TEACHING EFFECTIVENESS IN ENTREPRENEURSHIP EDUCATION

Characteristics of the Student, Course, and Program

Maike Liu
INVITATION

You are cordially invited to the public defence of my PhD thesis

Teaching Effectiveness in Entrepreneurship Education

Wednesday, November 23, 2022
13:00

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Teaching Effectiveness in Entrepreneurship Education: Characteristics of the Student, Course, and Program

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1. To cultivate future entrepreneurs, we need to understand the cognitive, affective, and behavioral processes that underlie the formation of entrepreneurial self-efficacy and intentions. (This dissertation)

2. Person-environment fit and regulatory fit are essential for effective entrepreneurship support and education. (This dissertation)

3. By influencing students’ well-being, both promotion focus and prevention focus can be relevant to students’ entrepreneurial career choices (This dissertation)

4. When following an experiential entrepreneurship program, supportive resources are more important than challenges for predicting study engagement. (This dissertation)

5. Understanding and motivating students’ feedback seeking behavior is important for the success of a lean startup-based entrepreneurship educational program. (This dissertation)

6. Failure is an important part of lifelong learning, because it allows us to grow.

7. Education offers students the unique opportunity to find out who they want to be and gives them the confidence they need to get there.

8. If you want a year of prosperity, grow grain. If you want 10 years of prosperity, grow trees. If you want 100 years of prosperity, grow people. (Chinese proverb)

9. Taking responsibilities creates trust and dependability in intimate relationships.

10. Happiness can be found, even in the darkest of times, if one remembers to turn on the light. (Albus Dumbledore)

11. Our culture shapes who we are and then who we are shapes our culture.
Teaching Effectiveness in Entrepreneurship Education:

Characteristics of the Student, Course, and Program

Maike Liu
This landscape of “mountains” and “valleys” speckled with glittering stars, called the Cosmic Cliffs, looking like craggy mountains on a moonlit evening, is the edge of a nearby, young, star-forming region called NGC 3324 in the Carina Nebula. Captured in infrared light by NASA’s James Webb Space Telescope, this image reveals for the first time the areas of star birth that are completely hidden in visible-light pictures.

A new starter may be too doubtful to see their lights, just like those newborn stars, hidden behind the dust and darkness. Brighter eyes with a longer wavelength are brought to us, to unveil the potential, to inspire a vision, to find a pathway. No matter how far or deep, your ideas, your lights, will eventually begin to grow, shine, and light up the sky.
Teaching Effectiveness in Entrepreneurship Education:  
Characteristics of the Student, Course, and Program

Effectiviteit van ondernemerschapsonderwijs:  
Kenmerken van de student, de cursus en het programma

Thesis

to obtain the degree of Doctor from the
Erasmus University Rotterdam
by command of the
rector magnificus

Prof.dr. A.L. Bredenoord

and in accordance with the decision of the Doctorate Board.

The public defence shall be held on
Wednesday 23 November 2022 at 13.00 hrs

by

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Chapter 1
General Introduction
"The best way to predict the future is to create it."

Peter F. Drucker

The quote above is credited to Peter Ferdinand Drucker, a management consultant, educator, and author known for his achievements in management theory and practice. Rather than trying to predict the future, the best way to know what comes next is to be an active participant and advance the future through innovation and change. Nowadays, youth employment has been severely affected by the global pandemic. The access to the labor market is difficult for youth, and entrepreneurship is an important alternative (Zhang & Huang, 2021). By knowing what youth wants, and by being willing to do what it takes to get what they want, youth can create their own future through entrepreneurship, that is, through creating their own business instead of being employed.

Entrepreneurship is essential as it creates value for society, brings innovation to the market, increases economic growth, creates new jobs, and sustains employment levels (Zhao et al., 2005). Hence, preparing today's young students for successful venture creation in the global marketplace is one of the most important responsibilities in higher education (Sowmya et al., 2010). As important tools to cultivate future entrepreneurs, entrepreneurship support and education should be available to provide all students with opportunities to explore their entrepreneurial potential. Since the first entrepreneurship course was given in 1947 at Harvard University, the number of university institutions throughout the world offering entrepreneurship courses and programs at different levels has increased rapidly (Daniel, 2016). The number of students enrolled in entrepreneurship education courses and programs has also been growing steadily. Despite the importance of entrepreneurship to modern economies and the growing emphasis on entrepreneurship education, debates about the effective teaching approaches continue to arise, raising the question of how to teach entrepreneurship effectively.

Regarding the benefits which entrepreneurship education can have for students, there are a number of insights from previous research, including the positive impact of entrepreneurship education on entrepreneurial self-efficacy (for a review see, Newman et al., 2019), positive attitudes toward being an entrepreneur (e.g., Ahmed et al., 2020), entrepreneurial competence (e.g., Lv et al., 2021), and entrepreneurial intentions (e.g., Iwu et al., 2021). Among them, the most common entrepreneurship outcomes studied are entrepreneurial self-efficacy and entrepreneurial intentions (Nabi et al., 2017). Entrepreneurial self-efficacy refers to students' belief in their ability to successfully perform entrepreneurial roles and tasks (Zhao et al., 2005). Entrepreneurial intentions are defined as the conscious state of mind that
Chapter 1 | General Introduction

precedes action and directs attention toward a specific goal such as being an entrepreneur or starting a new business (Esfandiar et al., 2019; Moriano et al., 2012). Entrepreneurial self-efficacy and entrepreneurial intentions have been extensively used by researchers as indicators of the effectiveness of entrepreneurship education (Bandera et al., 2018), as well as being the critical target outcomes of entrepreneurship educational courses and programs.

To better explain how entrepreneurship education can be beneficial for students, this dissertation will provide answers to new questions that existing research has not yet thoroughly addressed, which will extend previous research and provide valuable new insights into the effectiveness of entrepreneurship education. First of all, what are the effective entrepreneurship education characteristics within higher education? Second, what are the explanatory mechanisms between entrepreneurship education and entrepreneurship outcomes for students? Third, if students are expected to benefit from entrepreneurship education and develop positive entrepreneurship outcomes, do different types of students benefit differently and if so, how? With these questions in mind, this dissertation sets out to increase our understanding of evaluating and improving entrepreneurship support and education.

In the next section, a brief overview is given of the current literature. Attention is drawn to current research gaps and limitations in the literature, and how these issues will be addressed in this dissertation. Thereafter, several established theoretical perspectives are presented. Building on the core principles and propositions of these theoretical perspectives, an overall theoretical framework is introduced to explain the potential mechanisms of how entrepreneurship support and education foster students’ entrepreneurship outcomes, as well as how students benefit from such support and education differently. To address the proposed hypotheses in the framework, survey data were collected and analyzed, the results of which will be presented in Chapters 2 to 5.

Entrepreneurship Education Characteristics

In this dissertation, we will first address the lack of studies on effective entrepreneurship education characteristics and answer the research question of what the characteristics of effective entrepreneurship education within higher education are.

Despite the increasing number of entrepreneurship courses and programs, student entrepreneurship figures remain low, and the entrepreneurial ambitions of many students are hindered by inadequate preparation (Reyes, 2016). Therefore, it remains of utmost importance that universities position themselves as the seedbeds of students' new ventures by nurturing a supportive environment for entrepreneurship and contributing substantially to social economics (Saeed et al., 2015). Given the increasing concern with university support for
student entrepreneurship (Yang et al., 2021), the role of university support is still in dispute (Davey et al., 2016).

Besides teaching students entrepreneurship knowledge and skills, universities can support student entrepreneurship in many ways. For example, universities can provide students with more target and specific support for starting a business, such as the provision of entrepreneurial awareness, motivation, and business ideas at the early stages of the entrepreneurship process, as well as the financial support to start up a firm. Although what universities are doing to support entrepreneurship can be measured objectively, in order to understand the extent of such support and its impact on students, it is crucial to measure students’ perceived university support, which is their perception of the support received from the university.

Effective entrepreneurship support and education provided by universities are considered efficient ways of obtaining the necessary knowledge and skills and motivating students to pursue an entrepreneurial career (Saeed et al., 2015). Stimulating student entrepreneurship is increasingly recognized as a part of the university’s role and future strategies (Guerrero et al., 2018). Indeed, a growing number of studies have reported a positive relationship between entrepreneurship education and student start-up intentions. However, results regarding the impact on entrepreneurial intentions are mixed (Hahn et al., 2020). In addition, even though our understanding of whether participation in entrepreneurship education fosters entrepreneurship outcomes for students has substantially increased, to date, little is known about the impact that various defined entrepreneurship education course/program characteristics may have (Yang et al., 2021).

Therefore, it is essential to answer the question of how specific characteristics of an entrepreneurship course/program influence the entrepreneurship outcomes of students. In this dissertation, entrepreneurship education refers to entrepreneurship courses and programs that aim to increase university students’ knowledge and skills required for discovering business opportunities, carrying out entrepreneurial activities, analyzing and understanding the business market; foster students’ entrepreneurial self-efficacy and encourage more students to start their own business in the near future. Within the context of an entrepreneurship course, these aims can be achieved using appropriate teaching strategies and supportive interpersonal relationships (Mayhew et al., 2012). Therefore, this dissertation will focus more on the principles and practices of good teaching and clarify the effective course characteristics from the way teachers deliver a course.

An entrepreneurship program is broader than a course, including various theoretical and practical training modules (Souitaris et al., 2007). Experiential entrepreneurship programs expose students to a real-life entrepreneurship context and provide learning-by-doing
experiences (Harms, 2015). A widely adopted example of experiential learning is to apply the lean startup method (Ries, 2011) and principles of customer development (Blank & Dorf, 2012) to iterate a business idea into a successful startup. “Get out of the building” is always an important practical module in experiential learning programs, during which students are stimulated to ask for feedback from customers and iterate the initial idea into a viable and scalable business model.

Similar to the actual work setting of entrepreneurs, students work toward specific goals such as completing tasks, doing projects and passing exams, and their core activities can be considered as “work” (Siu et al., 2021). Especially within experiential entrepreneurship programs, the analogy with the work situation is apparent, because the program reflects a setting that is modeled closely to what “real” entrepreneurs need to know and do to iterate business ideas into startups (Shepherd & Gruber, 2021). Therefore, to obtain more insight into the impact of entrepreneurship education characteristics, we can learn from the research in the field of work and organizational psychology. For instance, the job demands-resources theory (Bakker & Demerouti, 2008) might provide valuable insights, since the theory considers that job characteristics consist of resources and demands. In this way, educational program characteristics can also be classified into resources and demands (Gu et al., 2018).

**Entrepreneurship Education and Student Outcomes**

There is only limited empirical evidence on the potential mechanisms between the entrepreneurship support provided by universities and the development of entrepreneurial intentions among students (e.g., Saeed et al., 2015). Studies on the indirect effects of entrepreneurship education on students’ entrepreneurial intentions are also absent (Eesley et al., 2021) and our understanding remains limited as concerns the mechanisms through which entrepreneurship support and education may have their impacts. Therefore, the next research question of *what the explanatory mechanisms are of the relationship between entrepreneurship education and entrepreneurship outcomes for students will be answered in this dissertation.*

While previous studies contribute to our understanding of entrepreneurship education, broader theoretical underpinnings for the process between entrepreneurship education and student entrepreneurship outcomes are needed to further this understanding (Carpenter & Wilson, 2022). Martínez-Gregorio et al. (2021) recommended that future research should seek to fill the research gap concerning the potential mechanisms through which entrepreneurship education impacts the entrepreneurship outcomes of students. In the context of entrepreneurship support and education, many theoretical perspectives may be of particular interest, such as the theory of planned behavior (Ajzen, 1991), “cold” and “hot” pathways (e.g., Scott et al., 2014; Simon et al., 2015), job demands-resources theory (Bakker & Demerouti,
and the feedback seeking model (e.g., Anseel et al., 2016; Ashford & Cummings, 1983), as they articulate the explanatory mechanisms that foster entrepreneurship outcomes of students. These theoretical perspectives are introduced below, as well as how they have been used in the literature before and how we will apply them in the entrepreneurship support and education context.

**Theory of Planned Behavior**

The theory of planned behavior (TPB; Ajzen, 1991) focuses on individual intentions to perform any given action. According to the TPB, behavioral intentions are determined by three conceptual and independent constructs, namely attitudes toward behavior, subjective norms, and perceived behavioral control. Attitudes toward behavior refer to the overall evaluations of a behavior, such as starting a business. Attitudes toward behavior are influenced by a set of accessible behavioral beliefs linking the behavior to various outcomes. Subjective norms are an individual’s perceptions of whether important people in their lives think they should engage or not in a particular behavior, such as being an entrepreneur. Subjective norms consist of two components: normative beliefs and motivation to comply. The third TPB component, perceived behavioral control, refers to people’s perception of their ability to perform a given task, which is very similar to the concept of domain-specific self-efficacy (see Bandura, 1982). Both perceived behavioral control and self-efficacy concern the perceived ability to perform a specific task, which in this dissertation is starting a new business.

In many studies aimed at predicting students’ entrepreneurial intentions, scholars have included entrepreneurial self-efficacy instead of perceived behavioral control as a predictor (e.g., Feola et al., 2019; Gorgievski et al., 2018). While there have been a number of studies on entrepreneurial intentions that have applied the TPB to university student samples, little attention has been paid to the role of environmental conditions as predictors of attitudes, subjective norms, entrepreneurial self-efficacy and intentions (Lortie & Castogiovanni, 2015). In this dissertation, the role of university support for entrepreneurship in shaping positive attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy for students will be investigated. These three motives proposed in the TPB in turn are expected to foster students’ entrepreneurial intentions.

**“Cold” and “Hot” Pathways**

Within the context of an entrepreneurship course, course characteristics can be expected to influence entrepreneurial intentions through different pathways (Mueller, 2011) and previous studies largely describe these pathways in terms of the “cold” cognitive process, such as entrepreneurial self-efficacy. Social cognitive theory (SCT; Bandura, 1986) posits that being exposed to learning within a particular environment shapes personal cognitive
processes and beliefs in one’s own capacity (Zhao et al., 2005). According to the proposition of SCT, an individual’s sense of self-efficacy can be influenced through enactive mastery, role modelling and vicarious experience, social persuasion, as well as psychological and mood states. Therefore, various pedagogical practices used in the entrepreneurship course can be expected to positively relate to students’ beliefs in their ability to successfully perform entrepreneurial tasks (self-efficacy), which, in turn, foster their intentions to start a business.

SCT focuses mainly on cognitive processes free of affect. Affect related, or the so-called “hot” affective processes rarely enter the picture (Healey et al., 2017). Both “cold” cognitive and “hot” affective motives function together to predict educational outcomes (Simon et al., 2015). “Cold” motives are more cognitive and remediated in nature, while “hot” motives refer to the state of affect and emotion, and are more impulsive (Scott et al., 2014). Despite its importance in entrepreneurship education, student affect remains an under-researched phenomenon and little empirical research focuses on affective processes (Nabi et al., 2017). Hence, to advance our knowledge of affective motives, we will not only investigate the “cold” cognitive processes (entrepreneurial self-efficacy) in the relationship between entrepreneurship education and entrepreneurial intentions for students, but also the “hot” affective (study engagement) processes.

**Job-Demands Resources Theory**

Student well-being is also an essential topic in educational research due to its association with academic success and future career choices of students (Navarro et al., 2019; Pap et al., 2021). However, to date, little is known about how entrepreneurship education programs may relate to student well-being and entrepreneurial (career) intentions. To shed more light on the explanatory role of study engagement as a wellbeing indicator, we build on the job demands-resources theory (JD-R; Bakker & Demerouti, 2008), which has been predominantly used in organizational research.

JD-R theory postulates that work environments can be described in terms of job characteristics, which can be divided into job resources and demands (Bakker & Demerouti, 2008). Resources refer to those aspects of the job that are functional in stimulating well-being (e.g., engagement), whereas the impact of job demands on well-being depends on the nature of the demands (Bakker & Demerouti, 2017). Challenge demands refer to the aspects of the job that may cost effort but potentially promote personal learning and goal achievement, whereas hindrance demands may require effort and energy and negatively associate with well-being. Thus, challenge demands can function as fostering goals that stimulate well-being. Hindrance demands, which involve excessive or undesirable constraints that interfere with or inhibit goal achievement, fall outside the scope of this dissertation. JD-R theory further contents that these resources and challenge demands promote employee well-being,
which in turn, has a positive impact on performance (Bakker & Demerouti, 2017).

Recently, more and more studies have applied JD-R theory in educational research and the value of JD-R theory for educational research is increasingly acknowledged (e.g., Pap et al., 2021; Siu et al., 2014, 2021). As said before, within the study environment of experiential entrepreneurship programs, program characteristics can also be divided into resources and (challenge) demands that help students achieve their goals and stimulate learning. In this way, students engage in their studies and have all the energy and enthusiasm to perform well. Since well-being and motivation can be considered as essential determinants of individuals’ career choices (e.g., Agarwal & Gupta, 2018), student well-being is expected to predict their entrepreneurial career intentions over time. Therefore, in this dissertation, we use student well-being (study engagement) as the explanatory mechanism to investigate how program resources and challenge demands may relate to the entrepreneurial (career) intentions of students.

**Feedback Seeking Model**

In addition to the motivational mechanisms discussed above, studies on the behavioral mechanisms are absent, and our understanding of the behavioral process between entrepreneurship education programs and entrepreneurship outcomes of students remains limited. Yet, such understanding is necessary to further explain why and when entrepreneurship education is most likely to yield benefits for students. In this regard, feedback seeking behavior can be considered an important behavioral mechanism through which individual and environmental factors may impact individual outcomes (Shemueli et al., 2020).

Since the concept was introduced in 1983 by Ashford and Cummings, research attention for feedback seeking behavior has grown steadily (Sherf et al., 2020). Feedback seeking behavior is defined as the conscious devotion of effort towards determining the correctness and adequacy of an individual’s behaviors for attaining valued goals (Ashford & Cummings, 1983). In the field of work and organizational literature, a large number of antecedents and outcomes of feedback seeking behavior have been proposed and examined in various empirical studies. According to models of feedback seeking, when deciding whether to seek feedback or not, individuals make a conscious assessment of the value of feedback and the accompanied cost of seeking feedback (e.g., Anseel et al., 2015). Besides the cost-value framework, the relational context (e.g., leader-member exchange, coworker relationships) in which feedback seeking takes place also has a significant impact on the feedback seeking process (Ashford et al., 2016). By conceptualizing feedback seeking as a proactive behavior, individuals who seek feedback should show more control of their work and a sense of self-efficacy, as well as obtain higher performance (Parker et al., 2016).
Within the experiential learning context in entrepreneurship programs, customer development is an essential part of the lean startup method (Blank, 2013), during which students actively meet, talk to, and ask for feedback from customers to develop their minimal viable product into a scalable business model. In essence, the lean startup method emphasizes the process of seeking feedback from customers (Shepherd & Gruber, 2021). Hence, it is important to understand the crucial role of students’ feedback seeking behavior as the behavioral mechanism between experiential entrepreneurship programs and entrepreneurship outcomes for students.

