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Why is changing students' entrepreneurial intentions so hard? On dissonance reduction and the self-imposed self-fulfilling prophecy

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ABSTRACT

While most policymakers and researchers focus on how students' entrepreneurial intentions can be increased, this study examines what makes the change so difficult, i.e., why pre- and post-course entrepreneurial intentions are strongly related. Building on dissonance reduction theory pursuant to the self-imposed self-fulfilling prophecy phenomenon, we tested a serial mediation model in contexts that give rise to differing expectations regarding the role of inspiration: entrepreneurship versus other courses, in developed versus developing countries. Using pre-test post-test survey data collected from (mostly business) students at 16 universities across nine countries, we analysed an internationally representative sample of 580 valid responses through structural equation modelling. The results confirmed the serial mediation mechanism: pre-course intentions are positively related to students' expected entrepreneurial inspiration, enhancing in turn their experienced entrepreneurial inspiration, which ultimately leads to higher post-course intentions. This mechanism is significantly stronger among students taking entrepreneurship (versus other) courses but is unaffected by the economic context, as it is equally significant across developed and developing countries. Our findings shed light on exploring the determinants of intention fixedness, which is severely under-researched. Furthermore, our study enables policymakers and entrepreneurship educators to draft a more realistic expectation of students' post-course entrepreneurial intentions.

1. Introduction

Entrepreneurial intention (EI) refers to the conscious state of mind that directs personal attention, experience, and desire towards planned entrepreneurial behaviours to start a business (Bae, Qian, Miao, & Fiet, 2014; Bird, 1988; Shahab, Chengang, Arbizu, & Haider, 2019). Researchers have studied EI as the central outcome measure in the field of entrepreneurship education (Arranz, Arroyabe, Fdez, de Arroyabe, 2019; Nabi, Liñán, Fayolle, Krueger, & Walmsley, 2017) as this concept is deemed as the most proximal indicator of actual entrepreneurial activities predicted by the theory of planned behaviour (Ajzen, 1991; Krueger, Reilly, & Carsrud, 2000; Liñán & Chen, 2009; Schlaegel & Koenig, 2014). In a context where entrepreneurial behaviour is considered a solution to various societal and economic challenges (Ratten & Jones, 2021; Åstebro, Bazzazian, & Braguinsky, 2012), it is not surprising that the

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identification of variables contributing to EI change remains a focal point of the research field (Carpenter & Wilson, 2022; Martínez-Gregorio, Badenes-Ribera, & Oliver, 2021).

Various course-related variables have been found to influence EI, such as using visual narrative formats (Rivo-López, Lampón, Villanueva-Villar, & Míguez-Álvarez, 2022) and instructors as role models (San-Martín, Pérez, & Fernández-Laviada, 2022). Curiously, authoritative studies identified one other variable – often included as moderator or merely as part of the descriptive statistics – to have a more dominant impact on post-education EI than any other intervention variables, i.e., pre-education EI (Bae et al., 2014; Von Graevenitz, Harhoff, & Weber, 2010). We refer to the positive relationship between ex-ante and ex-post entrepreneurial intentions (i.e., EI_{t1} and EI_{t2}) as intertemporal EI linkage. Though students’ EI level may fluctuate as they move through their educational experience, we use the term “EI linkage” to indicate that high-EI_{t1} students tend to hold their EI_{t2} at a relatively higher level than the low-EI_{t1} students upon their completion of the course.

Now, if theoretical insights and academic understanding are expected to enable improvement in practice, we need to know about determinants of both EI change and determinants of intentional immobility. What are the factors that make initial intentions progressively consolidate into a permanent sentiment for or against becoming an entrepreneur? This angle, however, is under-researched in the field of management and entrepreneurship education. Adhering to the call for management education researchers to adopt a more critical stance and investigate barriers towards the effectiveness of education, rather than focus on its positive contributions (Ratten & Jones, 2021), we take a first step towards filling this gap and obtaining a more comprehensive understanding of (entrepreneurial) intention formation. In turn, this offers practical value. Knowing more about what supports the intertemporal EI linkage, helps entrepreneurship educators formulate a more realistic expectation of potential change, which counterbalances the potential positive bias in previous studies (Carpenter & Wilson, 2022).

Although several studies reported inspiration as critical emotional element of entrepreneurial intentions (Ahmed, Chandran, Klobas, Liñán, & Kokkalis, 2020; Cui, Sun, & Bell, 2019; Souitaris, Zerbinati, & Al-Laham, 2007), research on emotional approach remains limited (Nabi et al., 2017). Following these ground-breaking studies, we are among the first to introduce dissonance reduction theory (Aronson, 1969; Cancino-Montecinos, Björklund, & Lindholm, 2020) to outline a self-imposed self-fulfilling prophecy (Merton, 1948; Wineburg, 1987) between expected and experienced entrepreneurial inspiration. We will then test whether this prophecy effect constitutes the underlying generative mechanism explaining the EI linkage.

