analyses included four independent age groups (Group 1: 20-29; Group 2: 30-39; Group 3: 40-49; Group 4: 50 and older). The second series of ANOVA analyses included the independent variable grade level, which was divided into four groups (Group

1: K-2; Group 2: 3-5; Group 3: 6-8; Group 4: 9-12). The final series of ANOVA analyses included the three independent groups of years of teaching experience (Group 1: 1 to 5; Group 2: 6 to 15; Group 3: 16 and more) for this series of ANOVA analyses.

The results presented in Table 3 show that (a) at least two age groups differ on entrepreneurial behavior. The post hoc comparisons using the Bonferroni Test indicate that the 20-29 age group has a significantly lower mean score compared to the 40-49 and 50 and older age groups, and the 50 and older age group has a significantly higher mean score than the 30-39 group; (b) no significant difference was found between grade level groups; (c) at least two groups based on teaching experience differ on entrepreneurial behavior mean score. The post hoc comparisons using the Bonferroni Test show that those with 16 or more years of teaching experience have a significantly higher mean score on entrepreneurial behavior than those with 5 years or less.

Table 3

*Results of ANOVA Findings for Age, Grade Level, and Teaching Experience*

Variable/Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	$\eta^2$
Entrepreneurial Behavior				5.88*	0.04
Age					
20-29	78	3.53	0.45		
30-39	114	3.59	0.48		
40-49	96	3.74	0.50		
50+	113	3.78	0.47		
Entrepreneurial Behavior				1.48	0.01
Grade Level					
K-2	51	3.59	0.47		
3-5	52	3.69	0.54		
6-8	91	3.61	0.46		
9-12	207	3.71	0.48		
Entrepreneurial Behavior				5.08*	0.02
Teaching Experience					

1 to 5	103	3.54	0.48
6 to 15	146	3.69	0.48
16+	152	3.73	0.48

*Note.* \* $p < .05$ .  $M$  = Mean;  $SD$  = Standard Deviation.

### *Factorial ANOVA*

The series of t-tests and ANOVAs found that age, highest degree achieved, and years of teaching experience are associated with entrepreneurial behavior. These results indicate the need for further exploration of the data to answer to identify whether or not the differences on entrepreneurial behavior discovered for each one of these variables hold when controlled for the other variables.

A series of factorial ANOVAs was conducted. The results presented in Table 4 indicate that when controlled for age and highest degree achieved, the differences in years of teaching experience no longer have an effect on entrepreneurial behavior. However, the differences we found among age groups and highest degree achieved remain significant even after controlling for the variables entered in the model.

Table 4

*Results of factorial ANOVA for Age, Highest Degree Achieved and Years of Teaching Experience*

Source of Variation	$SS$	$df$	$MS$	$F$
Age	1.98	3	.66	2.89*
Highest Degree Achieved	1.09	1	1.09	4.81*
Yrs of Teaching Experience	.45	2	.22	.99

*Note.* \* $p < .05$ .  $R^2 = 0.06$

## **5. Discussion**

This study had the main objectives of (i) exploring the influence of self-efficacy on teachers' entrepreneurial behavior; (ii) identifying the best instrument to measure such contributions by testing a domain-specific instrument (Ohio State Teacher Efficacy Scale) vs. a general one (Occupational Self-Efficacy Scale), and (iii) investigating the demographic characteristics associated with teachers' entrepreneurial behavior. The results described under Section 4 show that self-efficacy can actually predict entrepreneurial behavior among teachers, with occupational self-efficacy being a slightly superior predictor of teachers' entrepreneurial behavior than specific teacher self-efficacy. Furthermore, the demographic variables of age and highest degree achieved were associated with entrepreneurial behavior, whereas gender did not present statistically significant differences.

#### 5.1. Differences between the two self-efficacy instruments

In particular, the motivation and rationale behind examining the two instruments is based on the work of Van Dam et al. (2010), in which the authors found occupational self-efficacy not significantly related to entrepreneurial behavior. In their discussion, they put forth the supposition that the occupational self-efficacy scale might have been too broad, and unable to capture activities in the specific domains of teaching which would be relevant to entrepreneurial behavior.

The fact that the occupational self-efficacy scale is a better predictor of teachers' entrepreneurial behavior might indicate that entrepreneurship within the educational sphere is less dependent on peculiarities of the teacher's occupation (e.g., lesson planning, teaching, grading of students' work etc.). Additionally, the results could also imply that teachers' entrepreneurial behavior is not clearly manifested in connection to the job's daily and specific activities, as opposed to what would be typically expected from entrepreneurial behavior within the corporate context. In other words, teachers who display high self-efficacy in relation to teaching activities



might not perceive their set of teaching skills and competences as a basis for entrepreneurial activities, whereas teachers who score higher on general occupational self-efficacy might tend to see a clearer link between their skills and entrepreneurial tendencies and behavior.