In experiential entrepreneurship programs, students’ feedback seeking behavior refers to the frequency of seeking feedback from potential customers about the development of their business model. Feedback seeking behavior has been identified as a valuable resource to stimulate student adaptation, learning, and performance (Leenknecht et al., 2019). Despite its popularity in lean startup-based entrepreneurship programs, empirical studies on student feedback seeking behavior are scarce. Therefore, we learn from feedback seeking models in the work and organizational literature to investigate the role of student feedback seeking, a proactive behavior, as the behavioral explanation between entrepreneurship program characteristics and entrepreneurial self-efficacy of students.

To summarize, given that studies addressing the potential mechanisms between entrepreneurship support and education and entrepreneurship outcomes of students are lacking, and in response to the call from scholars that more studies should explore such mechanisms to fill in the gap in entrepreneurship education literature, in this dissertation we will explore whether and how the motivational and behavioral constructs of established theoretical perspectives can help explain the mechanisms among entrepreneurship education characteristics and entrepreneurship outcomes of students.

**Student Individual Differences**

If students are expected to benefit from entrepreneurship education and develop positive entrepreneurship outcomes, do different types of students benefit differently and if so, how? To address this question and investigate the moderating role of student individual differences, we build on the person-environment (PE) fit theory (Kristof-Brown et al., 2005) and regulatory focus theory (Higgins, 1998, 2000).

Research on PE fit suggests that attitudinal outcomes result from the fit between environmental characteristics and individuals’ attributes (e.g., Kristof-Brown et al., 2005). Needs-supplies and demands-abilities fit are the two most commonly accepted content dimensions of PE fit. The needs-supplies fit is the extent to which the provision from the external environment fits the needs of an individual. The demands-abilities fit refers to fit
between the demands from the external environment and an individual’s abilities. Because the strength of various intrinsic needs, such as the need for autonomy, need for achievement, and need for affiliation, are drivers of motivating attitudes and behavior (Ryan & Deci, 2017) and the fulfillment of these needs is central to enhancing motivation (Deci & Ryan, 2002), this dissertation will focus on the needs-supplies dimension of PE fit.

Autonomy is one of the most relevant and frequently stated motives for entrepreneurship (Al-Jubari et al., 2017; Baluku et al., 2019). Individuals with a higher need for autonomy tend to make decisions more independently, engage deeper in processing information, as well as show more willpower and persistence in activities as compared to individuals with a lower need for autonomy (Chen et al., 2021). Thus, the university support for entrepreneurship may play a much bigger role in the development of positive entrepreneurial perceptions for students with a higher need for autonomy, presumably because they are self-selected into the entrepreneurial activities and optimize the provisions by their university, since these are relevant to their interests and goals. The association between autonomy and entrepreneurship has been empirically supported (e.g., Al-Jubari et al., 2017). However, the role of the need for autonomy as a moderator of the relationships between university support and student entrepreneurship perceptions has not been widely investigated.

Next to need for autonomy, there are two more needs, namely need for achievement and need for affiliation, that can be considered as important personal needs to students interested in entrepreneurship (Decker et al., 2012) and are relevant to students’ motivation and academic performance (Bipp et al., 2014). Students bring a variety of learning needs into the classroom (Ilonen, 2021). They may exhibit a need for achievement (Bartels & Magun-Jackson, 2009) or a desire for enhancing interpersonal relationships (Klein & Schnackenberg, 2000). Need for achievement refers to the desire for high performance goals and the need to excel past performance; need for affiliation refers to the need to develop interactions with others and a desire for approval from others (McClelland, 1961). Need for achievement and affiliation are essential entrepreneurial motives and personal needs (Hayton et al., 2002) and likewise, students may differ in their need for achievement and need for affiliation separately. Yet no studies to date have addressed the moderating role of need for achievement and need for affiliation in the relationship between entrepreneurship course characteristics and student outcomes.

Another theory that could explain individual differences is the regulatory focus theory. Individuals with high promotion focus strive to fulfil their goals and aspirations and are concerned with positive outcomes; whereas high prevention focused individuals are concerned with fulfilling their responsibilities and tend to avoid failure (Higgins, 1998). Regulatory focus theory suggests that the congruence (fit) between environmental factors and regulatory focus stimulates the motivational process (Higgins, 2000). For instance,
Brenninkmeijer et al. (2010) introduced the moderating role of regulatory focus in the job demands-resources model and showed that regulatory focus is important in explaining individual responses to job demands and resources. Similarly, Hu et al. (2018) proposed that the impact of regulatory focus is bounded by the environment and found that the interaction between regulatory focus and environmental turbulence related to entrepreneur improvisation.

Hence, within experiential entrepreneurship programs, we anticipate that students with a high promotion focus are particularly alert to program characteristics that are relevant to their pursuit of entrepreneurship process and tend to be highly motivated and persistent on entrepreneurial tasks; whereas high prevention focused students strive for security and avoid changeable situations and these conservative inclinations may buffer the impact of entrepreneurship program characteristics. However, existing literature has not fully documented the moderating role of individual differences, such as regulatory focus, in the relationship between entrepreneurship education and student outcomes. Regulatory focus, as an important self-regulating aspect, has also been applied to explain student engagement in their studies (e.g., Liu et al., 2020). Promotion focus may positively relate to study engagement because of the approach to positive emotions and outcomes; whereas prevention focus negatively relates to study engagement because of the tendency to avoid loss and failure. To further clarify the role of individual differences, we will also examine the impact of promotion focus and prevention focus on the motivation and well-being (e.g., study engagement) of students in this dissertation.

To summarize, attention for the effective teaching approaches continues to arise, raising the question of “how to teach entrepreneurship more effectively?” (Bell, 2022; Liu et al., 2021). To better address this question, three research questions are raised in this dissertation and will be answered in the different chapters included in this dissertation. Figure 1 displays the complete theorized framework of this dissertation as well as an overview of which variables and theoretical perspectives have been used in which chapters to examine the presented research questions that they are connected to.
Figure 1. A theorized framework of studies

Note: The black bold box indicates the first research question about the characteristics of effective entrepreneurship education. The text boxes with dotted borders provide an overview of entrepreneurship education characteristics included in each chapter. The red bold box provides an overview of the explanatory mechanisms of the relationship between entrepreneurship education and entrepreneurship outcomes for students; and the green bold box indicates the individual differences of students.
Methodological Considerations

In this dissertation, we focus on students in higher education institutions, especially students who enrolled in an entrepreneurship course or entrepreneurship program. To answer the presented research questions, a varied range of statistical methods were employed. Cross-sectional data were collected among university students (Chapter 2), pre-test and post-test data were collected at the beginning and the end of an entrepreneurship course (Chapter 3), and longitudinal data were collected at different points in time during an entrepreneurship program (Chapter 4 and Chapter 5).

The pre-test and post-test design (Dugard & Todman, 1995) used in this dissertation aimed to investigate the effect of entrepreneurship courses. A comparison between pre-test and post-test scores on students’ entrepreneurial intentions, with pre-test scores on entrepreneurial intentions as co-variate, provides a more appropriate and informative analysis and will indicate whether after participation in the entrepreneurship course, students’ entrepreneurial intentions have increased or not. Longitudinal data provide insights into causal mechanisms and processes, which are important for understanding the impact of entrepreneurship programs over the different phases of the program. In the longitudinal study, the data could potentially have a nested structure, because students work on their business models in teams or individually during the entrepreneurship program. We first checked if there is a multi-level structure of data before performing data analysis. Data were analyzed in R (Lavaan package, R Core team, 2015) applying Structural Equation Modelling (SEM). SEM is appropriate as it allowed us to estimate a series of separate but interdependent multiple regression equations (including indirect effects) simultaneously and, thus, permits modelling more complex models than traditional regression analyses (Bagozzi & Yi, 2012).

Research Aims and Questions

To summarize, the research aims of this dissertation can be captured in three research questions that will be answered throughout the different chapters (Chapter 2 – Chapter 5).

Research Question 1: What are the characteristics of effective entrepreneurship education within higher education?

Although some studies proposed and investigated the impact of entrepreneurship education characteristics (e.g., Mayhew et al., 2012; Mueller, 2011), up-to-date literature is lacking, hampering the further understanding of the effectiveness of university support for entrepreneurship and specific characteristics of entrepreneurship education courses and programs. To answer this question, Chapter 2 presents the importance of entrepreneurship support provided by universities and investigates the effectiveness of such support. From the
teaching perspective, Chapter 3 centers on the impact of a challenging learning environment and supportive teacher-student relationships within the context of an entrepreneurship course. Chapter 4 applies the job-demands resources theory in experiential entrepreneurship programs and investigates the impact of program resources (teacher-student and student-student relationships) and challenge demands (challenging learning environment). Chapter 5 builds on feedback seeking models and addresses the role of student social capital (teacher-student and student-student relationships) and cost-value perceptions (cost of feedback seeking and perceived value of received feedback) within a lean startup-based entrepreneurship program.

**Research Question 2: What are the explanatory mechanisms of the relationship between entrepreneurship education and entrepreneurship outcomes for students?**

The second objective of the current series of studies is to provide insights into the potential mechanisms between entrepreneurship support and education and entrepreneurship outcomes for students. All studies in this dissertation adopt various theoretical perspectives to answer this question. For instance, Chapter 2 draws upon the theory of planned behavior to investigate the mechanism through which students’ perceptions of university support are related to their entrepreneurial intentions. Chapter 3 centers on the role of both “cold” cognitive (i.e., entrepreneurial self-efficacy) and “hot” affective (i.e., study engagement) as the potential process through which a challenging learning environment and supportive teacher-student relationships stimulate entrepreneurial intentions of students. Following the propositions in job-demands resources theory, Chapter 4 explores the longitudinal relationship between entrepreneurship program resources and challenge demands, student well-being (study engagement), and students’ entrepreneurial (career) intentions. To obtain more insights into this research question, in Chapter 5, we also learn from research in the field of work and organization and investigate feedback seeking behavior (Anseel et al., 2015, 2016) as the behavioral process of how cost-value perceptions and social capital relate to entrepreneurial self-efficacy of students.

**Research Question 3: If students are expected to benefit from entrepreneurship education and develop positive entrepreneurship outcomes, do different types of students benefit differently and if so, how?**

The third, and final objective of this dissertation is to increase our understanding of whether and how different types of students benefit from entrepreneurship support and education differently. Chapter 2 and Chapter 3 draw on the person-environment fit theory to answer this question. Especially, Chapter 2 investigates how the need for autonomy boosts the relationships between perceived university support and attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy. Chapter 3 proposes that a challenging
learning environment and teacher-student relationships may have differential effects on entrepreneurial self-efficacy and study engagement, depending on the degree of students’ need for achievement and need for affiliation separately. Building on regulatory focus theory, Chapter 4 examines how regulatory focus explains students’ different responses to entrepreneurship program resources and challenge demands, and how two types of regulatory focus relate to study engagement differently.

**General Discussion**

The results of the studies described in Chapters 2 to 5 are summarized and discussed in Chapter 6. This final chapter reflects on the main findings of each chapter guided by the presented research questions. In addition, the limitations of the studies are discussed as well as the suggestions for future research. Chapter 6 concludes with the practical implications and an overall conclusion of this dissertation.
Regardless of whether students actually start a business or not, the university offers them the opportunity to find out if there is an entrepreneur in them.
Chapter 2

Perceived University Support and Entrepreneurial Intentions: Do Different Students Benefit Differently?

This Chapter is published as:
Abstract

The question of how universities can most effectively contribute to student entrepreneurship remains important. Integrating theory of planned behavior and person-environment fit theory, we investigated how perceived university support relates to students’ attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy, which in turn impact entrepreneurial intentions. Moreover, moderating effects were investigated of the need for autonomy. Data were collected among 395 Chinese students. Results showed that perceived university support related indirectly to students’ entrepreneurial intentions through subjective norms and entrepreneurial self-efficacy. Though perceived university support significantly related to attitudes toward entrepreneurship, attitudes toward entrepreneurship did not significantly predict entrepreneurial intentions. As expected, the higher students’ need for autonomy, the stronger were the positive effects of perceived university support on attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy. Taking students’ needs differences into account, this study provides valuable new insights to evaluate the effectiveness of current university support practices and policies.
Introduction

Despite the importance of entrepreneurship to economic growth and the development of modern society, the role universities play in stimulating entrepreneurship is still in dispute and questions remain as to how universities can most effectively contribute to student entrepreneurship (Davey et al., 2016). Furthermore, despite the interest in entrepreneurship education effectiveness (Liu et al., 2021) and given the increasing concern with university support and student entrepreneurship (Yang et al., 2021), relatively little is known about the mechanisms through which university support promotes student entrepreneurial intentions (Walter et al., 2006). Previous research has also indicated that university efforts toward entrepreneurship support might not have a direct impact on students’ entrepreneurial intentions (Wegner et al., 2019). There is only limited empirical evidence on the mechanisms between entrepreneurship support provided by universities and the development of students’ entrepreneurial intentions (e.g., Saeed et al., 2015).

In this study, we draw upon the theory of planned behavior (TPB; Ajzen, 1991) to investigate the mechanism through which students’ perceptions of university support are related to their entrepreneurial intentions. According to the TPB, entrepreneurial intentions are influenced through three motivational factors that comprise positive attitudes toward entrepreneurship, subjective norms, and perceived behavioral control. Perceived behavioral control refers to people’s perceptions of their ability to perform a given task, which is very similar to the concept of domain specific self-efficacy (see Bandura, 1982). Both concepts concern the perceived ability to perform a specific task, which in this study is starting a new business. In their review of the TPB, Armitage and Conner (2001) indicated that self-efficacy is a more clearly defined concept, which is also more strongly related with intentions than perceived behavioral control. Hence, in many studies aimed at predicting students’ entrepreneurial intentions, scholars have included entrepreneurial self-efficacy rather than perceived behavioral control as a predictor (e.g., Feola et al., 2019; Gorgievski et al., 2018; Moriano et al., 2012). We follow this line of research and focus on entrepreneurial self-efficacy instead of perceived behavioral control. While there have been a number of studies on entrepreneurial intentions that have applied TPB to university student samples (e.g., Joensuu-Salo et al., 2015), little attention has been devoted to the role of environmental conditions in the existing entrepreneurial TPB model (Lortie & Castogiovanni, 2015), such as university entrepreneurship support, in shaping the attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy among students. Combining environmental factors will better explain and predict entrepreneurial intentions, and they are almost absent from the TPB literature.
Another relevant question that has received limited attention is whether and why some students may benefit more from their university’s support than others. Person-environment fit theory (PE fit; Kristof-Brown et al., 2005) suggests that attitudinal outcomes are shaped by individual’s evaluations of both personal needs and the external environment. If the environment provides opportunities for fulfilling an individual’s basic psychological needs, the positive link between the environment and an individual’s attitudes are expected to be stronger. Based on this notion, we propose that the students’ need for autonomy will strengthen the effects of university support. In addition to standing out as one of the most important basic psychological needs, autonomy has emerged as a central intrinsic motivation to start a business (van Gelderen, 2010). Research has shown empirical support for the association between autonomy and entrepreneurship (Al-Jubari et al., 2017). However, the role of need for autonomy as a moderator of the environment – entrepreneurship link has, to our knowledge, not been widely investigated. Drawing on PE fit theory, we reason that a university environment that is supportive of entrepreneurship will be more appealing to students with a high need for autonomy, who are then more likely to benefit from such an environment and develop more favorable attitudes toward entrepreneurship, experience stronger subjective norms and higher entrepreneurial self-efficacy.

Overall, this study aims to deepen our understanding of the relationship between perceived university support and students’ entrepreneurial intentions by combining the TPB and PE fit theory (see Figure 1 for the conceptual model). Two research questions have guided this study. The first question is what the explanatory mechanisms are between university support and students’ entrepreneurial intentions. The second question is whether students with different levels of need for autonomy benefit from the university support for entrepreneurship differently.

This study makes the following theoretical and practical contributions. First, this study incorporates contextual factors into the TPB model and provides insight into the role of university support in fostering entrepreneurial intentions through TPB variables. We also examine the cross-cultural application of the TPB in the collectivist context of China, in response to the call from Shiri et al. (2017) that more studies in developing nations should serve to assess the generalizability of the TPB model. Second, our study addresses the gap in the entrepreneurship education literature by introducing the individual characteristic, need for autonomy, as a moderating factor. We investigate whether need for autonomy amplifies the effect of perceived university support on students’ attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy, to advance our understanding of how different students benefit from the university support for entrepreneurship differently. The findings will help university managers and educators to understand and evaluate the effectiveness of current practices and policy measures aimed at stimulating and supporting entrepreneurship.
Figure 1. Conceptual Model

Theoretical Background and Hypotheses

The role of Perceived University Support

Stimulating entrepreneurship is increasingly recognized as part of the university’s role and institutional strategy (Guerrero et al., 2018). However, while the number of entrepreneurship courses and curricula has increased, the number of students who choose an entrepreneurial career remains low (Kraaijenbrink et al., 2010). Studies have indicated that many students’ entrepreneurial ambitions are hindered by inadequate preparation (Reyes, 2016). Therefore, it remains of utmost importance that universities position themselves as seedbeds of new ventures by nurturing a supportive entrepreneurial environment and contributing substantially to society (Saeed et al., 2015; Coduras et al., 2008). According to the ranking of universities for entrepreneurship (The Princeton Review, 2021), universities in the USA and European countries effectively provide entrepreneurship education and entrepreneurship support for students, which inspired them to become entrepreneurs. The cultivation of entrepreneurial potential in Chinese higher education institutions is still in its infancy, but since more than a decade, higher education institutions in the Chinese context have increased their efforts to stimulate student entrepreneurship and provide the necessary support for students’ entrepreneurship activities (An et al., 2021).