That said, we would immediately wonder to what extent contextual factors would influence this serial mediation mechanism. As Bergmann, Hundt, and Sternberg (2016) emphasized, entrepreneurship and entrepreneurial phenomena in the university in particular are highly context-dependent, but the role of contexts has been largely underplayed in entrepreneurship education research. First, will the serial mediation mechanism hold only for students taking an entrepreneurship course, or also for other students? Noting that there are many entrepreneurs who have started their businesses without formal entrepreneurship education (García, 2014), it is important to assess whether the scope of the explanatory framework could be applied to non-entrepreneurship students. Second, will the serial mediation mechanism be reinforced or attenuated by the economic context in which the higher education institution operates? As incentives for entrepreneurship may differ across developed and developing countries, the explanatory power of the underlying mechanism may too. Amidst mostly single-course, single-country extant studies (Carpenter & Wilson, 2022), our sample consists of university students studying various entrepreneurship and other courses (N = 580) at 16 universities in nine countries, allows us to explore these boundary conditions. This will lead us to better understand the contextual sensitivity of the intertemporal EI linkage and its generative mechanism.

In the paper below, we will first provide a review of research on EI and entrepreneurial inspiration, as well as an outline of the self-fulfilling prophecy effect between expected and experienced inspiration. Supported by established literature and the theory of dissonance reduction, we propose seven hypotheses on the presence, formulation mechanism, and contextual sensitivity of the intertemporal EI linkage. Afterwards, we will report on our methodology and share the results of our tests. The paper concludes with a discussion of theoretical contributions, practical implications, research limitations, and next steps.

2. Theoretical framework and hypotheses

The conceptual framework of our study is summarized in Fig. 1. We will then outline the theoretical and empirical rationale for each of the hypotheses.

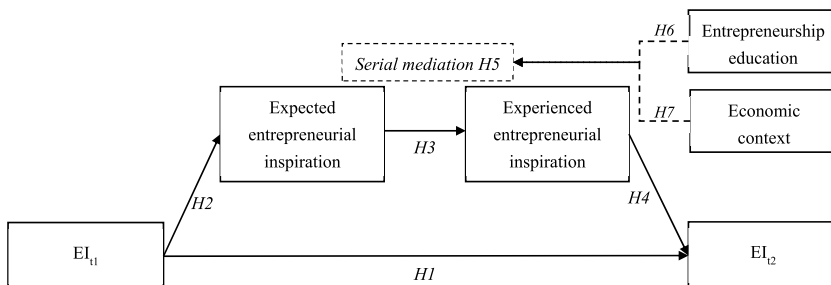


Fig. 1. The conceptual framework.

2.1. The intertemporal relationship between ex-ante and ex-post EI: the linkage

Existing literature on students' start-up intention has produced compelling evidence that students' pre-education EI is a critical determinant of their post-course EI. For example, Von Graevenitz et al. (2010) found that students with extremely high or low ex-ante intention are less likely to change their opinions. According to the study by Volery, Müller, Oser, Naepflin, and Rey (2013), entrepreneurship education increases perceived feasibility, entrepreneurial knowledge, and opportunity exploitation, whereas entrepreneurial intention remains relatively stable. Bae et al. (2014) found that the effect of entrepreneurial education on post-education EI is insignificant and nearly zero after controlling for the pre-education EI. Fayolle and Gailly (2015) also reported that the impact of education on post-course EI is, on average, nonsignificant, but strongly depends on students' prior entrepreneurial exposure and intention. These observations, taken together, suggest that pre-education EI, more than entrepreneurial education, has a dominant effect on predicting post-education EI. This leads to the following hypothesis:

Hypothesis 1. Students' pre-education EI (EI_{t1}) is positively related to their post-education EI (EI_{t2}).

2.2. Expected and experienced inspiration: the mechanism

Inspiration is a multifaceted phenomenon that is generally considered as "a specific mental process that facilitates learning and development" (van Ewijk, Nabi, & Weber, 2021, p. 1873). In the context of entrepreneurship education, research has focused on inspiration as a state as opposed to a trait Thrash and Elliot (2003, 2004). As an emotional state, inspiration is malleable and can be influenced by, for example, an entrepreneurship course or program. The focus was thus on course-related entrepreneurial inspiration: "a change of hearts and minds evoked by events or inputs from the program and directed towards considering becoming an entrepreneur" (see also Cui et al., 2019; Souitaris et al., 2007, p. 573). Where all previous studies focused on experienced course-related entrepreneurial inspiration by measuring this state upon the completion of entrepreneurship education (e.g. van Ewijk et al., 2021), we distinguish this from another inspiration-as-state construct, namely expected course-related entrepreneurial inspiration, which can be measured at the pre-education stage. As below, we posit that these two constructs of state inspiration, constitute a serial mediation mechanism underlying the EI linkage. That is, students' pre-education EI positively shapes their expected course-related entrepreneurial inspiration, which, in turn, translates to their experienced course-related entrepreneurial inspiration that further promotes their post-education intention.