Practical strategies and policies could be designed towards enhancing teachers' entrepreneurial behavior and the related learning outcomes in the classroom. These strategies and policies could be steered by an emphasis on improving teachers' self-efficacy of the occupational activities, as opposed to developing very specific teaching skills. In this particular aspect, more experienced teachers could, for instance, take the role of mentors or advisors and develop the habit of constantly and consistently providing feedback to less experienced teachers on broader challenges and aspects of the profession and the teacher's career as a whole. Along those lines, school leadership could also develop specific programs and performance evaluation systems whose priorities are focused on accentuating general occupational characteristics of the teaching career. These programs and systems could make use of the positive experiences of teachers' personal growth and experience mastery, in line with what was presented by Boyd and Vozikis (1994).

Furthermore, entrepreneurship education programs targeted at teachers could highlight generic occupational aspects, such as the fundamental learning, educational, technological, and social competences for innovative teaching practices and use of resources (Zhu, Wang, Cai, & Engels, 2013). In particular, entrepreneurial teachers can be seen as "critical innovators": reliable authorities on both the transformational possibilities and potential risks associated with innovation in the classroom (Papendieck & Hughes, 2017).

These entrepreneurship education programs for teachers could emphasize, for instance, the development of (i) teachers' networking, communication, and collaboration skills; (ii) teamwork;

(iii) time and task management and planning; (iv) conflict and negotiation management; (v) improvisational skills; and (vi) creative and flexible problem-solving (Van Dam et al., 2010). In this sense, entrepreneurship education programs targeted at teachers would then have a reduced weight on particular innovative teaching methods, tools, and practices. These programs might also set the scene for fruitful collaboration opportunities with education-related professionals who might be willing to share and exchange their experience in developing general competences and skills.

## 5.2. The influence of demographic characteristics on teachers' entrepreneurial behavior

With regards to demographic characteristics associated with entrepreneurial behavior, the variables of age and highest degree achieved display a statistically relevant influence on entrepreneurial behavior. Teachers in the 50+ age group scored significantly higher in entrepreneurial behavior than younger teachers. Since age can represent several other personal characteristics (Lévesque & Minniti, 2006), and older teachers displayed higher entrepreneurial behavior, it was expected that more experienced teachers would also exhibit enhanced entrepreneurial inclination. However, our findings did not confirm this.

In general, the literature presents conflicting findings linking age and entrepreneurial behavior (e.g., Fung, Lai, & Ng, 2001; Hatak et al., 2015; Kautonen et al., 2014; Lévesque & Minniti, 2006; Sahut et al., 2015; Weber & Schaper, 2004). However, it is still possible to draw some insights from the results of the statistical analysis. Older teachers could be more entrepreneurial because they might possess more sophisticated mechanisms for innovating in the classroom (Kautonen, Hatak, Kibler, & Wainwright, 2015; Weber & Schaper, 2004), partially due to their experience in the classroom and the likelihood of higher exposure to the topics of entrepreneurship in a multitude of contexts. Additionally, teachers also develop a deeper

understanding of the broader educational system over time, alongside the particularities of the school leadership, and its rules and people. As previously mentioned, age has been widely used as a proxy for several other individual characteristics, with special attention to work experience. Therefore, even though we didn't find an explicit correlation between years of teaching experience and entrepreneurial behavior, this facet of experience might be implicitly reflected onto the larger construct of age.

On the other hand, there is also a broad agreement that older individuals tend to invest much less time in activities with uncertain and long paybacks (Fung, Lai, & Ng, 2001; Hatak, Harms, & Fink, 2015), which are typical features of entrepreneurial activities. However, the particular context in which teachers operate might offer them a safer and more comfortable support towards innovating and engaging in entrepreneurial activities. Since being an entrepreneur in the classroom does not necessarily entail elevated amounts of risk and highly uncertain activities with fuzzy paybacks, educational institutions might operate as "safety nets" for teachers. We could then argue that the higher entrepreneurial behavior displayed by older teachers might be a direct manifestation of their wider range of experiences and personal and professional mechanisms to act upon opportunities of innovating in the classroom.

Regarding the effects of highest degree achieved, we found that teachers holding graduate degrees displayed higher entrepreneurial behavior than their counterparts holding bachelor's degrees. This result confirms the findings of AUTHOR (2017), in which educational level was significantly related to entrepreneurial behavior. Coupled with the previously mentioned note on the solid entrepreneurial culture of the United States, teachers holding graduate degrees may have been more exposed to formal entrepreneurship education covering the three main constituent elements of entrepreneurial behavior: opportunity recognition, initiative, and risk management. As

explored under Section 2.1.2, the body of research into the relationship between educational level and entrepreneurship is inconclusive. On one hand, the study carried out by Van Dam et al. (2010) reported significant correlation between education level and entrepreneurial knowledge, as well as creative thinking. Therefore, Van Dam et al. (2010) claim that both entrepreneurial knowledge and creative thinking act as mediators for the relationship between educational level and entrepreneurial behavior. On the other hand, Crant (1996) and Ertuna and Gurel (2011) present direct relationships between educational level and entrepreneurial behavior.