Universities can support student entrepreneurship in many ways. They can teach students knowledge and skills, such as opportunity recognition, business plan development, and resource acquisition (Zhang et al., 2014). Universities can do so in the forms of, for instance, courses, workshops, and conferences. Universities can also provide learning-by-doing or mastery experiences, which includes the opportunity to work on entrepreneurship projects, do internships in new ventures, or develop business plans (Saeed et al., 2015). Students
can also benefit from being presented with role models and being stimulated to build entrepreneurship networks. In addition to the traditional teaching role, universities can foster a supportive entrepreneurship environment (Trivedi, 2016). One way is to create awareness of entrepreneurship as a future career option. This includes providing students with ideas and motivating venture creation. Another way is to use their reputation to support student entrepreneurship, provide financial means and serve as the lead customers of students’ new businesses. This type of support moves from the teaching role to universities’ knowledge commercialization role.

Although what universities are doing to support student entrepreneurship can be measured objectively, to understand the effectiveness of university support, it is crucial to measure the extent to which they reach students. Kraaijenbrink et al. (2010) proposed three aspects of perceived university support. First, students can recognize educational support through which they learn knowledge and skills that are needed to initiate a new venture. Second, students can perceive the university’s commercialization role through the provision of more targeted and specific support for starting a business. This specific support consists of two types: concept development support and business development support. Concept development support provides students with awareness, motivation, and business ideas in the early stages of the entrepreneurship process in which business opportunity discovery and development take place. Business development support is typically given to student start-up firms.

We propose that students at universities with more active entrepreneurship support are more likely to have favorable attitudes toward entrepreneurship, experience more positive subjective norms and have higher entrepreneurial self-efficacy, which, in turn, increase their entrepreneurial intentions. As concerns attitudes toward entrepreneurship, educational and concept development support provide techniques and methods, like market analysis, which can confirm that a business idea is valuable. Then business development support provides access to further evaluate and explore elemental business ideas. The expected profitability and visibility of business opportunities play a major role in the decision to develop a business (Bhave, 1994). Students perceive that entrepreneurship is desirable since it means creating new jobs and being their own boss. Even though they may face new challenges and take potential risks, a positive evaluation of the new business fosters their favorable attitudes toward entrepreneurship, and subsequently, promotes their intentions to start the business. In a study among young researchers, Feola et al. (2019) found that university support had an indirect effect on academic entrepreneurial intentions through fostering attitudes toward entrepreneurship. Thus, we formulate that:

*Hypothesis 1a. Perceived university support has a positive indirect effect on students’ entrepreneurial intentions via attitudes toward entrepreneurship.*
From the perspective of organizational norms (Feldman, 1984), entrepreneurship support from universities signals that entrepreneurship is socially desirable. In some countries, universities can receive public funding to stimulate student venture creation, which reflects a public interest in entrepreneurship. Consequently, university support may reflect both organizational and social environments that promote entrepreneurship. In this sense, the value assigned to entrepreneurship by the university may contribute to the generation of positive perceptions of subjective norms toward entrepreneurship. Whilst empirical studies on the association between university support and students’ subjective norms are lacking, the notion that the external environment may increase the perception of subjective norms provides tentative support for our premise. For instance, Shiri et al. (2017) have provided empirical evidence that the social environment (cultural values in society which may encourage entrepreneurship) was positively related to students’ subjective norms, which in turn shaped entrepreneurial intentions. Therefore, we argue that:

**Hypothesis 1b.** Perceived university support has a positive indirect effect on students’ entrepreneurial intentions via perceived subjective norms.

Finally, as concerns entrepreneurial self-efficacy, educational and concept development support aims at providing a basis at entrepreneurship-related areas. Such knowledge and entrepreneurial awareness should give students the confidence to consider starting their own business and promote their entrepreneurial self-efficacy. Business development support contributes to overcoming constraints that hinder or slow down the entrepreneurship process. Such support builds students’ entrepreneurial self-efficacy by enabling them to overcome barriers and make them capable to start a new business. Empirical research has shown that perceived educational support, concept and business development support shaped students’ entrepreneurial self-efficacy, which in turn had a significant effect on entrepreneurial intentions (Saeed et al., 2015). Hence, we expect that:

**Hypothesis 1c.** Perceived university support has a positive indirect effect on students’ entrepreneurial intentions via entrepreneurial self-efficacy.

**PE Fit and Need for Autonomy**

It is our contention that some students are more likely than others to benefit from the university’s support for entrepreneurship. We build on the growing literature of PE fit theory, which shows that how individuals’ attributes fit the external environment fosters attitudinal outcomes (Kristof-Brown et al., 2005). Needs-supplies fit and demands-abilities fit are the two most commonly accepted dimensions of PE fit. The needs-supplies fit refers to the extent to which the external environment, such as the university support, fits the needs of an individual. The demands-abilities fit is the congruence between the demands from the
Chapter 2 | Perceived University Support

external environment and the individual's ability. Because the strength of various intrinsic needs, such as achievement, affiliation, autonomy, and dominance, are substantial drivers of motivating attitudes and behavior (Steers & Braunstein, 1976), we focus on the needs-supplies dimension of PE fit, which is defined as the compatibility between students' needs and what the university can offer. Some of the motives associated with starting a business include need for achievement, need for affiliation, and need for autonomy (Hayton et al., 2002). Of all the needs identified in the literature, autonomy stands out as the most relevant and frequently stated motive for venture creation (Al-Jubari et al., 2017; Baluku et al., 2019). Need for autonomy refers to an inherent and motivational state, invigorating an individual's interest-taking, assimilation of information and psychological growth (Ryan & Deci, 2017). People with a need for autonomy prefer self-directed work, avoid restrictions and rules, and tend to make decisions independently. They also engage deeper in processing information, show a higher level of willpower and persistence in activities (Chen et al., 2021).

Universities’ support for entrepreneurship may have differential impacts on the students' three TPB motivational outcomes, depending on the degree of their innate need for autonomy. Following the reasoning of PE fit theory, perceived university support is expected to relate to more favorable attitudes toward entrepreneurship, higher subjective norms, and higher entrepreneurial self-efficacy for students with a high need for autonomy. This is because these students are best served by and thus attracted to their university’s initiatives supporting entrepreneurship. Students with a high need for autonomy, want to be self-governing, initiate their own activities, and are open to self-exploration. They enter the university naturally inclined to be self-directed and self-endorsing their activities (Cheon et al., 2019). These students may self-select into the entrepreneurial learning activities and make better use of the entrepreneurial opportunities provided by their university because these are relevant to their personal interests.

As an important start-up motive, autonomy pertains to the striving to develop personal values, goals, and interests related to entrepreneurship (Al-Jubari et al., 2017). Driven by the need for autonomy, students are not only independent in decision-making, but they also know their dreams and aims, as well as take necessary actions that lead to the fulfillment of their dreams and reaching their aims (van Gelderen, 2010). Engaging more actively with the entrepreneurial environment, students with a high need for autonomy can be expected to develop more favorable attitudes towards entrepreneurship than students with a low need for autonomy, because they respond more positively and proactively to the entrepreneurship support provided by their university. They make full use of the possibilities and exploit available opportunities to further estimate the benefits and minimize the costs of venture creation. Driven by entrepreneurial aspirations, students with a high need for autonomy may also experience more approval of others and observe more entrepreneurial role models that motivate them to take entrepreneurial responsibilities, thus resulting in higher perceived
subjective norms. They are also better able to make use of knowledge, skills, and resources gained through university support. Accordingly, they are more likely to engage in risk-taking, problem-solving, and opportunity-seeking behavior. As a result, they obtain more experience that boosts their entrepreneurial self-efficacy.

In contrast, for students with a low need for autonomy, university support for entrepreneurship may play a much smaller role in the development of positive attitudes towards entrepreneurship, a sense of subjective norm of entrepreneurship as a future career option, or entrepreneurial self-efficacy. Even when students with a low need for autonomy are offered similar support, we postulate that they are less inclined to actively process and utilize the entrepreneurship support the university provides. Although empirical studies on the moderating role of need for autonomy are lacking, some studies do provide tentative or indirect support for our premise. For instance, based on a narrative review of the literature, Hayton et al. (2002) developed a model proposing personal needs as a moderator of the relationship between contextual factors and entrepreneurial outcomes. Additionally, Baluku et al. (2019) found a moderating role of need for autonomy in the association between entrepreneurial mentoring and entrepreneurial intentions, showing that need for autonomy is a necessary condition for transferring the knowledge and support gained through entrepreneurship mentoring into entrepreneurial intentions. It is likely that people with a high need for autonomy have also self-selected into situations in which they also experience more autonomy. Therefore, we expect that:

Hypothesis 2. The positive effects of perceived university support on (a) attitudes toward entrepreneurship (b) perceived subjective norms and (c) entrepreneurial self-efficacy are stronger for students with a high need for autonomy.

Method

Sample and Procedure

To test the research model, an online survey was conducted among first-year and second-year undergraduate students from the school of management at a local university in China during the autumn semester of the 2019-2020 academic year. During the data collection process, students first received an invitation letter with an introduction of the study and a consent form that emphasized voluntary participation and guaranteed confidentiality. A total of 500 students responded to the invitation letter and agreed to participate in the survey. Then we distributed the link of the questionnaire to these students. Students received a summary report and participated in a raffle for a film voucher as a token of appreciation for completing the questionnaire. The ethical committee of a large university in the Netherlands has approved this study. Prior to performing any analyzes, the data were coded without
directly identifiable information. In total, we collected 395 valid responses (response rate of 79%). Of these, 169 were male (42.8%) and 226 were female (57.2%). The age distribution of the sample ranged from 17 (minimum) to 26 (maximum) and the mean age was 19.7 years old (standard deviation = 1.22). Of the students, 44.8% have the experience of joining an entrepreneurship course, and most of them (96.7%) had never started a business.

**Measures**

Measurement scales were adapted from the existing literature to ensure validity. A back-to-back translation procedure was performed to translate the scales from English to Chinese.

**Perceived University Support** was measured with a 13-item scale developed by Kraaijenbrink et al. (2010). Six items measured the subscale perceived educational support (e.g., “My university offers elective courses on entrepreneurship”), four items assessed perceived concept development support (e.g., “My university creates awareness of entrepreneurship as a possible career choice”), and three items measured perceived business development support (e.g., “My university provides students with financial means to start a new business”). Responses were given on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Principal component analysis justified that the three scales could be combined into one overall university support index, explaining 83% of the variance. Cronbach’s alpha of the combined scale was .95.

**Need for Autonomy** was assessed with the five-item scale of the Manifest Needs Questionnaire (MNQ) in work settings developed by Steers and Braunstein (1976). We contextualized the questionnaire to reflect the educational setting to fit the study. An example item is “In my course assignments, I try to be my own boss”. We deleted the reverse-coded item to increase the reliability (Cook & Beckman, 2006). Items were rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*) and Cronbach’s alpha was .70.

The four TPB components were measured using validated scales of the Entrepreneurial Intention Questionnaire (EIQ; Moriano et al., 2012). **Attitudes Toward Entrepreneurship** were evaluated with two sets of six items that assess expected outcomes of an entrepreneurial career (e.g., “creating a new company or becoming an entrepreneur would mean for you: facing new challenges”, answers range from 1 = *absolutely improbable* to 7 = *absolutely probable*) and desirability of these outcomes (answers range from 1 = *absolutely undesirable* to 7 = *absolutely desirable*). Following Ajzen (2002), each outcome expectation was multiplied by its matching desirability score and then divided by 10 to obtain the average scores per outcome, with higher scores reflecting more positive attitudes toward entrepreneurship. Cronbach’s alpha was .94.
Subjective Norms were measured with two sets of three items from the EIQ. The first set assessed how significant others (close family members, close friends, and colleagues or classmates) would view entrepreneurship, using items such as “My family members think that I should pursue a career as an entrepreneur”. Answers range from 1 = absolutely disagree to 7 = absolutely agree. These answers were multiplied with the answers on the second set, measuring their motivation to comply with these reference people, using statements such as “To what extent do you care about what your family members think as you decide on whether or not to pursue an entrepreneurial career.” Answers range from 1 = not at all to 7 = very important. These multiplied items were divided by 10 to obtain the average scale scores across items, with higher scores reflecting greater subjective norms. Cronbach’s alpha was .91.

Perceived behavioral control was measured with a 5-item EIQ Entrepreneurial Self-efficacy scale. Respondents answered to the question “If you were to create your own business, to what extent would you be able to complete the following tasks?” One example item followed “Define your business idea and strategy of your company.” Answers range from 1 = not at all effective to 7 = very effective. Cronbach’s alpha was .95.

Entrepreneurial Intentions were measured with a 4-item EIQ scale evaluating the likelihood to start a new business (e.g., “Do you think in the future you will create your own company?”). Answers range from 1 = definitely not to 7 = definitely yes. Cronbach’s alpha was .86.

The control variables are some domestic variables, including age, gender (1 = male, 0 = female), entrepreneurial education (1 = ever joined the entrepreneurship course, 0 = no), and entrepreneurial experience (1 = ever started a business, 0 = no), as they have been shown to be associated with entrepreneurship.

Results

Descriptive Statistics

Cronbach’s alpha and composite reliability values of each construct were greater than .70, indicating satisfactory construct reliability (Nunnally, 1978). All factor loadings exceed .60, and Average Variance Extracted (AVE) scores were higher than .50, indicating adequate convergent validity (Fornell & Larcker, 1981). As illustrated by Table 1, the square roots of Average Variance Extracted (AVE) scores were higher than the bivariate correlations, which confirmed the discriminant validity of the measures. The correlations between perceived university support, attitudes toward entrepreneurship, subjective norms, entrepreneurial self-efficacy, and entrepreneurial intentions were all significant and in the expected direction, providing initial support for the hypotheses.
Table 1. Means, Standard Deviations and Correlations (N = 395)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study variables</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Perceived university support</td>
<td>3.71</td>
<td>.67</td>
<td>(.81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Attitudes toward entrepreneurship</td>
<td>3.29</td>
<td>1.02</td>
<td>.41**</td>
<td>(.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Subjective norms</td>
<td>2.42</td>
<td>1.04</td>
<td>.36**</td>
<td>.46**</td>
<td>(.92)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Entrepreneurial self-efficacy</td>
<td>5.21</td>
<td>1.06</td>
<td>.47**</td>
<td>.60**</td>
<td>.54**</td>
<td>(.91)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Need for autonomy</td>
<td>3.44</td>
<td>.63</td>
<td>.41**</td>
<td>.33**</td>
<td>.28**</td>
<td>.34**</td>
<td>(.73)</td>
<td></td>
</tr>
<tr>
<td>6. Entrepreneurial intentions</td>
<td>4.57</td>
<td>1.20</td>
<td>.23**</td>
<td>.31**</td>
<td>.50**</td>
<td>.38**</td>
<td>.23**</td>
<td>(.85)</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>19.7</td>
<td>1.22</td>
<td>.02</td>
<td>.08</td>
<td>.16**</td>
<td>.11*</td>
<td>.06</td>
<td>.07</td>
</tr>
<tr>
<td>Gender</td>
<td>.43</td>
<td>.50</td>
<td>.00</td>
<td>-.01</td>
<td>.15**</td>
<td>.06</td>
<td>.08</td>
<td>.29**</td>
</tr>
<tr>
<td>Entrepreneurial experience</td>
<td>.03</td>
<td>.18</td>
<td>.03</td>
<td>.02</td>
<td>.03</td>
<td>.09</td>
<td>.12*</td>
<td>.16**</td>
</tr>
<tr>
<td>Entrepreneurship education</td>
<td>.45</td>
<td>.50</td>
<td>.14**</td>
<td>.12*</td>
<td>.25**</td>
<td>.24**</td>
<td>.18**</td>
<td>.13**</td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01. Square AVE are shown on the diagonal. AVE = Average Variance Extracted.
Hypothesis Testing

Data were analyzed in R (Lavaan package; R Core Team, 2015). We applied latent variables structural equation modeling to test our hypotheses. Model fit was based on the chi-square ($\chi^2$/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI). To further reduce bias, we controlled for age, gender, entrepreneurial experience, and entrepreneurship education in all our analyses. We conducted a confirmatory factor analysis to examine the construct validity of the variables in our model. The latent variables “attitudes toward entrepreneurship”, “subjective norms”, “entrepreneurial self-efficacy”, and “entrepreneurial intentions” were indicated by their separate items. To decrease model complexity, perceived university support was indicated by the three subscale scores representing education support, concept development support, and business development support. The latent constructs were all allowed to covary. This formed Measurement Model 1. We mean-centered perceived university support and need for autonomy, and multiplied the terms to create the interaction term (Support x Autonomy; Shieh, 2011). Then we added the interaction term to Measurement Model 1 and formed Measurement Model 2. We applied the formula advanced by Bohrnstedt and Marwell (1978) to calculate the error variance of interaction terms and correct for measurement error. Results of confirmatory factor analysis showed a good fit to the data (see Table 2 for model fit indices).

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement model 1</td>
<td>3.073</td>
<td>.072</td>
<td>.950</td>
<td>.941</td>
</tr>
<tr>
<td>Measurement model 2</td>
<td>2.966</td>
<td>.071</td>
<td>.949</td>
<td>.939</td>
</tr>
<tr>
<td>Mediation model</td>
<td>3.287</td>
<td>.076</td>
<td>.924</td>
<td>.911</td>
</tr>
<tr>
<td>Moderation model</td>
<td>3.141</td>
<td>.074</td>
<td>.932</td>
<td>.910</td>
</tr>
</tbody>
</table>

To test the mediation effects (Hypothesis 1), according to which perceived university support has a positive indirect relationship with entrepreneurial intentions through attitudes toward entrepreneurship ($H1a$), subjective norms ($H1b$), and entrepreneurial self-efficacy ($H1c$), we modelled the paths from perceived university support to attitudes toward entrepreneurship, subjective norms, entrepreneurial self-efficacy, and entrepreneurial intentions. Additionally, we added paths from attitudes toward behavior, subjective norms, and entrepreneurial self-efficacy to entrepreneurial intentions. This formed the mediation model, and it showed a good fit to the data. The results (see Figure 2) showed significant paths from perceived university support to attitudes toward entrepreneurship ($\beta = .48, p < .001$), subjective norms ($\beta = .37, p < .001$), and entrepreneurial self-efficacy ($\beta = .49, p < .001$), and subsequently, from subjective norms ($\beta = .42, p < .001$) and entrepreneurial self-efficacy ($\beta = .20, p < .001$) to entrepreneurial intentions. While the paths from perceived university support ($\beta = .05, ns$)
and attitudes toward entrepreneurship ($\beta = .05$, $ns$) to entrepreneurial intentions were not significant.