While most existing works treat intention as an outcome variable of education programs and focused on investigating its antecedents (Arranz, Arroyabe, & Fdez de Arroyabe, 2019; Bonesso, Gerli, Pizzi, & Cortellazzo, 2018; Dragan, Schin, Sava, & Panait, 2022; Haddoud, Onjewu, Nowinski, & Alammari, 2022), to our knowledge no studies have examined the impact of pre-education intentions on students' state of mind. Indirect evidence concerning the intention-expectation relationship comes from the study of the "self-selection bias" in entrepreneurship education (Liñán, 2004). For example, in testing the educational impact of entrepreneurship programs on EI, Bae et al. (2014) noted the possibility of reverse causation between pre-education intention and students' later choice of entrepreneurship courses, which signals their expectation towards an entrepreneurial career. Similarly, Liñán, Ceresia, and Bernal (2018) highlighted how students' pre-existing entrepreneurial self-identity leads them to be more interested in and attracted to entrepreneurship courses. In this regard, students with higher pre-education EI would expect themselves to be inspired by the entrepreneurial aspects of the upcoming course. This is achieved "by augmenting the likelihood of individuals perceiving triggers for inspiration as positive" (van Ewijk et al., 2021, p. 1875). In other words, we expect that:

Hypothesis 2. EI_{t1} is positively related to students' expected course-related entrepreneurial inspiration.

The relationship between expected and experienced entrepreneurial inspiration is a typical example of a self-fulfilling prophecy (Merton, 1948; Wilkins, 1976; Wineburg, 1987). Self-fulfilling prophecies are either self-imposed (self-imposed) or other-imposed (interpersonal). The other-imposed self-fulfilling prophecy, also known as the Pygmalion effect, has long been a dominant theme in the education literature (Gentrup, Lorenz, Kristen, & Kogan, 2020; Timmermans, Rubie-Davies, & Rjosk, 2018; Wilkins, 1976). This would occur when others' expectations, such as parents or teachers, influence students' behaviours and performance. The other important, but lesser researched, educational process concerns the self-imposed prophecy, or the Galatea effect (Eden & Zuk, 1995), whereby individuals' perceptions and performance are results of his/her own anticipations or beliefs.

The self-imposed prophecy can be explained by dissonance reduction theory (Festinger, 1957). Dissonance reduction theory holds that individuals experiencing cognitive inconsistency would feel discomfort, such that the person will attempt to reduce dissonance and achieve consonance (Aronson, 1969; Cancino-Montecinos et al., 2020). The study journey is a dynamic exploration where students' preconceived ideas of their upcoming learning experiences continue to be tested against their perceptions. Along this process, students unconsciously seek outcomes that confirm their pre-existing beliefs (Mills, 1999). When high-expectation students feel less inspired, this psychological inconsistency would trigger further actions to minimize cognitive dissonance. As a result, they are more likely to actively search for and be touched by inspiration in all aspects of the course, thus, reducing the unpleasant dissonance and augmenting experienced entrepreneurial inspiration. This self-selective exposure to inspiration also applies to students with low expectations of inspiration. To maintain cognitive consistency, these students are less likely to pay attention to inspirational elements in the course, or may choose to ignore these elements. Hence, their initial low expectations will result in a lower state of experienced inspiration.

Additional indirect evidence of self-imposed self-expectancy effects comes from studies on the influence of self-expectancy on performance, which revealed that positive self-imposed prophecies may lead to personal success due to enhanced belief about oneself

(Olivier, Archambault, De Clercq, & Galand, 2019). For example, Eden and Ravid (1982) found durable effects of both instructor expectations and self-expectations on learning performance, and they reported that instructors' interpersonal self-fulfilling prophecy effect is realized through self-imposed self-expectations.

In summary, individuals resort to an internal dialogue to convince themselves of the alignment between their expectations and experiences, to maintain cognitive consonance throughout their learning process. The occurrence of the prophesized state of mind (i.e., self-perceived entrepreneurial inspiration experience) becomes a directly available means for the prophet to justify his/her prior expectancy as well as subsequent effortful actions, such that s/he will proactively seek out this inspiration state to minimize dissonance and maximize consonance (Archibald, 1974). Therefore, we expect a positive self-imposed prophecy between students' expected and experienced entrepreneurial inspiration throughout their learning journey.

Hypothesis 3. Students' pre-education expected entrepreneurial inspiration are positively related to their post-education experienced entrepreneurial inspiration.

Based on recent studies reporting inspiration as a strong indicator of EI, we further propose that students' experienced inspiration promotes their post-education intention to found businesses. Souitaris et al. (2007) reported that as the most influential benefit of entrepreneurship program, post-education inspiration directly predicts intention along with the subjective norm that further increases the intention to found a business (Schlaegel & Koenig, 2014). Another study by Nabi, Walmsley, Liñán, Akhtar, and Neame (2018) also revealed how entrepreneurial inspiration can lead to higher EI among first-year university students. Similarly, a recent study confirmed that course-related entrepreneurial inspiration stimulates inexperienced students' aspirations to become entrepreneurs (van Ewijk et al., 2021). Furthermore, inspiration could be derived from students' participation in entrepreneurial tasks, such as enrollment in a junior enterprise, which leads to an improved EI (Daniel & Almeida, 2021). We thus propose that students' experienced entrepreneurial inspiration will boost their end-of-course intention to start a business.