In an effort to define more specific knowledge acquisition, the concept of entrepreneurial knowledge arises as an important component within formal degree-based teacher training. Entrepreneurial knowledge results from learning how to recognize and act upon potential opportunities (Shane, 2000) and cope with unexpected challenges (Shepherd, Douglas, & Shanley, 2000). In this sense, entrepreneurial knowledge is built by individual exposure to experiences and learning activities involving both the recognition and development of opportunities and the administration of novelty (Politis, 2005). Therefore, understanding entrepreneurial knowledge mostly through the lens of experience might shed light on the limitations of entrepreneurial education programs as a standalone effect on entrepreneurial inclinations (Miralles et al., 2016).

Since entrepreneurial intention and behavior are positively influenced by entrepreneurial knowledge (Miralles et al., 2016) and are in line with results from the current study, public policies and institutions' private strategies could focus on valuing individual entrepreneurial knowledge more intensely, and strengthening the appeal of entrepreneurship-based careers to attract more experienced individuals. This could be translated into the educational context by emphasizing and promoting examples of entrepreneurial teachers and how they operate and adapt in the classroom. Additionally, as mentioned under Section 2.1.2, there is an emerging consensus on the positive

correlation between education and entrepreneurial success (Dickson, Solomon, & Weaver, 2008). Therefore, it seems plausible to expect that organizational strategies aimed at enhancing entrepreneurial knowledge among teachers will be more effective in producing positive outcomes—from a teacher’s perspective (e.g. job satisfaction, improved performance, superior means, and funds for teaching)—as well as from a learning perspective (e.g. more engaged students, entrepreneurial role model, and tools-enriched learning environments).

Unlike the correlations with age and highest degree achieved, no significant difference was found between genders. This result opposes what has been reported in the literature. Several studies account for a higher incidence of entrepreneurship among men, which holds consistent even when examined against different cultural backgrounds (Ahl, 2006; Langowitz & Minniti, 2007; Lewis, 2006; Marlow & Patton, 2005; Zhang et al., 2009). In general, deep-rooted stereotypes against women in the workplace (Marlow & Patton, 2005) and the long-standing cultural association between entrepreneurship success and masculine traits (Ahl, 2006; Lewis, 2006) play fundamental roles in this gender imbalance. A likely explanation for the absence of statistically significant differences between genders might be connected to the well-established entrepreneurial culture of the United States (Kelley, Singer, & Herrington, 2016; Terjesen, Hessels, & Li, 2016), especially in relation to opportunity perception (Ács, Szerb, Autio, & Lloyd, 2017). Furthermore, other contributing factors for the absence of statistically significant differences between genders could include the fact that about 56% of teachers in the USA have graduate degrees and teaching is dominated by women, leading to a high percentage of educated women in this specific group/profession (U.S. Department of Education, National Center for Education Statistics, 2016).

### 5.3. Addressing limitations and charting future research streams

While the study contributes to the literature of educational entrepreneurship and self-efficacy, some limitations can be highlighted. First, the quantitative focus of the research does not provide for a deeper understanding of the underlying mechanisms of the relationship between self-efficacy and entrepreneurial behavior. Second, the comparison of self-efficacy instruments (domain-specific vs. general) is based on correlational analysis of only two known scales, leaving less room for exploring the potential causes of such differences in the prediction of entrepreneurial behavior. Third, aspects of organizational climate were not considered in the predictive model. Fourth, the findings might be limited in terms of representing the national reality of teachers' entrepreneurial behavior and self-efficacy in the United States. Finally, demographic variables were limited to age, gender, grade levels taught, highest degree achieved, and years of teaching experience.

With a view both to addressing these limitations and further developing the field of educational entrepreneurship, future research works pinpoint many potential pathways by (i) qualitatively investigating the connection between self-efficacy and entrepreneurial behavior, with a view to describing the main features and driving forces of this relationship; (ii) further exploring the differences between the occupational self-efficacy scale and the teacher-focused one in terms of predicting teachers' entrepreneurial behavior; (iii) specifically examining how the teaching and school organizational climates influence the correlation between self-efficacy and entrepreneurial behavior; (iv) performing comparative studies to check the consistency of the findings we presented in this study in relation to different cultural and national identities; and (v) investigating the effects of other demographic variables on teachers' entrepreneurial behavior, such as geography (region, city, etc.), teachers' professional background, nature of the subject taught at school (science, arts etc.), or family background related to entrepreneurship, as these

characteristics are gaining attention from researchers and practitioners (Ruskovaara, Hämäläinen, & Pihkala, 2016; Ruskovaara et al., 2015).

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