![Diagram of the Theory of Planned Behavior](image)

Figure 2. Standardized model coefficient. All paths were tested simultaneously. The dashed line indicated the non-significant path. *$p < .05$, **$p < .01$, ***$p < .001$

To examine the significance of the indirect pathways (i.e., $\beta_{\text{indirect}}$) between perceived university support and entrepreneurial intentions through attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy, we followed Shrout and Bolger (2002) and examined the strength of the product of the pathway from perceived university support to TPB constructs and the pathway from TPB constructs to entrepreneurial intentions. The results support Hypothesis 1b and 1c: the indirect relationships between perceived university support and TPB constructs and entrepreneurial self-efficacy were all significant. While the indirect effect via attitudes toward entrepreneurship was not significant ($\beta_{\text{indirect}} = .02$, $p > .05$, 95% CI [-.05, .10]). Thus, Hypothesis 1a was not supported.

To test the moderating effect of need for autonomy on the relationships between perceived university support and attitudes toward entrepreneurship (Hypothesis 2a), subjective norms (Hypothesis 2b), and entrepreneurial self-efficacy (Hypothesis 2c), we added the interaction term to the mediation model, and added paths from the interaction term to attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy to address the moderation hypothesis. This formed the moderation model, and it showed a good fit to the data. In line with our predictions, the interaction between perceived university support and need for autonomy significantly related to attitudes toward entrepreneurship ($\beta = .12$, $p < .05$), subjective norms ($\beta = .23$, $p < .001$), and entrepreneurial self-efficacy ($\beta = .11$, $p < .05$). The interaction effect is plotted in Figure 3. The higher (vs lower) students’ need for autonomy, the stronger the effect of perceived university support on attitudes toward
entrepreneurship \((b = .57, p < .01; b = .41, p < .01)\), subjective norms \((b = .54, p < .01; b = .25, p < .01)\), and entrepreneurial self-efficacy \((b = .58, p < .01; b = .44, p < .01)\). Thus, Hypothesis 2 was supported.

**Figure 3.1.** The interaction between perceived university support and need for autonomy on attitudes toward entrepreneurship.

**Figure 3.2.** The interaction between perceived university support and need for autonomy on subjective norms.
Figure 3.3. The interaction between perceived university support and need for autonomy on entrepreneurial self-efficacy.

Discussion

The current study investigated the relationships among perceived university support, attitudes toward entrepreneurship, subjective norms, entrepreneurial self-efficacy, and entrepreneurial intentions. Our findings suggested that perceived university support for entrepreneurship positively and significantly related to students’ entrepreneurial intentions via subjective norms and entrepreneurial self-efficacy. At the same time, perceived university support related positively and significantly to attitudes toward entrepreneurship. However, and unexpectedly, attitudes did not significantly relate to entrepreneurial intentions. Furthermore, our results showed that different students benefitted differently from university support. More specifically, a university’s supportive environment for entrepreneurship related stronger to attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy for students with a high need for autonomy. Taken together, these findings make several theoretical contributions to entrepreneurship education literature.

First, given that studies addressing the relationship among perceived university support and entrepreneurial intentions building on TPB are lacking, our results extend the TPB literature by incorporating environmental factors and showing that environmental factors affect entrepreneurial intentions through TPB constructs. Environmental factors, like university support, have been investigated in some entrepreneurship studies. For instance, Turker and Selcuk (2009) analyzed the impact of perceived educational support on entrepreneurial intentions of university students. Similarly, Walter et al. (2013) addressed the association
between entrepreneurship support programs and students’ increased self-employment intentions. The indirect effect of university support on researchers’ academic entrepreneurial intentions via attitudes toward entrepreneurship (Feola et al., 2019), as well as the indirect effect of perceived university support on entrepreneurial intentions through students’ entrepreneurial self-efficacy (Saeed et al., 2015) have been attested separately. We extend previous research by investigating an integrated model in which all TPB motivational constructs are included as mediators in the university support – entrepreneurial intentions link simultaneously.

Second, our study adds to TPB research by addressing the effects of attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy on entrepreneurial intentions in a Chinese collectivist context. The application of the TPB in entrepreneurship has been studied extensively. However, the existence of conflicting results across collectivist and individualist cultures suggests differences in the predictive power of attitudes toward entrepreneurship and subjective norms on entrepreneurial intentions. Our results indicated the significant link between subjective norms and entrepreneurial intentions, which is consistent with studies conducted in the Chinese collectivist context and contradicts its non-significance in studies undertaken in more individualist contexts (Siu & Lo, 2013). Surprisingly, attitudes toward entrepreneurship did not relate to students’ entrepreneurial intentions over and above the other two TPB constructs. A possible explanation might be that for Chinese students, a positive attitude does not always result in entrepreneurial intentions, because subjective norms play a more significant role. The approval and support of others may outweigh the perceived advantages of launching one’s own business.

The measures used might also explain the conflicting results. According to Moriano et al. (2012), the cross-cultural equivalence of the used measures has been shown across different cultures, including Asian and collective cultures (India, Iran, Spain, and Poland). Nevertheless, the centering approach that was used to select those variables that can be applied across different cultures may have resulted in omitting attitudes toward entrepreneurship that are specifically important in the Chinese context. Liñán and Chen (2009) have applied another approach, using a general attitude scale referring to students’ evaluation about being an entrepreneur. With this more general attitude measure, rather than the more detailed “outcome beliefs x desirability of the outcomes” measure, they did find a significant relationship between attitudes and entrepreneurial intentions among Chinese university students. This is consistent with the findings from Siu and Lo (2013), who found that their more general measure of attitudes toward entrepreneurship related significantly to entrepreneurial intentions among Chinese students. On the other hand, using measures of normative beliefs alone rather than a more comprehensive measure that combines both normative beliefs and motivations to comply has been argued to lead to an underestimation of the role subjective norms play in explaining entrepreneurial intentions (Al-Jubari et al.,
Previous research applying the “normative beliefs x motivation to comply” measure has indicated a significant relationship with entrepreneurial intentions, while the simpler subjective norm measure has most often been found non-significant (Liñán & Chen, 2009; Siu & Lo, 2013).

Third, our study enriches the literature by combining the TPB with PE fit theory and by empirically addressing how need for autonomy enhances the positive effects of university support on attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy, which has been neglected in previous studies (Walter et al., 2006). Previous studies revealed that need for autonomy is essential to entrepreneurship, but the fit between need for autonomy and external environment has been ignored in scientific research. Baluku et al. (2019) found that need for autonomy moderated the relationship between entrepreneurial mentoring and entrepreneurial intentions, and its moderating role in the mentoring-intentions link differed across countries and employment status. Similarly, our results suggest that the effects of perceived university support on TPB constructs were stronger for students with a high need for autonomy. Making personal decisions and taking responsibility to act upon these decisions are key components of autonomy (van Gelderen, 2010). As compared to students with a low need for autonomy, our results imply that students with a high need for autonomy are more likely to transfer the knowledge, skills, and resources gained through entrepreneurship support from the university into practice, through developing more positive attitudes toward entrepreneurship, perceiving stronger behavioral norms in favor of entrepreneurship, as well as build greater entrepreneurial self-efficacy. Besides, although PE fit theory has been applied to entrepreneurship (e.g., Hsu et al., 2019), these studies have not particularly investigated unique dimensions and/or categories of PE fit.

**Limitations and Future Research**

Some limitations of our study should be acknowledged. First, like most studies in the literature, our focus is on behavioral intentions rather than actual entrepreneurial behavior. Although some scholars have revealed a strong positive relationship between entrepreneurial intentions and entrepreneurial activities, there is still a gap between intentions and actual behavior. Consequently, our study is unable to predict how many students will eventually materialize their intentions to start a business. A future longitudinal study could reveal a better understanding of whether entrepreneurial intentions turn into behavior.

Second, this study focused on the need for autonomy and indicated its moderating effect on the association between university support and entrepreneurial perceptions. However, there are various content dimensions of PE fit that deserve further investigation. For example, future studies could investigate the fit of entrepreneurship education programs or curricula with students’ personality, values, capabilities, needs (like the need for
achievement), and actual needs satisfaction. These variables could also be important to student entrepreneurship, because some students may perceive poor fit and thus move away from entrepreneurship. Prior research suggested that entrepreneurship education should help students learn more about the person-side of the PE fit (Hsu et al., 2019) and educators should individualize entrepreneurship education to put different students into context (van Gelderen, 2012).

Third, the generalizability of the current findings may be limited. As is often the case, this study was conducted within one country. Our framework provides a meaningful understanding of the topic, and future research could survey a more diverse sample that comes from different cultures and countries. Besides, against mounting employment pressure, a critical part of the Chinese government agenda has been to encourage more university graduates to start up their own business (Cooke & Xiao, 2021). Since cultural disparities might be responsible for the non-significant relationship between attitudes toward entrepreneurship and entrepreneurial intentions (Liñán & Chen, 2009), future studies could also investigate whether there are potential specific motives and advantages for university students to start a new business in China, taking government policy and culture context into consideration. For such an endeavor, it would be important to revisit the question of how best to measure attitudes toward entrepreneurship and subjective norms.

**Practical Implications**

Despite its limitations, our results have several practical implications for university educators and policymakers to foster student entrepreneurship. A key purpose of universities is to combine their traditional teaching role with commercialization role to provide effective entrepreneurship support and prepare students for starting a new business. Our findings showed that the role of university support is fundamental to student entrepreneurship. Therefore, we suggest that universities should continuously assess and evaluate students’ perceptions of the entrepreneurship support they provide and its impact on students.

However, a “one-size-fits-all” university support for students may not be appropriate. In order to increase students’ participation in entrepreneurial activities, universities continuously need to evaluate the effectiveness of their efforts for different groups of students (Wegner et al., 2019). Different groups may benefit from university support initiatives differently. Our findings revealed that students with a high need for autonomy perceive stronger effects of university support on their favorable attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy. They are most likely to start their own business. For these students, universities might develop initiatives aimed at providing support specifically tailored to different stages of business start-ups and help students to achieve and maintain independence and freedom. The meaningful rationale of university support may make
them feel that these provisions back up their need for autonomy and allow them to express themselves. As a result, they might be able to create new ventures successfully.

Next to that, to increase the number of future entrepreneurs, there is the need for educators to ensure that the content and delivery of entrepreneurship support is customized to students’ different levels of need for autonomy. It remains an interesting question as to how students with a lower need for autonomy could be motivated to engage in entrepreneurial activities. Educators would need to find ways to provide these students with tangible and intangible support that facilitates their positive evaluations and desirability of entrepreneurship. This would need to focus on other advantages entrepreneurship has for offer to those who have a lower need of autonomy. In order to increase the relationship between university support and TPB motivational factors for students with a lower need for autonomy, it may for example be helpful to use other types of role models with which they can identify; role models that less emphasize autonomy as a prerequisite or advantage.

**Conclusion**

To conclude, our study showed that the TPB and PE fit theory may provide a fruitful framework to explain the mechanism between perceived university support and entrepreneurial intentions, as well as how different students benefit differently from university support for entrepreneurship. Taking needs differences into account, this study provides valuable new insights into entrepreneurship education research and evaluations. The findings may contribute to continuously evaluating the effectiveness of current university practices and policies for stimulating student entrepreneurship.
Appendix

Questionnaire items

Perceived University Support
The following items describe the university support for entrepreneurship. To what extent do you agree with them? (Answers range from 1 “strongly disagree” to 5 “strongly agree”)

Perceived educational support
1. My university offers elective courses on entrepreneurship.
2. My university offers project work focused on entrepreneurship.
3. My university offers internship focused on entrepreneurship.
4. My university offers a bachelor or master study on entrepreneurship.
5. My university arranges conferences/workshops on entrepreneurship.
6. My university brings entrepreneurial students in contact with each other.

Perceived concept development support
7. My university creates awareness of entrepreneurship as a possible career choice.
8. My university motivates students to start a new business.
9. My university provides students with ideas to start a new business from.
10. My university provides students with the knowledge needed to start a new business.

Perceived business development support
11. My university provides students with the financial means to start a new business.
12. My university uses its reputation to support students that start a new business.
13. My university serves as a lead customer of students that start a new business.

Need for autonomy
Below are the statements that describe various thing students do or try to do in their studies, we would like to know which of these statements you feel most accurately describe your own behavior as a student. (Answers range from 1 “strongly disagree” to 5 “strongly agree”)

1. When doing course assignments, I try to be my own boss.
2. I go my own way, regardless of the opinions of others.
3. I disregard rules and regulations that hamper my personal freedom in my study.
4. “I consider myself a “team player” as a student. (R)
5. I am at my best when studying alone.
Entrepreneurial Intention Questionnaire

*Attitudes toward entrepreneurship: Outcome beliefs*

Creating a new company or becoming an entrepreneur would mean for you … (Answers range from 1 “totally improbable” to 7 “totally probable”)

1. Facing new challenges.
2. Creating new jobs.
3. To be creative and innovative.
4. Obtaining high incomes.
5. Taking calculated risks.
6. To be my own boss (independence)

*Attitudes toward entrepreneurship: Desire of the outcomes*

Now, please indicate how desirable are they for you in your everyday life: (Answers ranged from 1 “totally undesirable” to 7 “totally desirable”)

1. Facing new challenges.
2. Creating new jobs.
3. To be creative and innovative.
4. Obtaining high incomes.
5. Taking calculated risks.
6. To be my own boss (independence)

*Subjective norms: Normative beliefs*

Please, indicate the extent to which you agree or not with the following statements. (Answers range from 1 “absolutely disagree” to 7 “absolutely agree”)

1. My closest family members think that I should pursue a career as an entrepreneur.
2. My closest friends think that I should pursue a career as an entrepreneur.
3. My classmates think that I should pursue a career as an entrepreneur.

*Subjective norms: Motivation to comply*

Now, indicate to what extent do you care about what they think as you decide on whether or not to pursue a career as an entrepreneur. (Answers range from 1 “not at all” to 7 “very important”)

1. My closest family members.
2. My closest friends.
3. My classmates.
Entrepreneurial self-efficacy (Perceived behavioral control)

If you were to create your own business, to what degree would you be able to complete the following tasks? (Answers range from 1 “not at all effective” to 7 “very effective”)

1. Define your business idea and strategy of your company.
2. Write your business plan (do a market research, financial analysis, etc.)
3. Negotiate and maintain supportive relationships with potential investors and banks.
4. To recognize market opportunities for the development of new products and/or services.
5. To relate to key people to obtain the capital needed for your business.

Entrepreneurial intentions

1. Do you think that in the future you will create your own company? (Answers range from 1 “Definitely not” to 7 “Definitely yes”)
2. If you had the opportunity to choose freely the career to follow, what would you prefer? (Answers range from 1 “I’d prefer to be employed by someone else” to 7 “I’d prefer to create my own business”)
3. Nevertheless, considering your actual situation and the limitations toward your options (e.g., lack of money) indicate which career is more probable to be chosen: (Answers range from 1 “employed by somebody else” to 7 “create my own business”)
4. With what probability do you consider to create your own business from present to five years in time? (Answers range from 1 “Totally improbable” to 7 “Totally probable”)

Note: “R” denotes reverse scoring. * refers to the deleted item.
Chapter 3

Increasing Teaching Effectiveness in Entrepreneurship Education: Course Characteristics and Student Needs Differences

This Chapter is published as:
Chapter 3 | Entrepreneurship Course Characteristics

Abstract

This study investigated the impact of entrepreneurship course characteristics on students’ entrepreneurial intentions through fostering entrepreneurial self-efficacy and study engagement. Furthermore, the moderating role of student needs differences was examined. Data were collected among 302 Chinese undergraduates who enrolled in an entrepreneurship course. Students filled in a questionnaire before and after the course. Results of structural equation modeling revealed that a challenging learning environment positively related to entrepreneurial self-efficacy and study engagement, which in turn related to entrepreneurial intentions. Teacher-student relationships only related to study engagement. In addition, a challenging learning environment related stronger to enhanced study engagement for the high need for achievement students, and teacher-student relationships significantly and positively related to entrepreneurial self-efficacy only among students with a high need for affiliation. The findings can be used to improve entrepreneurship education. Theoretical and practical implications will be discussed.
Introduction

Entrepreneurship education has been recognized as one of the crucial factors in developing students’ intentions to start a business (Karimi et al., 2016; Tantawy et al., 2021). However, the growing number of studies on the impact of entrepreneurship education offer contradictory and mixed results (Hahn et al., 2020). Nabi and colleagues (2017) systematically reviewed empirical evidence on the impact of entrepreneurship education in higher education on various entrepreneurial outcomes (e.g., attitude, skills and knowledge, feasibility, and entrepreneurial intentions). They concluded that the most common outcome studied is entrepreneurial intentions. Whereas most reviewed studies reported a positive link between entrepreneurship education and start-up intentions, some studies reported mixed, ambiguous or even negative, results. Besides, most empirical studies focus on the question of whether participating in entrepreneurship courses fosters student entrepreneurship, without considering the differential effects that different course characteristics may have (Yang et al., 2021). Therefore, it is important to answer the question of how specific characteristics of an entrepreneurship course influence students’ entrepreneurial intentions. Only a few studies have empirically examined the direct (Mayhew et al., 2012) and indirect (Mueller, 2011) effects of course characteristics on the development of students’ entrepreneurial intentions. Hence, the mechanism through which entrepreneurship courses may have their impacts has not been clearly articulated (Eesley et al., 2021).