Hypothesis 4. Students' experienced entrepreneurial inspiration is positively related to EI_{t2}.

Given the relationships hypothesized above, we propose the following serial mediation hypothesis to explain why students' pre-education EI (EI_{t1}) positively links to their post-education EI (EI_{t2}) through pre-education expected entrepreneurial inspiration and then post-education experienced entrepreneurial inspiration, sequentially.

Hypothesis 5. Students' expected and experienced entrepreneurial inspiration sequentially mediate the intertemporal EI linkage.

2.3. Type of course and economic conditions: the context

Entrepreneurship education refers to pedagogical programs aimed at developing entrepreneurial attitudes and skills (Fayolle, Gailly, & Lassas-Clerc, 2006). Research on the direct impacts of entrepreneurship education on EI and other learning outcomes has been inconclusive (Nowiński, Haddoud, Lančarič, Egerová, & Czeglédi, 2019) with a mixed findings of positive (Fayolle et al., 2006; Martin, McNally, & Kay, 2013; Martínez-Gregorio et al., 2021; Roman & Maxim, 2017) and negative influences (Oosterbeek, van Praag, & Ijsselstein, 2010). Nevertheless, students' entrepreneurial mindsets, e.g., their course-induced updates in self-knowledge and personal attitude towards entrepreneurship, can substantially shaped by the education programs they have received (Fretschner & Lampe, 2019; van Ewijk & Weber, 2021). We further posit that the course offerings (entrepreneurship vs. non-entrepreneurship programs) as an educational context can shape the serial mediation process underlying the intertemporal EI linkage, because of the "selection role" played by entrepreneurship education (Carpenter & Wilson, 2022; Liñán, 2004). When students select the entrepreneurship as their major and/or enrol themselves into entrepreneurship courses, they have harboured a desire, or at least, an interest to be self-employed and to learn to initiate their own businesses. This desire predisposes students to a positive attitude towards entrepreneurship (Ajzen, 2001), which, in turn, translates to higher expected and experienced inspiration, leading to stronger intentions to start a new venture compared with non-entrepreneurship students (Bae et al., 2014). Thus, we expect that the serial mediation effect through expected and experienced entrepreneurial inspiration will be stronger among students enrolled in entrepreneurship (vs. non-entrepreneurship) education courses.

Hypothesis 6. The serial mediation effect of expected and experienced inspiration on the intertemporal EI linkage is stronger among students taking entrepreneurship (vs. other) courses.

Entrepreneurship, the act of launching a new business venture (Gartner, 1988), is a regional phenomenon and highly context dependent as it is influenced by the availability of supportive infrastructures, including easy access to business enablers of financial institutions, logistics, internal and external linkages to networks, skilled workers and intellectual property protection (Hervás-Oliver & Albors-Garrigós, 2007). Based on economic situations, developed countries are more likely to have access to such conducive business infrastructure compared to developing countries. This results in more innovation-, technology-, and high growth-driven entrepreneurial start-ups in developed countries (Acs, Desai, & Hessels, 2008), providing an appealing economic, cultural and social perspective to aspiring entrepreneurship students (Chen, 2020; Jang, Hadley, Son, & Song, 2019). However, there is evidence that entrepreneurial activities generally stay at a relatively lower level in developed countries (Bosma, Acs, Autio, Coduras, & Levie, 2009, p. 5). For example, rich and developed countries, such as Finland, Norway and Japan, typically register low entrepreneurial scores (GEM, 2022). This is because individuals are less motivated to start their own businesses in developed than in developing countries. As economies become more developed, their working population finds more career opportunities in working for an established organization with a comfortable salary relative to being self-employed (Acs et al., 2008; Kuznets, 1973).

While multinational corporations create many career opportunities for students graduated from universities in developed countries, their counterparts from developing countries may find it more difficult to secure a position in large organizations facing peer competition. Thus, students in developing countries are more likely to find self-employment a viable option for them after graduation. More importantly, though some may argue that entrepreneurial priorities are mostly placed on production efficiency and cost reduction in developing and middle-income countries, there is also evidence that developing countries are increasingly moving rapidly towards knowledge-related sectors, building up innovative technology for the future (Acs, Szerb, & Autio, 2016). Institutional-based policies in efficiency-driven economies are likely to encourage entrepreneurial activities as part of strategies for economic growth and job creation, thus, creating an encouraging climate of wealth and value creation for aspiring entrepreneurs (Hessels, van Gelderen, & Thurik, 2008). Many of these programs are aspirational in nature with intention to inspire young people to consider entrepreneurship as a viable career option (Estrin, Korosteleva, & Mickiewicz, 2013; St Clair & Benjamin, 2011), which is seen as a more sustainable means to mitigate poverty (Bruton, Ketchen, & Ireland, 2013). Therefore, we posit that entrepreneurship students in developing (vs. developed) countries are more likely to be inspired to pursue entrepreneurship as a viable vocation, and, as such, more motivated to bring their experiences of inspiration in line with their expectations.