Exposure to entrepreneurship education is essential for acquiring entrepreneurial knowledge and skills, as well as developing other attributes associated with becoming an entrepreneur. In entrepreneurship courses, these goals can be achieved using appropriate teaching strategies and supportive interpersonal relationships (Mayhew et al., 2012). Based on social cognitive theory (SCT; Bandura, 1986), which posits that being exposed to learning within a particular social setting shapes personal cognitive processes and capacities (Tantawy et al., 2021; Zhao et al., 2005), we focused on two characteristics of an entrepreneurship course environment, which are a challenging learning environment and supportive teacher-student relationships. A challenging learning environment is one in which students are provided with daring and provocative assignments that encourage them to think outside the box, explore original ideas, and apply innovative approaches (Fast et al., 2010; Mayhew et al., 2012). Besides, entrepreneurship is taught in a social context, which involves the interaction between teachers and students (Otache, 2019). Supportive teacher-student relationships, conceptualized as the degree of closeness and supportiveness within these relationships, provide them with information, opportunities, and resources.
In addition, we investigated the role of both “cold” cognitive (i.e., entrepreneurial self-efficacy) and “hot” affective (i.e., study engagement) motives as the potential processes through which a challenging learning environment and supportive teacher-student relationships stimulate entrepreneurial intentions. Both “cold” cognitive and “hot” affective motives combine and function together to predict educational outcomes (Abelson, 1963; Simon & Stenstrom, 2015). “Cold” motives are more cognitive and premeditated in nature, while “hot” motives refer to the state of affect and emotion, which is more affective and impulsive (Scott et al., 2014). Previous studies in Chinese or other cultural contexts that investigated the impact of a challenging learning environment and supportive teacher-student relationships (e.g., Gu et al., 2018) have shown their positive effects on self-efficacy and study engagement among university students in general (Brouwer et al., 2016; Fast et al., 2010; Xerri et al., 2018). However, to our knowledge, these links have not been widely investigated within entrepreneurship education.

While entrepreneurship courses have been shown to promote student entrepreneurial outcomes, existing research offers little insight into why some students may benefit more than others and do not focus on the moderating role of students’ person-specific factors (Nabi et al., 2017). Students bring a variety of learning needs into an entrepreneurship course (Ilonen, 2021). Building on the person-environment fit theory (PE fit; Kristof-Brown et al., 2005), which suggests that attitudinal outcomes result from the fit between environmental characteristics and individual needs, we focused specifically on the need for achievement and the need for affiliation as individual components of PE fit. Need for achievement refers to the desire for high-performance goals, and the need to excel and improve past performance; need for affiliation refers to the need to develop interactions and friendships with others, and a desire for approval from others (McClelland, 1961). Need for achievement and need for affiliation are important entrepreneurial motives and personal needs (Hayton et al., 2002) that may qualify relationships among entrepreneurship course characteristics and entrepreneurial self-efficacy and study engagement. Yet, students may differ in the extent to which they exhibit a desire for achievement (Bartels & Magun-Jackson, 2009) and a desire for enhancing interpersonal relationships (Klein & Schnackenberg, 2000). To our knowledge, no studies to date have addressed the moderating role of need for achievement and need for affiliation on the relationships between entrepreneurship course characteristics and student outcomes.

**Aims and Hypotheses**

We aim to deepen our understanding of the impact of entrepreneurship courses on students’ entrepreneurial intentions (see the conceptual model in Figure 1). The contribution of this study is threefold. First, this study adds to the current entrepreneurship education literature and practice by providing empirical insights into how entrepreneurship course characteristics
relate to entrepreneurial self-efficacy and study engagement, which subsequently increase entrepreneurial intentions. While entrepreneurial self-efficacy has proven to be a key factor in determining entrepreneurial intentions (e.g., Gorgievski et al., 2018), research addressing the relationship between study engagement and entrepreneurial intentions is still scarce. Second, empirical studies on how course characteristics and individual needs interact are scant as well. Our study addresses the gap in entrepreneurship education research by introducing an interactive framework to investigate the effect of entrepreneurship course characteristics on different students. We explored whether the need for achievement and need for affiliation enhance the effects of course characteristics on students’ entrepreneurial self-efficacy and study engagement, which advances our knowledge on how to teach entrepreneurship while taking individual differences into account. The third contribution is our specific focus on the impact of entrepreneurship education. Despite the increased emphasis on entrepreneurship education, debates about the effectiveness of teaching approaches continue to arise, raising the question of “How to teach in a more effective way?” (Bell, 2022; Liu et al., 2021). We sought to assess the impact of the entrepreneurship course characteristics on entrepreneurial intentions and to provide a better theoretical understanding of the mechanism between them. Besides the theoretical contributions, the findings were also expected to have practical implications for teaching methods and educational pedagogy.

Figure 1. Concept Model
Entrepreneurial Self-efficacy

Self-efficacy is a cognitive motive defined by Bandura (1986) as the self-judgment of one's ability to perform a task in a specific domain. Specifically, entrepreneurial self-efficacy refers to a person's belief in their ability to successfully perform entrepreneurial roles and tasks (Zhao et al., 2005). An essential component of SCT concerns the process through which self-efficacy judgments are formed. SCT explains that self-efficacy can be influenced through enactive mastery, role modeling and vicarious experience, social persuasion, and psychological and mood states. These sources of self-efficacy should be reflected in an entrepreneurship course. Focusing on perceived entrepreneurship course characteristics is in line with Bandura’s SCT (1986), which suggests that how individuals interpret relevant information can be related to self-efficacy development. Thus, we expect that students' perceptions of a challenging learning environment and teacher-student relationships relate positively to their entrepreneurial self-efficacy.

Although some students may perceive being challenged during a course as unpleasant, most students indicate that they enjoy learning when tasks are challenging (Zahorik, 1996). During an entrepreneurship course, students are typically provided with progressively more challenging tasks. Participating in these tasks promotes students to notice their incremental improvements in entrepreneurship, which can be expected to increase their entrepreneurial self-efficacy. Whilst research on the relationship between a challenging learning environment and entrepreneurial self-efficacy is absent, studies indicated that a challenging learning environment led to higher general self-efficacy (Gentry & Owen, 2004). Moreover, Fast et al. (2010) revealed that students who perceive their classroom environment as challenging had a higher level of math self-efficacy.

In addition to a challenging learning environment, teacher-student relationships are important predictors of student learning outcomes and good interrelationships can enhance the quality of education (Brouwer et al., 2016). Students enter entrepreneurship courses with beliefs about their ability to complete assignments, which indicates their self-efficacy. These beliefs can be influenced by how they interact with teachers, through the forms of advice, information, feedback, guidance, and motivation. Being accessible to these valuable resources is essential for helping students develop positive perceptions and build confidence. Supportive teacher-student relationships may foster a warm course environment and enhance students’ entrepreneurial self-efficacy by providing useful feedback or contributing to their knowledge and skills. Research has shown that teacher-student relationships positively relate to students’ self-efficacy (Zhou et al., 2020). Accordingly, we formulate that:
Hypothesis 1: Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships relate positively to entrepreneurial self-efficacy.

Study Engagement

Study engagement is another psychological dimension relevant to learning outcomes (Mandernach et al., 2011). According to Balwant (2018), a useful way to measure study engagement is to measure it analogous to the concept of work engagement, which refers to a positive, fulfilling, work-related affective motivational state consisting of vigor, dedication, and absorption (Schaufeli et al., 2006). Siu et al. (2021) explained that students’ core activities, such as attending lectures, working on assignments, and studying, can be considered as “work”. Besides, like employees, students work towards specific goals including completing courses, passing examinations, and academic performance. Hence, similar to work engagement, study engagement in this study is conceptualized as a positive and affective state of mind encompassing vigor, dedication, and absorption in learning (Siu et al., 2014). The Job Demands-Resources (JD-R) theory (Bakker & Demerouti, 2007, 2008), which proposes that both challenging job demands and job resources are the main predictors of engagement (Bakker & Demerouti, 2008; Tadić et al. 2015), may shed light on the effect of a challenging learning environment and supportive teacher-student relationships on study engagement.

The JD-R theory has been employed in educational settings (e.g., Gu et al., 2018; Siu et al., 2021). Also in the context of entrepreneurship education, we anticipate that a challenging learning environment (as a challenge demand) and teacher-student relationships (as resources) foster study engagement. Although empirical studies on the relationship between a challenging learning environment and study engagement in entrepreneurship courses are lacking, the finding of Hamari et al. (2016) that challenges in game-based learning increased student engagement provides tentative support for our premise. While working on challenging and complex problems instead of confronting topics superficially, students became more intrinsically motivated, paid more attention and concentrated much harder. Conversely, research has suggested that lack of challenge is a common explanation for study disengagement (Shernoff, 2013).

In addition, study engagement could be significantly enhanced through students’ relationships with teachers (Sadoughi & Hejazi, 2021). Given the frequent interactions between teachers and students in the entrepreneurship course, positive teacher-student relationships can foster an encouraging and supportive environment, which could increase study engagement. Students who perceived that their teaching staff understood their learning needs and developed a friendly relationship with teachers were more likely to ask
more questions, get more feedback, and highly invest in their studies. Consequently, they become more engaged in the course. While empirical research addressing the positive effect of supportive teacher-student relationships on study engagement in entrepreneurship courses is lacking, some studies have already shown the association between teacher-student relationships and enhanced student engagement (e.g., Quin, 2017; Xerri et al., 2018). Accordingly, we expect that:

**Hypothesis 2:** Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships positively associate with study engagement.

**Entrepreneurial Intentions**

We argue that entrepreneurial self-efficacy and study engagement can impact students' intentions to start a business. Building on SCT, self-efficacy represents the mechanism of personal agency, and it is expected to affect one's effort and persistence on a specific task, as well as the very choice of activities and behavioral settings. High self-efficacy regarding an entrepreneurial setting leads students to approach that setting, whereas low self-efficacy leads students to evade that setting (Zhao et al., 2005). In the field of student entrepreneurship, entrepreneurial self-efficacy has proven to be an important explanatory predictor in determining the strength of entrepreneurial intentions. For instance, Nowiński et al. (2019) found support for the role of entrepreneurial self-efficacy in enhancing entrepreneurial intentions among university students.

We also expect that study engagement in an entrepreneurship course increases students' entrepreneurial intentions. Engaged students often experience positive emotions, such as enjoyment, interest, and enthusiasm. These positive emotions broaden their awareness, encourage creative thoughts and actions, as well as increase their strength and motivation (Fredrickson, 2001), which ultimately could be applied to the entrepreneurship process and facilitate entrepreneurial intentions. Besides, the emotions experienced by highly engaged students are also high in energy, dedication, and mental resilience, which enables them to perform their best at entrepreneurial assignments. This may, in turn, lead to increased entrepreneurial intentions. Little is currently known about the relationships between study engagement during an entrepreneurship course and entrepreneurial intentions, but the notion that study engagement is positively associated with students' academic performance, well-being, and behavioral conduct may provide support for our proposal (Siu et al., 2021). Therefore, we postulate that:

**Hypothesis 3:** Within the context of an entrepreneurship course, (a) entrepreneurial self-efficacy and (b) study engagement positively associate with entrepreneurial intentions.
Taken together, a challenging learning environment and teacher-student relationships positively relate to entrepreneurial self-efficacy and study engagement, and, in turn to students’ entrepreneurial intentions. Hence, to holistically address our framework we formulate the following hypotheses:

\textit{Hypothesis 4: Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships have a positive indirect effect on entrepreneurial intentions through (1) entrepreneurial self-efficacy and (2) study engagement.}

\textbf{PE Fit and Needs Differences}

The general conception is that higher education should provide a learning environment to fit the diverse needs of university students (Larkin & Richardson, 2013). McClelland’s theory of needs (1961) identified three types of motivational needs, namely achievement, affiliation, and power, and individuals have different characteristics depending on their dominant motivator. The third need, need for power, relates to controlling and influencing others and falls outside the scope of this study. Students in entrepreneurship courses have an interest in entrepreneurship and seek out further entrepreneurial knowledge and skills (Hahn et al., 2020). Compared with other motivational needs, need for achievement and need for affiliation are more common personal needs among students interested in entrepreneurship (Decker et al., 2012) and likewise, their need for achievement and/or need for affiliation might be different from each other. Therefore, in line with the PE fit premise regarding the congruence between personal needs and the external environment, we argue that a challenging learning environment and supportive teacher-student relationships may have differential impacts on students’ entrepreneurial self-efficacy and study engagement, depending on the degree of their need for achievement and need for affiliation separately.

Some empirical studies have investigated the moderating role of need for achievement and affiliation in work settings (e.g., Chou & Lopez-Rodriguez, 2013; Fatima et al., 2017), but to the best of our knowledge, the role of need for achievement and need for affiliation has not been examined in the relationships between entrepreneurship course characteristics and student entrepreneurial outcomes. Even though research on the moderating role of needs in entrepreneurship is absent, in their review paper, Hayton et al. (2002) proposed that the need for achievement and the need for affiliation would moderate the relationship between environmental factors and entrepreneurial outcomes. Similarly, Baluku et al. (2019) empirically revealed that entrepreneurial mentoring was highly associated with entrepreneurial intentions among individuals with a high need for autonomy.
Individuals with a high need for achievement constantly seek progress, improvements, growth, and responsibilities (Hart & Albarracín, 2009). We contend that students with a high need for achievement benefit more from challenging learning environments and experience higher entrepreneurial self-efficacy and study engagement. Individuals who are motivated by achievement need aim for high performance, strive for their targets through efforts, and tend to excel in their field (Embi et al., 2019; McClelland, 1961). Besides, they prefer challenging tasks and have a strong mindset towards accomplishing the given task. Therefore, students with a high need for achievement are expected to do their best at challenging entrepreneurial tasks and become more confident during task completion. While working on challenging tasks, students who are motivated by achievement may also appreciate accomplishments and perceive higher vigor, dedication, and absorption during the entrepreneurship course.

Individuals with a high need for affiliation seek for harmonious and close interpersonal interactions with others, which enable them to acquire more support and assistance (Decker et al., 2012). We postulate that supportive teacher-student relationships work best for students with a high need for affiliation, and they are more likely to develop higher entrepreneurial self-efficacy and study engagement. Individuals who are motivated by their affiliation need desire warm interpersonal relations, seek companionship, and have a strong desire for acceptance and approval from others (Arshad et al., 2019; McClelland, 1961). As compared to low need for affiliation students, students with a high need for affiliation are expected to experience more emotional appreciation and seek continued guidance and feedback from teachers. They would also make better use of these resources obtained from teachers to further develop their knowledge and skills, which contribute to higher entrepreneurial self-efficacy. In addition, students with a high need for affiliation may obtain the most benefit from actively interacting with teachers, investing more time and effort, and engaging more deeply in an entrepreneurship course. Accordingly, we expect that:

Hypothesis 5: Within the context of an entrepreneurship course, the positive effects of (a) a challenging learning environment on (1) entrepreneurial self-efficacy and (2) study engagement are stronger for students with high (vs. low) levels of need for achievement. The positive effects of (b) teacher-student relationships on (1) entrepreneurial self-efficacy and (2) study engagement are stronger for students with high (vs. low) levels of need for affiliation.
Methods

Sample and Procedure

This study was conducted at the School of Management in two universities in China. Data were collected among undergraduate students who enrolled in an entrepreneurship course during the autumn semester of the 2019-2020 academic year. The entrepreneurship course was taught to undergraduate students in their last two years of university. It aimed to increase students’ knowledge and skills required for discovering business opportunities, carrying out entrepreneurial activities, analyzing and understanding the business market; foster students’ entrepreneurial self-efficacy, and encourage more students to pursue a career as an entrepreneur in the near future. The teaching methods most often employed in the current study were lectures, presentations, group discussions, writing business plans, case studies and guest speakers. Ex-ante and ex-post approaches were used. Students received and filled in the online pre-test questionnaire at the beginning of the first class of the entrepreneurship course (T0), comprising scales about demographic variables, need for achievement, need for affiliation, and entrepreneurial intentions. Approximately eight weeks later, students received and filled in the online post-test questionnaire at the beginning of the final class of the entrepreneurship course (T1), comprising scales about challenging learning environment, teacher-student relationships, entrepreneurial self-efficacy, study engagement, and entrepreneurial intentions. Students were informed about the study, in which they could voluntarily participate with guaranteed confidentiality. The ethical committee of a large university in the Netherlands has approved this study. Prior to analysis, the data were coded without directly identifiable information. In total, 568 students enrolled in the entrepreneurship course. Among them, 412 participated in the pre-test questionnaire and 422 participated in the post-test questionnaire. We were able to match the two questionnaires (at T0 and T1) for 302 students, with ages ranging from 18 to 25. Of these, 165 were female (54.60%) and most students (88.40%) had never started a business.

Measures

Measurement items were adapted from the existing scales to ensure validity. A back-to-back translation procedure (Brislin, 1970) was performed to translate the scales from English to Chinese. Two researchers translated the English scales into Chinese. Two other researchers translated the questionnaire back. Then six undergraduate students were selected to pilot test the survey and give feedback to increase clarity, based on which items were slightly modified. We contextualized the questionnaire to reflect the entrepreneurship classroom.
Five-point Likert scales were employed to measure course characteristics and needs. Answers ranged from 1 (strongly disagree) to 5 (strongly agree). **Challenging learning environment** (Cronbach’s alpha = .93) was assessed with the Perceptions of Learning Environment (Mayhew et al., 2012), which was adapted from the Wabash Student Experience Survey (Pascarella et al., 2004, 2005). Six items measured a challenging learning environment, and three items measured the assessments encouraging innovative approaches. Even though they are intended to measure two constructs, a factor analysis revealed that all nine items loaded on one underlying factor. Besides, both the “challenging learning environment” and the “assessment encouraging innovative approaches” scales are from the Perceptions of Learning Environment survey and fit the definition of a challenging learning environment as proposed in the introduction section. Sample items are “The teachers asked challenging questions in class” and “Assignments required me to create innovative solutions.” **Teacher-student relationship quality** (Cronbach’s a = .87) was assessed with a five-item scale based on the Course Evaluation Questionnaire (Kember & Leung, 2008). A sample item is “I felt that our teaching staff understood our learning needs”. **Need for achievement** (Cronbach’s a = .60) and **need for affiliation**1 (Cronbach’s a = .48) were measured with the scales of the Manifest Needs Questionnaire in work settings developed by Steers and Braunstein (1976). Example items are “I do my best when my course assignments are fairly difficult” and “I pay a good deal of attention to the feelings of others at the course”.

**Study engagement** was measured with the nine-item version of the Utrecht work engagement scale (UWES; Schaufeli et al., 2006), including three subscales of vigor, dedication, and absorption. Some example items are “When I study, I felt bursting with energy”, “I was enthusiastic about my study”, and “I was immersed in my study”. Answers range from 1 = never to 7 = always. Principal component analysis indicated that three subscales are part of one single higher-order factor that represents engagement, explaining 90.11% of the variance. Factor loadings of the subscales were .95, .97 and .93. Cronbach’s alpha of the combined engagement scale was .96.

Entrepreneurial self-efficacy and intentions were measured using the Entrepreneurial Intentions Questionnaire (EIQ; Moriano et al., 2012). **Entrepreneurial self-efficacy** (Cronbach’s a = .93) was measured with a five-item likert type scale. Respondents answered the question: “If you were to create your own business, to what extent would you be able to complete the following tasks?” followed by for example: “Define your business idea and strategy of your company.” Answers ranged from 1 = not at all effective to 7 = very effective. **Entrepreneurial intentions** (Cronbach’s a = .87) were measured with four items assessing the likelihood of an individual to start a new business (e.g., Do you think in the future you will create your own business?). Answers ranged from 1 = definitely not to 7 = definitely yes.

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1 Two reverse-coded items were deleted to increase reliability (cf., Cook & Beckman, 2006).
Control variables were students’ age, gender (1 = male, 0 = female), entrepreneurial experience (1 = ever started a business, 0 = not), and entrepreneurial intentions at the beginning of the course (T0, Cronbach’s a = .83).

**Results**

**Descriptive Statics**

Cronbach’s alpha of each construct was greater than the recommended acceptable level of .60 (Fornell & Larcker, 1981; Nunally, 1978), except for the need for affiliation. The low Cronbach’s alpha value is consistent with the findings reported in Geiger and Cooper (1995) among students. Although exhibiting low Cronbach’s alphas, the composite reliability of the need for affiliation\(^2\) scale was greater than .70, indicating adequate reliability. All composite reliability values ranged from .74 to .97, indicating a good construct reliability (Nunnally, 1978). All factor loadings exceed .50, and the Average Variance Extracted (AVE) scores of each construct were higher than .50, indicating adequate convergent validity (Fornell & Larcker, 1981). As shown in Table 1, the square roots of AVE scores for each construct were greater than the correlations between constructs, which confirmed the discriminant validity.

Table 1 presents the means, standard deviations, and correlations between the variables. All correlations were in the expected direction, providing initial support for our hypothesis. Paired T-Test showed a significant difference in the pre-test (M = 4.35) and post-test (M = 4.50) of entrepreneurial intentions, t(301) = -2.54, \( p < 0.01 \), which confirmed the expected role of the initial value of entrepreneurial intentions as the control variable.

\(^2\)The rather low Cronbach’s alpha reliability of the scale measuring need for affiliation may lead to an underestimation of relationships. As a popular alternative to evaluate reliability, composite reliability is usually calculated in conjunction with the structural equation model (Peterson & Kim, 2013). The composite reliability of .74 was acceptable in this study.
### Table 1. Means, Standard Deviations and Correlations (N = 302)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Challenging learning environment</td>
<td>3.88</td>
<td>.52</td>
<td>( .81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Teacher-student relationships</td>
<td>3.76</td>
<td>.57</td>
<td>.72**</td>
<td>( .82)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Need for achievement</td>
<td>3.59</td>
<td>.47</td>
<td>.26**</td>
<td>.19**</td>
<td>( .83)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Need for affiliation</td>
<td>3.66</td>
<td>.56</td>
<td>.30**</td>
<td>.26**</td>
<td>.28**</td>
<td>( .71)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Entrepreneurial self-efficacy</td>
<td>5.06</td>
<td>.90</td>
<td>.60**</td>
<td>.53**</td>
<td>.29**</td>
<td>.33**</td>
<td>( .88)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Study engagement</td>
<td>4.88</td>
<td>1.03</td>
<td>.63**</td>
<td>.57**</td>
<td>.38**</td>
<td>.31**</td>
<td>.56**</td>
<td>( .95)</td>
<td></td>
</tr>
<tr>
<td>7 Entrepreneurial intentions (T1)</td>
<td>4.50</td>
<td>1.14</td>
<td>.41**</td>
<td>.42**</td>
<td>.21**</td>
<td>.32**</td>
<td>.62**</td>
<td>.50**</td>
<td>( .85)</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>20.15</td>
<td>1.08</td>
<td>.13**</td>
<td>.15**</td>
<td>.10</td>
<td>-.00</td>
<td>.05</td>
<td>.10</td>
<td>.14*</td>
</tr>
<tr>
<td>Gender</td>
<td>.45</td>
<td>.50</td>
<td>-.04</td>
<td>.05</td>
<td>.04</td>
<td>.06</td>
<td>.16**</td>
<td>.14*</td>
<td>.35**</td>
</tr>
<tr>
<td>Entrepreneurial experience</td>
<td>.12</td>
<td>.32</td>
<td>.12*</td>
<td>.07</td>
<td>.07</td>
<td>-.08</td>
<td>.10</td>
<td>.08</td>
<td>.21**</td>
</tr>
<tr>
<td>Entrepreneurial intentions (T0)</td>
<td>4.35</td>
<td>1.23</td>
<td>.21**</td>
<td>.22**</td>
<td>.29**</td>
<td>.29**</td>
<td>.42**</td>
<td>.31**</td>
<td>.64**</td>
</tr>
</tbody>
</table>

*Note. *p < .05. **p < .01. Square AVE are shown on the diagonal. AVE = Average Variance Extracted.*
Hypothesis Testing

Data were analyzed in R (Lavaan package; R Core Team, 2015). We applied structural equation modeling to test our hypotheses (Little et al., 2007). Model fit was based on the chi-square ($\chi^2$/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and standardized root mean square residuals (SRMR) (Marsh et al., 2004). To further reduce the bias, we controlled for age, gender, entrepreneurial experience, and initial entrepreneurial intentions (T0) in all our analyses. The latent variables, “challenging learning environment”, “teacher-student relationships”, “entrepreneurial self-efficacy”, and “entrepreneurial intentions” were indicated by their separate items. To decrease model complexity, study engagement was indicated by the three subscales representing vigor, dedication, and absorption. This formed Measurement Model 1. We mean-centered and multiplied the terms to create the interaction terms: challenging learning environment x need for achievement, teacher-student relationships x need for affiliation (CLE x ACH, TSR x AFF; Shieh, 2011). Then we added two interaction terms to Measurement Model 1, which formed Measurement Model 2. We applied the formula advanced by Bohrnstedt and Marwell (1978) to calculate the error variance of interaction terms and correct for measurement error. Confirmatory factor analysis of both Measurement Model 1 and Measurement Model 2 showed a good fit to the data (see Table 2 for model fit indices).

Table 2. Model Fit Indices for the Research Model (N = 302)

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement model 1</td>
<td>2.384</td>
<td>.068</td>
<td>.936</td>
<td>.928</td>
<td>.043</td>
</tr>
<tr>
<td>Measurement model 2</td>
<td>2.142</td>
<td>.061</td>
<td>.942</td>
<td>.933</td>
<td>.041</td>
</tr>
<tr>
<td>Structural model</td>
<td>2.120</td>
<td>.061</td>
<td>.925</td>
<td>.917</td>
<td>.065</td>
</tr>
<tr>
<td>Moderation model</td>
<td>1.975</td>
<td>.057</td>
<td>.929</td>
<td>.920</td>
<td>.062</td>
</tr>
</tbody>
</table>

To test our hypothesis, we modelled the paths from challenging learning environment and teacher-student relationships to entrepreneurial self-efficacy, study engagement and entrepreneurial intentions. Additionally, we added paths from entrepreneurial self-efficacy and study engagement to entrepreneurial intentions. This formed the Structural Model, and it showed a good fit to the data. The results (see Figure 2) indicated significant paths from challenging learning environment to entrepreneurial self-efficacy ($\beta = .48, p < .001$) and study engagement ($\beta = .47, p < .001$) and, subsequently, from entrepreneurial self-efficacy ($\beta = .41, p < .001$) and study engagement ($\beta = .13, p < .01$) to entrepreneurial intentions. The path from teacher-student relationships to entrepreneurial self-efficacy ($\beta = .13, ns$) was not significant, but teacher-student relationships significantly related to study engagement ($\beta = .19, p < .05$). We also found that a challenging learning environment ($\beta = -.04, ns$) and teacher-student relationships ($\beta = .08, ns$) did no significantly relate to entrepreneurial intentions. Therefore,
Hypothesis 1a, Hypothesis 2, and Hypothesis 3 were supported, only Hypothesis 1b was not supported.

Figure 2. Standardized structural model. All paths were tested simultaneously. The dashed line indicated the non-significant path. *p < .05. **p < .01. ***p < .001

To examine the significance of the indirect pathways (i.e., $\beta_{\text{indirect}}$) between entrepreneurship course characteristics (i.e., challenging learning environment and teacher-student relationships) and entrepreneurial intentions through students motives (i.e., entrepreneurial self-efficacy and study engagement), we followed Shrout and Bolger (2002) and examined the strength of the product of the pathway from entrepreneurship course characteristics to student motives and the pathway from student motives to entrepreneurial intentions. The results support Hypothesis 4a$_1$ and 4a$_2$, the indirect effect of challenging learning environment on entrepreneurial intentions via entrepreneurial self-efficacy ($\beta_{\text{indirect}} = .22, p < .001, 95\% \text{ CI} [.11, .32]$) and study engagement ($\beta_{\text{indirect}} = .07, p < .05, 95\% \text{ CI} [.01, .14]$) were significant. Thus, the results indicated that a challenging learning environment positively and indirectly related to entrepreneurial intentions through entrepreneurial self-efficacy and study engagement. Hypothesis 4b$_1$ was not supported, because no significant relationship was found between teacher-student relationships and entrepreneurial self-efficacy. Additionally, although teacher-student relationships related to study engagement and study engagement in turn predicted entrepreneurial intentions, the indirect effect of teacher-student relationships on entrepreneurial intentions via study engagement ($\beta_{\text{indirect}} = .03, p = .09, 95\% \text{ CI} [-.01, .07]$) failed to reach significance (Hypothesis 4b$_2$).

To test the moderated effect of need for achievement and need for affiliation, we included two interaction terms in the structural model and added paths from both interaction terms to entrepreneurial self-efficacy and study engagement. This formed the Moderation Model, and it showed a good fit to the data. Results showed that the interaction effect of a challenging learning environment and need for achievement on study engagement was significant ($\beta = .18, p < .05$). As can be seen in Figure 3, students with a high need for achievement
significantly benefitted more from the challenging learning environment and experienced higher study engagement. The interaction between a challenging learning environment and need for achievement did not significantly relate to entrepreneurship self-efficacy ($\beta = -.08$, $ns$). As for the interaction between teacher-student relationships and the need for affiliation, it significantly related to entrepreneurial self-efficacy ($\beta = .14$, $p < .05$), but not to study engagement ($\beta = -.12$, $ns$). The interaction effect is plotted in Figure 4. Students with high need for affiliation and high teacher-student relationships experienced significantly higher entrepreneurial self-efficacy. Thus, Hypothesis 5a and 5b were supported.

![Figure 3](image)

**Figure 3.** The interaction between challenging learning environment and need for achievement for study engagement. The slope is .62 ($p < .001$) for high need for achievement group (+1SD) and .26 ($ns$) for low need for achievement group (-1SD).
Figure 4. The interaction between teacher-student relationships and need for affiliation for entrepreneurial self-efficacy. The slope is .31 (p < .05) for high need for affiliation group (+1SD) and .02 (ns) for low need for affiliation group (-1SD).

Discussion

The current study investigated the relationships among entrepreneurship course characteristics (a challenging learning environment and teacher-student relationships), entrepreneurial self-efficacy, study engagement, and entrepreneurial intentions. Our findings show that a challenging learning environment relates positively to entrepreneurial self-efficacy and study engagement, which in turn significantly foster entrepreneurial intentions. Teacher-student relationships only relate significantly and positively to study engagement, but not entrepreneurial self-efficacy. The indirect effect of teacher-student relationships on entrepreneurial intentions through study engagement was not significant over and above the indirect relationship between a challenging learning environment and entrepreneurial intentions through study engagement. Furthermore, our results show that need for achievement strengthens the positive relationship between a challenging learning environment and study engagement, and teacher-student relationships are significant in increasing entrepreneurial self-efficacy among students with a high need for affiliation. Taken together, these findings make several theoretical contributions.
Course Characteristics

Our study enriches the research on entrepreneurship education effectiveness by empirically addressing the effects of a challenging learning environment and teacher-student relationships on entrepreneurial self-efficacy and study engagement in an entrepreneurship course. Nabi et al. (2017) concluded that novel ways of evaluating entrepreneurship course impact in higher education are needed, our study responses to their call and includes two aspects of an entrepreneurship course. The results indicate that a challenging learning environment fosters entrepreneurial self-efficacy and study engagement, whereas supportive teacher-student relationships only relate to study engagement. This extends results of previous studies, which showed that entrepreneurship courses can increase student entrepreneurship, but which had not shed light on the role of different teaching methods and interpersonal relationships (Iipinge & Shimpanda, 2022). Considering the importance of challenging learning environments and teacher-student relationships in higher education (Hagenauer & Volet, 2014), our findings partially corroborate the results of previous studies among university students in other educational settings (Brouwer et al., 2016; Fast et al., 2010; Xerri et al., 2018). Whereas we investigated the relationships between two course characteristics and self-efficacy and study engagement in the context of an entrepreneurship.

“Hot” and “Cold” Pathways

Second, our study adds to current insights by empirically unveiling the mechanisms explaining how entrepreneurship course characteristics foster entrepreneurial intentions through promoting entrepreneurial self-efficacy and study engagement. Building on the Theory of Planned Behavior, Mueller (2011) assessed the impact of entrepreneurship course characteristics on students’ entrepreneurial intentions. However, they neglected the role of study engagement, a critical factor contributing to student outcomes in both higher education and entrepreneurship education. Entrepreneurship course characteristics can be expected to influence entrepreneurial intentions through different pathways, such as perceived behavioral control and/or attitudes towards entrepreneurship (Mueller, 2011). Previous studies largely described these pathways in terms of “cold” cognition, that is, cognitive processes that are free of affect. Affect related, or so-called hot process rarely enter the picture (Healey et al., 2017). In response to the call from Nabi et al. (2017) that more studies should address the importance of student affect in entrepreneurship education, our study showed two different pathways through which entrepreneurship education can impact students’ entrepreneurial intentions: a cognitive pathway through impacting self-efficacy (a cold process) and an affective pathway through increasing engagement (a hot process). This is one of the first studies that proposed and tested the positive links between entrepreneurship course characteristics and study engagement, as well as the link between study engagement and entrepreneurial intentions.
Student Needs Differences

Third, building on PE fit theory, we have provided the first empirical evidence that individual differences in needs may explain why some students show more potential for and interest in entrepreneurship than others, after participating in an entrepreneurship course. While studies indicated that course characteristics influence student entrepreneurial outcomes (e.g., Mueller, 2011), these studies offer little insight on how to continuously improve teaching techniques and approaches for entrepreneurship education to meet the needs of students. Our findings provide new insights by introducing personal needs as moderators of the way the study environment relates to study outcomes. Results indicate that the positive effects of teacher-student relationships on entrepreneurial self-efficacy are significant among students with high need for affiliation. Part of these findings also respond to the call from Xerri et al. (2018) that future studies about diverse types of students are necessary to further explore the outcomes of teacher-student relationships and approaches to cultivating effective teacher-student interactions.

Limitations and Future Research

Despite its merits, some limitations of this study should be acknowledged. First, our study included a limited number of entrepreneurship course characteristics. There are several additional course variables, beyond those measured in this study, that might work together to increase students’ entrepreneurial outcomes. Future investigation of a wider variety of entrepreneurship course characteristics (such as student-student relationships) and their influence on students’ outcomes are necessary to substantially contribute to a fuller understanding of effective entrepreneurship course variables (Nabi et al., 2017). PE fit theory may provide an interesting framework, as it integrates both environmental characteristics and student individual differences. Educators in higher education institutions are teaching in an environment with diverse students and deciding on the appropriate teaching methods for such a diverse audience becomes important and challenging (lipinge & Shimpanda, 2022).

Second, our study established the moderating role of need for achievement and need for affiliation. However, PE fit has several content dimensions and different types that deserve further investigation. For instance, future research could explore the fit of student entrepreneurship teams or teaching styles with students’ attributes, goals, and learning styles. These variables could also be important, because some students may perceive poor fit and thus move away from entrepreneurship. Prior research suggested that entrepreneurship education should help students learn more about the person-side of the PE fit (Hsu et al., 2019) and educators should individualize entrepreneurship education to put different students into context (van Gelderen, 2012). In addition, the scales that were used to measure need for achievement and need for affiliation, which were taken from the Manifest Needs
Questionnaire (Steers & Braunstein, 1976), had low Cronbach’s alpha reliabilities. For future studies it is recommended to develop measures with a higher internal consistency.

Third, the generalizability of the current findings might be limited. Different entrepreneurship courses may include a wide range of aims, potential entrepreneurial outcomes, pedagogical designs, and methods; and educators are still struggling to find the most appropriate and effective teaching approaches for entrepreneurship education. Confusion regarding the impact of entrepreneurship education may result from the diversity of pedagogical methods employed in entrepreneurship courses, and pedagogy impact depends to an extent on the aims of the entrepreneurship course. For instance, Morselli (2018) focused on an entrepreneurship course that was structured with constructive alignment principles and aimed to move beyond reflection on entrepreneurship towards action. Their findings suggested that students developed more enterprising attitudes because of participating in the course. Hahn and colleagues (2020) conducted a quasi-experiment to identify the effects caused by participation in entrepreneurship courses aiming to develop entrepreneurial skills and prepare students to engage in entrepreneurial activities. They indicated that entrepreneurial courses contributed to students’ entrepreneurial skills. Besides, whether these teaching methods have differential effects for students with different needs still remains an open question.