Hypothesis 7. The serial mediation effect of expected and experienced inspiration on the intertemporal EI linkage is stronger among students in developing (vs. developed) countries.

3. Methodology

3.1. Data collection

We used responses to an ex-ante ex-post survey from students attending 16 universities across nine countries: Argentina, Australia, Belgium, Finland, Kenya, Malaysia, the Netherlands, the United Arab Emirates, and the United States. In total, 580 students provided valid responses at both the beginning (T1) and the end of the semester (T2). Among them, 55.17 percent students were enrolled in an entrepreneurship course ($N = 320$), and 44.83 percent students were in other courses ($N = 260$). According to the World Economic Situation and Prospects (WESP) report (United Nations, 2023), 49.48 percent of the students were in a developed country ($N = 287$: Australia, Belgium, Finland, the Netherlands and the United States), and 50.52 percent were in a developing country ($N = 293$: Argentina, Kenya, Malaysia and the United Arab Emirates). Their average age was 24.88 years (with a median of 23) and the male vs. female ratio was 50.17 percent. Table 1 provides an overview of the demographic characteristics of the sample.

3.2. Measurement

Participants rated all items in the questionnaire using a 5-point Likert scale (1 = totally disagree, 5 = totally agree). The EI-scale consisted of seven items drawn from previous entrepreneurship studies (Krueger et al., 2000; Liñán & Chen, 2009; Obschonka, Silberstein, & Schmitt-Rodermund, 2010). Cronbach's alpha was 0.92 at T1 and 0.94 at T2. We developed two scales to measure the expected educational inspiration at T1 (Cronbach's alpha = 0.85) and experienced educational inspiration at T2 (Cronbach's alpha = 0.87). We measured this for both entrepreneurship and non-entrepreneurship students: as stated in the introduction, we could not assume that students who study non-entrepreneurship courses would not be inspired as well to start a business based on their knowledge, skills, inventions, and/or ideas acquired from the course (e.g., coding skills acquired from a computer programming

Table 1
Sample profile.

Characteristics	Categories	N	Percentage
Age	20 and below	62	10.69%
	21–25	341	58.79%
	26–30	112	19.31%
	Above 30	65	11.21%
Gender	Female	289	49.83%
	Male	291	50.17%
Course offerings	Non-entrepreneurship	260	44.83%
	Entrepreneurship	320	55.17%
Economic context	Developed country	287	49.48%
	Developing country	293	50.52%
Country	Argentina	76	13.10%
	Australia	51	8.79%
	Belgium	32	5.52%
	Finland	60	10.34%
	Kenya	67	11.55%
	Malaysia	54	9.31%
	The Netherlands	60	10.34%
	United Arab Emirates	96	16.55%
	United States	84	14.48%
Total		580	100%

course). Table 2 shows the specific items used for the constructs. Three academics reviewed the (pre and post) questionnaire to ensure that the items sufficiently captured the intended concept. Seven staff members (with university degree) and (non-participating) students with various linguistic backgrounds piloted the questionnaire to enhance its clarity and face validity for respondents who would be mostly non-native English speakers. Hypothesized moderators were operationalized using dummy variables: entrepreneurship education (other courses = 0, entrepreneurial course = 1), and economic context (developed = 0, developing = 1). Finally, we controlled for common characteristics, such as students' age and gender (female = 0, male = 1) in all analyses.

3.3. Validity test

Exploratory factor analysis (EFA) with varimax rotation revealed that the factors of EI, expected inspiration and experienced inspiration all had an eigenvalue greater than one, extracting 68.92% variance of the data. Items for different factors were clearly distinguished and items for the same factors were grouped together with loadings greater than 0.6. We further examined the goodness of the measurement model with Confirmatory factors analysis (CFA) using AMOS. The measurement model includes EI₁, expected entrepreneurial inspiration, experienced entrepreneurial inspiration, and EI₂, which demonstrated an acceptable fit (RMSEA <0.1; CFI = 0.90; TLI = 0.89). Results showed that loadings of all items were highly significant ($p < 0.001$), their composite factor reliability values were greater than 0.7 (Hair, Anderson, Tatham, & Black, 1995), and values of average variance extracted (AVE) were greater than 0.5, indicating acceptable convergent validity.

Table 3 shows the means, standard deviations (SD), correlations, and the square root of AVE of these constructs. The inter-construct correlations were less than the square root of AVE for most constructs (Fornell & Larcker, 1981), except for EI₁ whose square root of AVE was slightly smaller ($\Delta = 0.01$) than its correlation with EI₂. Given that EI₁ and EI₂ were, in fact, the same construct, the discriminant validity could be established among the factors of EI, expected inspiration and experienced inspiration.