In spite of these limitations, our framework provides a meaningful understanding of the topic that are expected to apply to a wide range of educational settings. The variables included in our study are typical for, but not specific to entrepreneurship courses. These variables are critical when teaching a wide range of topics in higher education and contribute to student outcomes in general. A recommendation for future research is to survey a larger and broader variety of (entrepreneurship) courses and programs to investigate the generalizability of our findings to different contexts. The majority of entrepreneurship education studies were undertaken in business schools (Ahmad et al., 2018), and future studies could be carried out outside of the business school perspectives (such as engineering and science, hospitality, and tourism). Besides, people are under the influence of contexts embedded in the broader cultural climate, and there likely exists variability in their basic psychological needs across cultures (Deci & Ryan, 2012). Individuals in a more collectivistic-oriented Asian context, such as China, would benefit more from being involved in caring and supportive relationships, as they are in a more socialized and interpersonal context (Chen et al., 2015). Therefore, compared with students in individualist cultures, students in collectivist cultures may benefit more from the positive teacher-student relationships and then develop greater entrepreneurial potentials. Future studies could further investigate student needs differences in a more diverse sample that comes from different cultures.
Practical Implications

Despite its limitations, our study has several practical implications for managers in higher education and educators who consistently aim to improve the effectiveness of entrepreneurship education. Knowledge of what specific entrepreneurship course characteristics and teaching methods influence student outcomes is important for educators to design the course in a more targeted manner (Mueller, 2011; Yang et al., 2021). Our results showed the importance of a challenging learning environment and teacher-student relationships in fostering students’ entrepreneurial potentials. Hence, providing a challenging learning environment should be the core element of an entrepreneurship course. Teachers should encourage students to explore their original ideas and think outside the box. Challenging and graded assignments are also essential to encourage students to think critically and innovatively (Mayhew et al., 2012). Participating in challenging assignments allows students to notice their incremental improvement in a subject, such as entrepreneurship, which increases their feelings of self-competence and leads to stronger beliefs in their abilities (Fast et al., 2010). A certain level of entrepreneurial potentials (e.g., competence, self-efficacy) is essential for starting a new business and better prepares young students for new labor market requirements (Deprez et al., 2021). In addition, teachers are advised to keep active and good relations with students, understand their learning needs and interests, and invest in their students by employing strategies that fit a deeper learning approach. Our study showed that this relates positively to students’ increased study engagement.

Our results also indicate that both individual differences and course characteristics interact with each other and influence students’ entrepreneurial outcomes. Teachers may need to use different teaching methods and establish a varied course environment to match different types of students (Ipinge & Shimpanda, 2022). Our findings reveal that for students with a high need for achievement, the positive effect of a challenging learning environment on study engagement is stronger. Thus, teachers could give these students more difficult assignments, challenge their ideas more frequently and deeply, as well as provide more feedback on their progress and achievements. For students with a high need for affiliation, teacher-student relationships foster their entrepreneurial self-efficacy. Teachers should show their approval and acceptance and cultivate positive interactions with these students. Since they may learn and perform best in a more supportive environment, teachers could also provide more frequent guidance, opportunities, and resources to facilitate their learning and entrepreneurial self-efficacy.

Individuals low in needs differ from individuals high in these motives in many aspects (Chen et al., 2015). For example, students low in need for achievement may choose fewer challenging tasks and avoid receiving too much feedback about their progress and achievements. Thus,
teachers need to assure that the tasks are not too challenging but preferably within the reach of these students and provide feedback on regular intervals. Extrinsic motivation should also be useful to stimulate learning of these students (Richardson, 2010). Students who have a low need for affiliation may struggle in the course if they are expected to actively interact with others and build close relationships. They have a less intrinsic desire for being a part of the course and are more independent than others. Teachers should consider their low affiliation need and identify what motivates those students to their enhanced learning outcomes.

**Conclusion**

To conclude, this study provides a fruitful framework to explain the potential mechanisms between entrepreneurship course characteristics and student entrepreneurial intentions, as well as how different students benefit differently from a challenging learning environment and supportive teacher-student relationships. Taking students’ needs differences into account, we add valuable new insights into entrepreneurship education research, and the findings contribute to continuously evaluating and improving entrepreneurship education courses.
“A legendary hero is usually the founder of something – the founder of a new age, the founder of a new religion, the founder of a new city, the founder of a new way of life.”

Joseph Campbell, Hero with a Thousand Faces
Chapter 6

Summary and General Discussion
Guided by three research questions, the previous chapters have shed new light on (1) the characteristics of effective entrepreneurship education; (2) the explanatory mechanisms of the relationship between entrepreneurship education and entrepreneurship outcomes for students; (3) and how different types of students benefit from entrepreneurship education differently. In this last chapter, we first provide answers to the central research questions of this dissertation with a summary of the main findings in Chapter 2 to Chapter 5 and discuss the theoretical implications. Thereafter, the limitations of the studies and the directions for future research are addressed. We will end this chapter with a discussion of practical implications for university managers and teachers and a general conclusion.

**Research Question 1: What are the characteristics of effective entrepreneurship education within higher education?**

Studies on the impact of entrepreneurship education on students’ entrepreneurship outcomes in higher education have offered mixed findings (Hahn et al., 2020; Nabi et al., 2017) and little is known about the differential impact of various entrepreneurship education characteristics (Yang et al., 2021). By applying different theoretical perspectives and conducting multiple empirical studies, we made an integrated effort to show the impact of university support and the characteristics of entrepreneurship education courses and programs in Chapter 2 to Chapter 5.

**Perceived University Support**

It remains important for universities to position themselves as a hub of students’ new ventures by nurturing a supportive environment (Saeed et al., 2015). Building on the theory of planned behavior (TPB; Ajzen, 1991), the results of Chapter 2 showed that perceived university support for entrepreneurship positively and significantly related to attitudes toward entrepreneurship, subjective norms and entrepreneurial self-efficacy. Our findings partly correspond to previous studies concerning the impact of university support on attitudes toward entrepreneurial behavior among a sample of young researchers in science and technical departments (Feola et al., 2019) and entrepreneurial self-efficacy for university students (Saeed et al., 2019). Given the increasing focus on university support for entrepreneurship (Yang et al., 2021), the study described in Chapter 2 can advance our understanding based on previous research by testing an integrated model in which environmental conditions and all three TPB motivational constructs are included.

**Course and Program Characteristics**

Higher education studies have extensively investigated educational course and program characteristics and their relation to the study outcomes of students. For instance, the Student...
Experience Survey (Pascarella, 2006) and the Course Evaluation Questionnaire (Kember & Leung, 2008) have been developed and employed to assess teaching effectiveness in higher education (e.g., Yin et al., 2015). However, approaches of investigating and assessing the effectiveness of entrepreneurship education are still scant (Nabi et al., 2017). In Chapter 3 to Chapter 5, we applied different theoretical perspectives to introduce and examine the impact of the characteristics of entrepreneurship courses and educational programs. This also allows us to look at similar constructs through different theoretical lenses.

Prior studies had shown the positive impact of entrepreneurship courses, but they did not shed light on the impact of teaching strategies and interpersonal relationships (Iipinge & Shimpanda, 2022). Building on social cognitive theory (SCT; Bandura, 1986), in Chapter 3 we introduce the concepts of a challenging learning environment and supportive teacher-student relationships as key aspects of an effective entrepreneurship course. Corroborating the results of previous studies conducted in other educational settings (e.g., Brouwer et al., 2016, Xerri et al., 2017), our findings showed that a challenging learning environment related positively to entrepreneurial self-efficacy and study engagement. Supportive teacher-student relationships related positively to study engagement, but not entrepreneurial self-efficacy.

Our findings in Chapter 3 indicated a significant impact of a challenging learning environment and teacher-student relationships on study engagement, and that study engagement as an indicator of student well-being is essential to study success and students' career development (cf., Navarro et al., 2019; Pap et al., 2021). However, to date, empirical studies on the relationship between entrepreneurship program characteristics and study engagement are scarce. Hence, to obtain deeper insights into this aspect, Chapter 4 labeled a challenging learning environment and teacher-student relationships studied in Chapter 3 as challenge demands and resources and investigated these characteristics from the perspective of the job demands-resources theory (JD-R; Bakker & Demerouti, 2007, 2008). The results showed that teacher-student and student-student relationships (as supportive resources), but not a challenging learning environment (posing challenge demands), positively and significantly related to study engagement. The non-significant impact of a challenging learning environment is contrary to the results reported in Chapter 3, which did show a significant relationship between a challenging learning environment and study engagement.

One possible explanation might be a ceiling effect for challenge demands due to the already more challenging nature of experiential entrepreneurship programs (Chapter 4), as compared to more traditional entrepreneurship courses (Chapter 3). It can be expected that when following a more traditional, theoretical-oriented course, students are more in their comfort zone than when following an experiential learning program and they need challenging assignments to draw them into the learning zone. Experiential programs expose students
to a “real” entrepreneurship context and in this way, the challenges draw most, if not all students outside their comfort zone into the growth (learning) zone where learning and growth take place (cf. the learning zone model; Senninger, 2000; Vygotsky, 1978). Experiential learning programs stimulate students to act and take risks, because of which they step into their learning zone. In this context, students may need more support from teachers and peers during the transition from the comfort zone to the growth zone and avoid moving into the panic zone (Young et al., 2018). Guidance from teachers and cooperation with peers help students reflect on what they have learned, and students may experience study engagement, an affective-motivational state encompassing vigor, dedication, and absorption.

Not only the motivational constructs studied in Chapter 3 and Chapter 4, but also the impact of program characteristics on behavioral constructs is absent in the literature. Hence, Chapter 5 focused on program characteristics from a feedback seeking perspective (e.g., Anseel et al., 2015, 2016). We learned from work and organizational research and investigated the impact of cost-value perceptions and social capital on students’ feedback seeking behavior. Corroborating the results of previous studies (Sung & Choi, 2021), the findings suggested that when students perceived the potential value of feedback to be positive, they would seek feedback more frequently. The expectation was that when students perceive the cost of seeking feedback to be high, they would be less inclined to seek feedback. However, the impact of perceived feedback seeking cost was not significant (Anseel et al., 2015). One explanation might be the practical module of experiential programs. Students are stimulated to get out of the building, and in this case, they should seek feedback from potential customers no matter how high or low the cost of seeking it out is. When students see the feedback from potential customers as valuable for business development, they may go beyond what is required and seek feedback more frequently.

Contrary to the results of Chapter 4 and studies conducted in higher educational settings, in which both teacher-student and student-student relationism were found to be important for study outcomes (e.g., Brouwer et al., 2016), our longitudinal study in Chapter 5 found that student-student relationships related significantly and positively to feedback seeking behavior, whereas the impact of teacher-student relationships was not significant. An explanation might be the different outcome measures used in the studies reported in Chapter 4 and Chapter 5. Though both teacher-student and student-student relationships foster study engagement (Chapter 4), regarding the more practical feedback seeking process (Chapter 5), the discussion and collaboration with peers contribute better than the instructions and guidance from teachers.
Research Question 2: What are the explanatory mechanisms of the relationship between entrepreneurship education and entrepreneurship outcomes for students?

Our understanding of the mechanisms through which entrepreneurship support and education may have their impacts remains limited (Eesley et al., 2021; Saeed et al., 2015). Therefore, broader theoretical underpinnings are needed to fill in the gap and enrich entrepreneurship education research (Carpenter & Wilson, 2022; Martínez-Gregorio et al., 2021). Building on the motivational and behavioral process as articulated in various theoretical perspectives, the studies presented in this dissertation are, to our knowledge, the first to provide new insights into how entrepreneurship support and education foster entrepreneurship outcomes for students through different processes.

The motivational constructs proposed and investigated in these studies somewhat overlap with each other. For instance, the study presented in Chapter 2 built on the TPB and showed the role of three motivational constructs, namely attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy. Entrepreneurial self-efficacy is also the “cold” cognitive process as articulated in the study presented in Chapter 3. The “hot” affective process (study engagement) mentioned in this study is also the well-being and motivation proposed by the JD-R theory (Chapter 4).

Theory of Planned Behavior

The study presented in Chapter 2 showed that perceived university support for entrepreneurship positively and significantly related to students’ entrepreneurial intentions through subjective norms and entrepreneurial self-efficacy. Meanwhile, perceived university support related significantly and positively to attitudes toward entrepreneurship, and unexpectedly, attitudes toward entrepreneurship did not significantly relate to entrepreneurial intentions. Although university support has been found relevant to entrepreneurial intentions indirectly via attitudes toward entrepreneurship (Feola et al., 2019) and entrepreneurial self-efficacy (Saeed et al., 2015), studies addressing the role of university support in the integrated TPB including all three motivational indicators are scarce (Lortie & Castogiovanni, 2015). The findings of Chapter 2 extend previous research by introducing environmental factors into the TPB and showing that university support promotes entrepreneurial intentions via subjective norms and entrepreneurial self-efficacy.

Results of the study presented in Chapter 2 also provide evidence for the cross-cultural application of the TPB in a collectivist culture, heeding previous calls of, for instance, Shiri et al. (2017) that more studies in diverse contexts should assess the generalization of the TPB. Our findings showed that attitude toward entrepreneurship was not a significant predictor of entrepreneurial intentions whereas subjective norms were, which is consistent with other
studies conducted in the Chinese collectivist context and contradicts studies undertaken in more individualist contexts (Siu & Lo, 2013). The conflicting results regarding the predictive power of attitudes toward entrepreneurship and subjective norms are mostly attributed to the cultural context in which the study was conducted. The measures used could also be an explanation (Al-Jubari et al., 2017). Using a general attitudes measure, rather than the detailed “outcomes beliefs × desirability of the outcomes” measure, was found to be significantly related to Chinese students’ entrepreneurial intentions (Liñán & Chen, 2009), indicating that the current, more detailed measures might not be able to capture the typical pros and cons of entrepreneurship as perceived by Chinese students. Besides, studies applying the “normative belief × motivation to comply” measure have indicated a significant impact on entrepreneurial intentions, while the impact of simpler subjective norm measure is often non-significant (Liñán & Chen, 2009; Siu & Lo, 2013).

“Cold” and “Hot” Pathways

Previous studies extensively described the pathways between entrepreneurship education and student outcomes in terms of “cold” cognitive processes, such as through increased entrepreneurial self-efficacy as studied in Chapter 2. “Hot” affective processes rarely enter the picture (Healey et al., 2017; Nabi et al., 2017). The findings of the study presented in Chapter 3 showed that a challenging learning environment significantly and positively related to entrepreneurial intentions via entrepreneurial self-efficacy and study engagement. Although teacher-student relationships related to study engagement and study engagement, in turn, fostered entrepreneurial intentions, the indirect effect of teacher-student relationships on entrepreneurial intentions via study engagement was not significant over and above the indirect effect of a challenging learning environment on entrepreneurial intentions via study engagement. The study adds valuable new insights by empirically unveiling the cognitive and affective mechanisms explaining how entrepreneurship course characteristics relate to students’ entrepreneurial intentions.

Job Demands-Resources Theory

Study engagement, as an indicator of student well-being (Maricuţoiu & Sulea, 2019), was investigated in the study presented in Chapter 4 as the motivational process through which entrepreneurship programs related to students’ entrepreneurial (career) intentions. Our findings showed that the indirect effect of student-student relationships on entrepreneurial career intentions via study engagement was not significant over and above the indirect effect of teacher-student relationships on entrepreneurial career intentions via study engagement. The indirect effect of a challenging environment on entrepreneurial career intentions was not significant because no significant relationship was found between a challenging learning environment and study engagement. This is contrary to the results presented in Chapter
3, which might be due to the different nature of the learning environment between more theoretical-oriented courses (Chapter 3) and more practical-oriented programs (Chapter 4) as was explained before.

**Feedback Seeking Model**

Besides the motivational processes discussed in Chapter 2 to Chapter 4, a behavioral process was also found to be an explanatory process (Shemueli et al., 2020). Our longitudinal study presented in Chapter 5 is one of the first studies that proposed and examined the role of student feedback seeking within the experiential learning context of a lean startup-based entrepreneurship program. The findings showed that participation in entrepreneurship programs significantly enhanced students’ entrepreneurial self-efficacy. The indirect effect of student-student relationships on entrepreneurial self-efficacy via feedback seeking behavior was not significant over and above the indirect effect of the perceived value of feedback on entrepreneurial self-efficacy via feedback seeking behavior. The indirect effects of teacher-student relationships and feedback seeking cost on entrepreneurial self-efficacy were not significant, because no significant relationships were found between teacher-student relationships and the cost of seeking feedback with feedback seeking behavior.

**Research Question 3: If students are expected to benefit from entrepreneurship education and develop positive entrepreneurship outcomes, do different types of students benefit differently and if so, how?**

Although some studies have shown a favorable impact of entrepreneurship education on students’ entrepreneurship outcomes (e.g., Liu et al., 2021), existing research offers little insights into whether and why some students may benefit more than others and does not focus on the moderating role of students’ differences (Nabi et al., 2017). Moreover, the mixed findings as concerns the impact of entrepreneurship education (Hahn et al., 2020) also indicate there may be individual differences in students’ responses to entrepreneurship education.

Building on the person-environment (PE) fit theory (Kristof-Brown et al., 2005), the studies presented in Chapter 2 and Chapter 3 extended previous studies by introducing and investigating the moderating role of students’ personal needs. More specifically, the study presented in Chapter 2 showed that a university’s supportive environment for entrepreneurship relates stronger to attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy for students with a high need for autonomy. Within the context of an entrepreneurship course, we extended the insights gained in Chapter 2 and focused on two other types of needs, namely need for achievement and need for affiliation (Chapter 3). The results showed that need for achievement strengthened the positive
relationship between a challenging learning environment and study engagement. Supportive teacher-student relationships were significant in fostering entrepreneurial self-efficacy for students with a high need for affiliation.

The study presented in Chapter 4 focused on another individual difference variable, namely regulatory focus. In line with the results of Liu et al. (2020) and extending their findings to entrepreneurship programs, our findings showed that promotion focus positively, and prevention focus negatively related to study engagement. Besides, and unexpectedly, this study showed that both promotion and prevention focus boosted the positive effect of student-student relationships on study engagement. Prevention focus attenuated the positive effect of teacher-student relationships on study engagement. The findings enrich the literature with respect to students’ different responses to program resources. This is among the first studies that unveiled the moderating role of regulatory focus in the JD-R model in the context of experiential entrepreneurship programs. Overall, the study presented in Chapter 4 adds to the literature by pointing out the relevance of regulatory focus for study engagement and subsequently being relevant to the future career development of students.

**Theoretical Implications**

In sum, to answer the posed three research questions, we created an overall theoretical framework that explains the characteristics of entrepreneurship support and education, the explanatory mechanisms between these characteristics and entrepreneurship outcomes for students, and how different students respond to these characteristics differently. Several theoretical perspectives are at the basis of this overall framework. These theoretical perspectives have demonstrated validity and have been applied in a multitude of contexts among work and organizational and educational studies. Hence, the results of this dissertation can also be interpreted as an extension and examination of these theoretical perspectives in the context of entrepreneurship education. Adopting such perspectives has provided valuable new insights into entrepreneurship education literature.