4. Results

Hypotheses 1 to 4 were tested using structural equation modelling (SEM) in AMOS. We built and ran an SEM model by specifying all the potential causal relationships among the main constructs as latent variables, and the corresponding measurement items were placed as observable variables (RMSEA <0.1; CFI = 0.90; TLI = 0.89). Results were based on bias-corrected 95% confidence intervals (BC 95% CI) and 5000 iterations. Fig. 2 shows all the standardized direct effects among main constructs. We found that EI₁ had a positive direct effect on EI₂ ($\beta = 0.78, p < 0.001, BC\ 95\% \ CI = [0.70, 0.84]$), and its total effect was significant ($\beta = 0.86, p < 0.001, BC\ 95\% \ CI = [0.81, 0.90]$), in support of hypothesis 1. EI₁ was positively related to pre-education expected entrepreneurial inspiration ($\beta = 0.58, p < 0.001, BC\ 95\% \ CI = [0.49, 0.66]$), providing support to hypothesis 2. Pre-education expected entrepreneurial inspiration was found to significantly predict post-education experienced entrepreneurial inspiration (the self-fulfilling prophecy effect: $\beta = 0.52, p < 0.001, BC\ 95\% \ CI = [0.41, 0.62]$), lending support to hypothesis 3. Post-education experienced entrepreneurial inspiration was found to be positively associated with EI₁ ($\beta = 0.29, p < 0.001, BC\ 95\% \ CI = [0.20, 0.39]$). Thus, hypothesis 4 was also supported.

We adopted the user-defined function in AMOS to estimate the effect size of serial mediation between EI₁ and EI₂ to test hypothesis 5. Results showed that the standardized indirect effect (EI₁ → expected inspiration → experienced inspiration → EI₂) was highly significant ($\beta = 0.09, p < 0.001, BC\ 95\% \ CI = [0.05, 0.13]$), lending support to hypothesis 5.

Finally, we tested the moderated serial mediation (hypotheses 6 and 7) with SEM analysis and the results are presented in Table 4. Among students enrolled in entrepreneurship education courses, the serial mediation effect was 0.08 ($p < 0.001, BC\ 95\% \ CI = [0.04, 0.16]$), which was greater than that among students taking non-entrepreneurship courses ($\beta = 0.05, p < 0.01, BC\ 95\% \ CI = [0.02, 0.10]$). This is mainly due to a higher direct effect of experienced entrepreneurial inspiration on EI₂ among students taking entrepreneurship ($\beta = 0.33, p < 0.001, BC\ 95\% \ CI = [0.20, 0.45]$) relative to non-entrepreneurship courses ($\beta = 0.17, p < 0.01, BC\ 95\% \ CI = [0.06, 0.31]$). We then conducted further analyses using PROCESS macro (Model 89) in SPSS (Hayes, 2018) with 5000 bootstrap samples and covariates. We found a significant difference in the serial mediation effect (index of moderated mediation = 0.04, Bootstrap 95% CI = [0.0005, 0.0808]). In other words, entrepreneurship education significantly enhances the serial mediation effect,

Table 2
Item description.

Construct		Items
EI (T ₁ & T ₂)	1	My professional goal is to become an entrepreneur
	2	I prefer to be employed in an organization and not be an entrepreneur (R)
	3	Being an entrepreneur would give me great satisfaction
	4	A career as an entrepreneur is totally unattractive to me (R)
	5	I am very seriously thinking of starting my own venture or business
	6	If I had the opportunity and resources, I would love to start my own venture or business
	7	I am ready to do anything to become an entrepreneur
Expected inspiration (T ₁)	1	I expect to be inspired by this course.
	2	I expect the course will inspire me about entrepreneurship in general.
	3	I expect the course will inspire me to consider the possibility of being an entrepreneur myself.
Experienced inspiration (T ₂)	1	I was inspired by this course.
	2	The course inspired me about entrepreneurship.
	3	The course inspired me to consider the possibility of becoming an entrepreneur myself.

Table 3
Correlation results and descriptive statistics.

	Mean	S.D.	1	2	3	4	5	6	7	8
1 Age	24.88	4.99								
2 Gender	0.50	0.50	0.15***							
3 Entrepreneurship education	0.55	0.50	-0.07	0.06						
4 Economic context	0.49	0.50	0.04	0.09*	0.07					
5 EI _{t1}	3.60	0.89	0.05	0.15***	0.14***	-0.18***	0.79			
6 Expected inspiration	3.74	0.81	0.06	-0.02	0.21***	-0.14***	0.52***	0.83		
7 Experienced inspiration	3.48	0.92	0.11**	0.04	0.28***	-0.17***	0.46***	0.59***	0.84	
8 EI _{t2}	3.54	0.91	0.10*	0.18***	0.17***	-0.16***	0.80***	0.46***	0.55***	0.81

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; two tailed. The square roots of AVE are displayed along the diagonal.

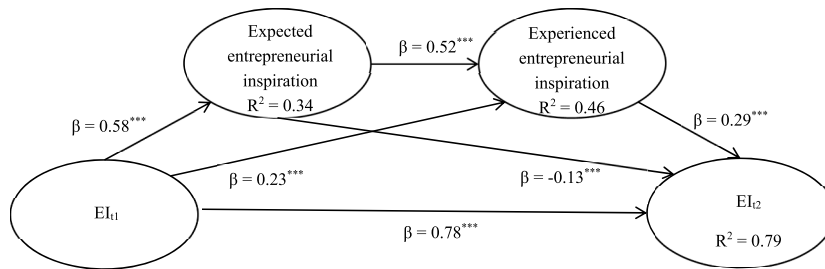


Fig. 2. Complete SEM model (used for testing hypotheses 1–4).

Table 4
Results of SEM analyses across hypothesized moderators.

Moderators	Entrepreneurship education		Economic context	
	Entrepreneurial (1) N = 320	Non-entrepreneurial (0) N = 260	Developing (1) N = 293	Developed (0) N = 287
<i>Direct effects</i>				
EI _{t1} → EI _{t2}	0.78*** [0.66, 0.88]	0.82*** [0.73, 0.89]	0.69*** [0.58, 0.79]	0.83*** [0.74, 0.91]
EI _{t1} → Expected inspiration	0.63*** [0.49, 0.74]	0.52*** [0.38, 0.63]	0.49*** [0.34, 0.61]	0.62*** [0.50, 0.72]
Expected inspiration → Experienced inspiration	0.39*** [0.20, 0.58]	0.55*** [0.40, 0.67]	0.46*** [0.27, 0.62]	0.55*** [0.40, 0.69]
Experienced inspiration → EI _{t2}	0.33*** [0.20, 0.45]	0.17** [0.06, 0.31]	0.37*** [0.24, 0.50]	0.23*** [0.09, 0.37]
<i>Serial mediation effect</i>				
EI _{t1} → Expected inspiration → Experienced inspiration → EI _{t2}	0.08*** [0.04, 0.16]	0.05** [0.02, 0.10]	0.08*** [0.04, 0.15]	0.08*** [0.03, 0.15]
<i>Total effect</i>				
EI _{t1} → EI _{t2}	0.82*** [0.75, 0.88]	0.89*** [0.84, 0.93]	0.78*** [0.69, 0.84]	0.89*** [0.84, 0.93]

Note: ** $p < 0.01$, *** $p < 0.001$; two tailed. Standardized coefficients and BC 95% CIs are presented.

lending support to hypothesis 6. Given the reduced direct effect of EI_{t1} among entrepreneurship (vs. non-entrepreneurship) students, the direct EI linkage seems playing a less salient role in explaining the formation of post-education EI in entrepreneurship courses than the serial moderation effect.

Among students in developed countries, the serial mediation effect was 0.08 ($p < 0.001$, BC 95% CI = [0.03, 0.15]), similar to the mediation effect among students in developing countries ($\beta = 0.08$, $p < 0.001$, BC 95% CI = [0.04, 0.15]). Results using PROCESS macro (Model 89) showed no significant difference in the serial mediation (index of moderated mediation = -0.00, Bootstrap 95% CI = [-0.04, 0.04]). In other words, the serial mediation effect held equally strong in either economic context: hypothesis 7 was not supported. No significant influence of gender or age on the serial mediation effect was found. Noticeably, the correlation tables did reveal that students in developed countries scored significantly lower on all variables (EI_{t1}, expected and experienced inspirations, and EI_{t2}).

5. Discussion and conclusions

With the pre-test post-test research design and data from two waves of large-scale survey, our research confirms the intertemporal link between students’ pre- and post-education EI (Bae et al., 2014) for all types of students, taking entrepreneurship or other (business) courses, at the individual level, regardless of a slight drop in the average EI at the aggregate level. In addition, our results showed that the serial mediation mechanism of the self-imposed self-fulfilling prophecy (Aronson, 1969, 2019; Cancino-Montecinos et al., 2020), a dissonance-reduction process between the expected and experienced entrepreneurial inspiration, was highly significant.

Controlling for gender and age, we finally found that the serial mediation mechanism of EI linkage is more salient in entrepreneurship (vs. other) courses. This enhanced indirect effect is accompanied with a reduced direct effect of initial EI. In contrast, the serial mediation model is unaffected by the economic context, as it was equally significant across developed and developing countries, whereby overall levels of EI were significantly lower in developed countries. What does this implicate for researchers, policymakers and instructors in management education?

First, whereas the existing literature focuses on entrepreneurial inspiration as a course-derived benefit of entrepreneurship education (e.g. [Nabi et al., 2017](#); [Nabi et al., 2018](#); [Souitaris et al., 2007](#); [van Ewijk et al., 2021](#)), the present study is the first to emphasize and explain the intertemporal EI linkage realized through the connection between expected and experienced inspiration, based on a rigorous study design ([Carpenter & Wilson, 2022](#)). Since economic context did not show any moderating effects on the effectiveness of entrepreneurship education ([Martínez-Gregorio et al., 2021](#)), we conclude that the serial mediation mechanism of EI linkage is equally strong and significant between developed and developing countries. Hence, our findings provide an initial foundation for researchers in management education to examine the impact of entrepreneurship programs in diverse geographical locations to explicitly take pre-education EI into account, as a precautionary measure to ensure the robustness of further findings, particularly if effects are related to entrepreneurial beliefs or cognitions ([Laukkanen, 2022](#)).

Second, our study presents a solid theoretical framework of dissonance reduction in a self-imposed self-fulfilling prophecy. While the theory of cognitive dissonance has been applied to explicate a wide range of human behaviours ([Aronson, 2019](#)), to our knowledge, it has not featured in the field of entrepreneurship and management education. Our findings offer initial evidence for future research to further identify how the psychological need for consistency motivates students to adjust their perceptions of course-related inspiration towards entrepreneurship. These endeavours could also include other potential contextual moderators of the serial mediation mechanism we identified, such as characteristics of course instructors, the design of course structure, and teaching methods ([van Ewijk, Oikkonen, & Belghiti-Mahut, 2020](#)). In addition, it would be interesting to assess the explanatory power of this new theoretical framework compared to the dominant theoretical underpinnings (e.g., theory of planned behaviour) used in prior research on drivers of EI (e.g., [Lechuga Sancho, Martín-Navarro, & Ramos-Rodríguez, 2020](#); [Neneh, 2022](#)).

Third, we call for policymakers and entrepreneurship educators to recognize that there are limits in increasing graduates' entrepreneurial willingness through education, just as there are barriers to converting intentions into actions, such as fear of failure ([Ahmed et al., 2020](#)). Certain educational approaches, such as action learning ([Byrne, Delmar, Fayolle, & Lamine, 2016](#)), or other supportive measures, such as facilitating student-led entrepreneurship associations or junior enterprises to complement formal education ([Almeida, Daniel, & Figueiredo, 2021](#); [Sansone, Ughetto, & Landoni, 2021](#)), have been shown to stimulate EI to a certain extent. However, we found a strong intertemporal EI linkage across all contexts as well as overall lower EI in developed countries. These findings highlight the necessity of more realistic expectations and goal setting by educators and policy makers, which may attenuate disappointment and demotivation in the process. This can be done by setting achievable goals and benchmarks, promoting a broader understanding of entrepreneurship beyond merely business creation, and fostering a supportive ecosystem that encourages experimentation and learning instead of promoting an entrepreneurial career.

Fourth, the upside of the serial mediation mechanism is that students who are already interested in entrepreneurship (i.e., high-EI individuals) will likely find ways to experience inspiration regardless of what happens. Their psychological need for consistency motivates them to adjust their perception of course-related entrepreneurial inspiration. Unfortunate events, such as cancelled guest speakers or excursions that would increase inspiration ([Ahmed et al., 2020](#)) – or a forced switch to online teaching which tend to diminish student engagement ([Knox, 2022](#)) – are plausibly less detrimental to students' post-course entrepreneurial intentions than expected by the course educator. Our findings indicate that this is particularly applicable to students in entrepreneurship courses. Likely, post-education EI could be even higher if these courses are elective or extracurricular, as these are generally related to greater initial intentions ([Martínez-Gregorio et al., 2021](#)). This is possibly because students enrolled in these courses have a pre-developed entrepreneurial self-identify ([Liñán, et al., 2018](#)).

Finally, this study has limitations that open avenues for future research. First, prior studies have researched multiple antecedents that shape the formation of EI in the higher education setting, such as self-efficacy ([Neneh, 2022](#)), attitude ([Lechuga Sancho et al., 2020](#)) and educational characteristics, including type of course instructors, course duration or teaching methods ([van Ewijk et al., 2020](#)). In addition, there are indications that study background matters: Due to previous experiences in related disciplines, students in business courses may possess distinct characteristics and intentions compared to those in other disciplines, such as engineering, social sciences, or life sciences. Learning experiences may then affect these students differently, as was found by [Daniel and Almeida \(2021\)](#) for extracurricular entrepreneurial activity. A discussion and empirical exploration of these differences and their potential impact would contribute to a more comprehensive understanding of the findings and their generalizability. Future research is therefore encouraged to explore the relative saliency between the inspirational serial mediation mechanism and other potential antecedents in determining graduates' intention to start a business. Second, our study focuses solely on students' EIs, albeit from an original angle. However, we concur with [Ahmed et al. \(2020\)](#) and [Lechuga Sancho, Ramos-Rodríguez, and Frende Vega \(2022\)](#), that it does not end with intentions as real impacts require actual entrepreneurial behaviours. As the path towards translating intentions into entrepreneurial behaviours is paved with challenges ([Ahmed et al., 2020](#)), more research on what facilitates and hinders the intention-to-behaviour conversion remains highly relevant in the context of business education.

Credit roles

Anne Rienke van Ewijk: Project administration; Writing – original draft; Writing – review & editing; Investigation; Data curation; Resources. Junjun Cheng: Conceptualization; Writing – original draft; Writing -review & editing; Methodology; Formal analysis;

Funding acquisition. Frances Y.M. Chang: Writing – review & editing; Investigation; Data curation; Resources.

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Data availability

Data will be made available on request.

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