First, we look at students’ relationships with teachers and other students through different theoretical lens and enrich the research by investigating the impact of interpersonal relationships on various outcomes. Higher education studies largely identified teacher-student and student-student relationships as social capital and investigated their impact on study success (e.g., Brouwer et al., 2016). Nevertheless, their impact on student well-being is absent from research, even though well-being and motivation are important aspects of students’ future career development (Navarro et al., 2019). Applying JD-R theory to entrepreneurship education and labelling interpersonal relationships as resources provides new insights into how program characteristics relate to student well-being and motivation, and subsequently being relevant to their entrepreneurial career development.
Besides, although social capital was found to be relevant to the motivational process (Xerri et al., 2018), to date little empirical research exists investigating the relationship between social capital and behavioral process, such as feedback seeking. Work and organizational studies suggested that feedback seeking is especially relevant to particular samples in particular contexts, and that it would be worthy of examination in other contexts besides employees in the working context (Susan et al., 2016). This dissertation aimed to fill this void. Results showing the importance of the value of feedback and peer relationships partly corroborate the findings in work and organizational studies and extend these findings to experiential entrepreneurship programs.

Second, our research adds to current insight by combining various theoretical perspectives and by empirically disentangling the cognitive, affective, and behavioral pathways through which entrepreneurship support and education relate to entrepreneurship outcomes of students. Although SCT posits that being exposed to studying within a particular social setting fosters cognitive processes (Tantawy et al. 2021), affective processes are still an under researched topic in the entrepreneurship education literature (Healey et al., 2017). Moreover, feedback seeking behavior as an important behavioral mechanism between contextual factors and individual outcomes has not been widely examined in the literature (Shemueli et al., 2020). The studies presented in this dissertation are among the first that proposed and tested these potential mechanisms from different perspectives.

Third, building on PE fit and regulatory focus theory, we have provided the first empirical evidence that individual differences could explain why some students show more entrepreneurial potential than others when being exposed to university support and entrepreneurship courses and educational programs. While personal needs and regulatory focus, as individual difference variables, have shown to be relevant to student entrepreneurship (e.g., Al-Jubari et al., 2017), the fit between needs and external environment or regulatory fit have been neglected in scientific research (Walter et al., 2006). Our findings provide new insights by introducing personal needs and regulatory focus as moderators of the way the study environment relates to study outcomes.

**Limitations and Future Research**

Some limitations should be acknowledged regarding the presented research on entrepreneurship education and the ideas on how to tackle these limitations in future studies. A first limitation relates to our focus on behavioral intentions rather than actual behavior in the studies presented in Chapter 2 to Chapter 4. Like many studies in the literature, we focus on entrepreneurial intentions. Even though scholars have revealed the predictive validity of intentions in general contexts, it has yet to be established in the context of entrepreneurship education to predict students’ entrepreneurial behaviors. Consequently, our studies are
unable to predict how many students will materialize their entrepreneurial intentions and start a new business. A future longitudinal study could better explain whether and why entrepreneurial intentions eventually turn into entrepreneurial behaviors.

A second limitation relates to the employed methodology. The findings in this dissertation were based on the survey data collected from university students. Both pre-test and post-test and longitudinal designs, which are currently predominant in the entrepreneurship education literature, were applied. The use of experimental designs as a methodology is still limited in entrepreneurship education, despite the benefits and importance of using experimental designs to establish causal relationships. Future studies are encouraged to use experimental designs to test the effectiveness of entrepreneurship pedagogical interventions. It is also recommended to include objective outcomes, such as students’ grades. Students should have the knowledge and skills required to start a new venture after following the entrepreneurship education (Wenninger, 2019), and their grades indicate whether tasks are well suited for the intended learning outcomes (Brookhart, 2013). How many new business ventures are started by students could also be an objective outcome to measure the effectiveness of entrepreneurship education.

Third, we made a selection of characteristics of entrepreneurship education and individual differences that were found to be the most influential variables in predicting students’ entrepreneurship outcomes and study success. There are several educational characteristics, beyond these measured in this dissertation, that might work together to increase students’ entrepreneurial outcomes. Future studies could investigate a wider range of characteristics and their impact to substantially contribute to a fuller understanding of the characteristics of entrepreneurship education (Nabi et al., 2017). Social cognitive theory may be interesting for this aspect, since this theory establishes that various pedagogical practices used in entrepreneurship courses can be related to the formation of self-efficacy judgements (Zhao et al., 2005).

It would also have been interesting to see how university support functions as an environment and influences the effect of other educational characteristics. For example, future research could address the question of whether and why entrepreneurship courses and programs taught at entrepreneurial universities are more effective than in other universities. Regarding individual differences, we investigated the moderating role of personal needs. There are several other personal attributes included in the premise of PE fit theory. For instance, future studies could focus more on demands-abilities fit instead of needs-supplies fit and investigate the fit between the requirements of entrepreneurship education (such as time pressure and workload) and students’ abilities (such as entrepreneurship competence and knowledge).
Finally, the results presented in Chapter 2 indeed contribute to the cultural validation of the TPB in Chinese collectivist culture. However, regarding students’ personal needs, there exists variability in the basic psychological needs across different cultures (Deci & Ryan, 2012). Compared with students in individualist cultures, students in collectivist cultures would benefit more from being involved in close and supportive relationships, since they are in a more socialized and interpersonal context (Chen et al., 2015). Besides, the variability in feedback seeking behavior also exists across cultural contexts (Ashford et al., 2016). Studies showed that people in a more individualist culture may express a desire for performance feedback, whereas in collectivist cultures, people may seek more feedback about the whole team (Ashford et al., 2003). Also, the motivation to seek feedback varies as a function of national culture (MacDonald et al., 2013). Therefore, scholars are encouraged to investigate a more diverse sample and apply our theoretical framework in different cultural contexts in the future.

Moreover, we applied various theoretical perspectives in the context of entrepreneurship education and provided valuable new insights into this topic. The variables included in the studies presented in this dissertation are typical for but may not be specific to entrepreneurship education. These variables are critical when teaching a range of topics in higher education and can be applied to other types of education as well. The explanatory process between educational characteristics and student outcomes, and the moderating role of student individual differences can be expected to be the same for other courses and programs, provided that the outcome variables are contextualized to fit the domain-specific education. A recommendation for future research is to survey a larger and broader variety of (entrepreneurship) courses and programs to extend the findings reported in this dissertation to a wide range of educational settings.

**Practical Implications**

Entrepreneurship education is becoming increasingly essential in developing students’ intentions to start a business (Tantawy et al., 2021). The research presented in this dissertation provides insights into the characteristics of effective entrepreneurship education, the explanatory mechanisms between entrepreneurship education and student outcomes, and how different types of students benefit from entrepreneurship education differently. The findings are relevant for university managers and teachers to improve entrepreneurship support, educational courses and programs. The most important practical implications are discussed below.

First, this dissertation showed the importance of university support for entrepreneurship, a challenging learning environment, and teacher-student and student-student relationships in fostering students’ motivation and entrepreneurial potential. Therefore, university managers
and teachers are suggested to continuously assess and evaluate students’ perceptions of
the entrepreneurship support they provide and its impact on students. Regarding more
theoretical-oriented courses, providing a challenging learning environment and supportive
teacher-student relationships are the core elements. Challenging tasks encourage students to
think critically and innovatively and allow students to notice their incremental improvement
in a subject, such as entrepreneurship, which increases their beliefs of self-competence and
abilities (Mayhew, et al., 2012). Teachers are also suggested to maintain active and good
relationships with students, understand their learning needs and interests, and pay attention
to the progress of individual students. Within more practical-oriented programs, students
are pulled out from their comfort zone to growth zone. In this aspect, to stimulate students’
learning and growth, supportive resources from teachers and peers to cope with challenges
are more important than creating a challenging learning environment. To help students
establish friendships and build collaborations with peers, teachers are suggested to pay
attention to the social environment. Organizing social activities might be helpful (Brouwer et
al., 2016).

Second, a “one-size-fits-all” solution may not be appropriate. Students with a high need
for autonomy perceived stronger effects of university support on their entrepreneurial
perceptions. These students are most likely to start their business and universities might
develop initiatives aim at providing support specifically tailored to different stages of start-
ups, back up for their independence and autonomy. Besides, personal needs and course
characteristics interact with each other and influence students’ entrepreneurship outcomes.
Teachers may need to employ different teaching methods to match different types of students
(Iipinge & Shimpanda, 2022). For students with a high need for achievement, teachers could
challenge their ideas more frequently and deeply, and provide more feedback on their
progress; as for high need for affiliation students, teachers should show their approval and
acceptance and cultivate positive interactions with them.

Furthermore, promotion or prevention focused students experience different levels of
study engagement and differ in their response to supportive resources. As such, it may be
important for teachers to recognize students’ regulatory focus tendency and understand
how it may drive students toward supportive resources. Promotion focus is more relevant
to entrepreneurial behaviors as compared with prevention focus (Hu et al., 2018), and the
study presented in Chapter 4 shows that promotion focus positively, and prevention focus
negatively relate to student well-being and subsequently their entrepreneurial career
intentions. Despite this, with appropriate support resources, high prevention focused
students or students with low promotion focus could also experience high well-being and
motivation and develop intentions to start their own business. Therefore, teachers are
suggested to tailor the supportive resources to students with different levels of promotion or
prevention focus to facilitate their motivation and entrepreneurship career development.
Conclusion

Taken together, building on various theoretical perspectives, the studies presented in this dissertation help advance entrepreneurship education literature and practice. The characteristics introduced in Chapter 2 to Chapter 5 provide a novel way of assessing and improving entrepreneurship support, educational courses and programs. By investigating both motivational and behavioral processes, this dissertation presents a holistic theoretical framework to investigate the explanatory mechanisms between entrepreneurship education and students’ entrepreneurship outcomes and how different students benefit from entrepreneurship education differently. Besides providing new insights, several new and unexplored research avenues have been recommended for future studies that may help further advance theoretical and practical implications. Taken together, future studies are encouraged to employ diverse theoretical perspectives to further address the question of how to teach entrepreneurship more effectively.
Summary
Youth employment has been heavily affected by the global pandemic. The access to the labor market is difficult for youth and entrepreneurship is an important alternative (Zhang & Huang, 2021). Entrepreneurship is essential as it creates value for society, brings innovation to the market, increases economic growth, creates new jobs, and sustains employment levels (Zhao et al., 2005). Hence, preparing today’s young students for successful venture creation in the new global marketplace is one of the most important responsibilities in higher education (Sowmya et al., 2010). Entrepreneurship support and education are important tools to cultivate future entrepreneurs and should be available for all students to provide them with the opportunities to explore their potential.

Despite the importance of entrepreneurship to society and the growing emphasis on entrepreneurship education, debates about the effective teaching approaches continue to arise, leaving unanswered the question of how to teach entrepreneurship more effectively (Bell, 2022; Liu et al., 2021). To better explain how entrepreneurship education can be beneficial to the development of students’ entrepreneurship outcomes, this dissertation will provide answers to three questions that previous studies have not yet thoroughly addressed. First of all, what are the effective characteristics of entrepreneurship education within higher education? Second, what are the explanatory mechanisms between entrepreneurship education and student outcomes? Third, if students are expected to benefit from entrepreneurship education and develop positive outcomes, do different types of students benefit differently and if so, how? With these questions in mind, this dissertation sets out to advance our understanding of evaluating and improving entrepreneurship support and education.

**Question 1: What are the characteristics of effective entrepreneurship education within higher education?**

Studies on the impact of entrepreneurship education on student outcomes in higher education have offered mixed findings (Hahn et al., 2020; Nabi et al., 2017) and little is known about the differential impact of various entrepreneurship education characteristics (Yang et al., 2021). By applying various theoretical perspectives and conducting multiple empirical studies, this dissertation made an integrated effort to show the impact of universities’ entrepreneurship support as well as the characteristics of educational courses and programs.

Building on the theory of planned behavior (TPB, Ajzen, 1991) and partly corresponding with previous studies (e.g., Feola et al., 2019; Saeed et al., 2019), the results of Chapter 2 showed that perceived university support for entrepreneurship positively related to attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy. Given the increasing focus on university support for entrepreneurship (Yang et al., 2021), the study described in Chapter 2 advances our understanding by testing an integrated model in which
environmental factors and three TPB motivational constructs are included.

Higher education studies have extensively investigated educational course and program characteristics and their relation to the study outcomes of students (e.g., Kember & Leung, 2008; Yin et al., 2015). However, approaches of investigating and assessing the effectiveness of entrepreneurship education are still scant (Nabi et al., 2017). Building on social cognitive theory (Bandura, 1986), in Chapter 3 we introduce the concepts of a challenging learning environment and supportive teacher-student relationships as key aspects of an effective entrepreneurship course. Corroborating the results of previous studies conducted in other educational settings (e.g., Brouwer et al., 2016, Xerri et al., 2017), our findings showed that a challenging learning environment related positively to entrepreneurial self-efficacy and study engagement. Supportive teacher-student relationships related positively to study engagement, but not entrepreneurial self-efficacy.

To obtain deeper insights into program characteristics and study engagement, Chapter 4 labeled a challenging learning environment and teacher-student relationships studied in Chapter 3 as challenge demands and resources and investigated these characteristics from the perspective of the job demands-resources theory (Bakker & Demerouti, 2007, 2008). The results showed that teacher-student and student-student relationships (as supportive resources), but not a challenging learning environment (posing challenge demands), positively and significantly related to study engagement. The non-significant impact of a challenging learning environment is contrary to the results reported in Chapter 3, which did show a significant relationship between a challenging learning environment and study engagement.

One possible explanation might be a ceiling effect for challenge demands due to the already more challenging nature of experiential entrepreneurship programs (Chapter 4), as compared to more traditional entrepreneurship courses (Chapter 3). It can be expected that when following a more traditional, theoretical-oriented course, students are more in their comfort zone than when following an experiential learning program and they need challenging assignments to draw them into the learning zone. Experiential programs expose students to a “real” entrepreneurship context and in this way, the challenges draw most, if not all students outside their comfort zone into the growth (learning) zone where learning and growth take place (cf. the learning zone model; Senninger, 2000; Vygotsky, 1978). Experiential learning programs stimulate students to act and take risks, because of which they step into their learning zone. In this context, students may need more support from teachers and peers during the transition from the comfort zone to the growth zone and avoid moving into the panic zone (Young et al., 2018). Guidance from teachers and cooperation with peers help students reflect on what they have learned, and students may experience study engagement, an affective-motivational state encompassing vigor, dedication, and absorption.
Not only the motivational constructs studied in Chapter 3 and Chapter 4, but also the impact of program characteristics on behavioral constructs is absent in the literature. Hence, Chapter 5 focused on program characteristics from a feedback seeking perspective (e.g., Anseel et al., 2015, 2016). We learned from work and organizational research and investigated the impact of cost-value perceptions and social capital on students’ feedback seeking behavior. Corroborating the results of previous studies (Sung & Choi, 2021), the findings suggested that when students perceived the potential value of feedback to be positive, they would seek feedback more frequently. The expectation was that when students perceive the costs of seeking feedback to be high, they would be less inclined to seek feedback. However, the impact of perceived feedback seeking costs was not significant (Anseel et al., 2015). One explanation might be the practical module of experiential programs. Students are stimulated to get out of the building, and in this case, they should seek feedback from potential customers no matter how high or low the costs of seeking it out is. When students see the feedback from potential customers as valuable for business development, they may go beyond what is required and seek feedback more frequently.

Contrary to the results indicated in Chapter 4 and studies conducted in higher educational settings, in which both teacher-student and student-student relationism were found to be important for study outcomes (e.g., Brouwer et al., 2016), our longitudinal study in Chapter 5 found that student-student relationships related significantly and positively to feedback seeking behavior, whereas the impact of teacher-student relationships was not significant. An explanation might be the different outcome measures used in the studies reported in Chapter 4 and Chapter 5. Though both teacher-student and student-student relationships foster study engagement (Chapter 4), regarding the more practical feedback seeking process (Chapter 5), the discussion and collaboration with peers contributed better than the instructions and guidance from teachers.

**Question 2: What are the explanatory mechanisms of the relationship between entrepreneurship education and entrepreneurship outcomes for students?**

Empirical studies on the indirect effects of entrepreneurship support and education on students’ entrepreneurial intentions are scarce (Eesley et al., 2021; Saeed et al., 2015) and our understanding of the mechanisms through which entrepreneurship support and education may have their impacts remains limited. Therefore, broader theoretical underpinnings are needed to fill in the gap and enrich entrepreneurship education research (Carpenter & Wilson, 2022; Martínez-Gregorio et al., 2021). Building on the motivational and behavioral process as articulated in various theoretical perspectives, the studies presented in this dissertation are to our knowledge the first to provide new insights into how entrepreneurship support and education foster entrepreneurship outcomes for students through different processes.
The study presented in Chapter 2 showed that perceived university support for entrepreneurship positively and significantly related to students’ entrepreneurial intentions through subjective norms and entrepreneurial self-efficacy. Meanwhile, perceived university support related significantly and positively to attitudes toward entrepreneurship, and unexpectedly, attitudes toward entrepreneurship did not significantly relate to entrepreneurial intentions. Although university support has been found relevant to entrepreneurial intentions indirectly via attitudes toward entrepreneurship (Feola et al., 2019) and entrepreneurial self-efficacy (Saeed et al., 2015), studies addressing the role of university support in the integrated TPB including all three motivational indicators are scarce (Lortie & Castogiovanni, 2015). The findings of Chapter 2 extend previous research by introducing environmental factors into the TPB and showing that university support promotes entrepreneurial intentions via subjective norms and entrepreneurial self-efficacy.

Results of the study presented in Chapter 2 also provide evidence for the cross-cultural application of the TPB in a collectivist culture, heeding previous calls of, for instance, Shiri et al. (2017), that more studies in diverse contexts should assess the generalization of the TPB. Our findings showed that attitude toward entrepreneurship was not a significant predictor of entrepreneurial intentions whereas subjective norms were, which is consistent with other studies conducted in the Chinese collectivist context and contradicts studies undertaken in more individualist contexts (Siu & Lo, 2013). The conflicting results regarding the predictive power of attitudes toward entrepreneurship and subjective norms are mostly attributed to the cultural context in which the study was conducted (Al-Jubari et al., 2017).

Previous studies extensively described the pathways between entrepreneurship education and student outcomes in terms of “cold” cognitive processes, such as through increased entrepreneurial self-efficacy as studied in Chapter 2. “Hot” affective processes rarely enter the picture (Healey et al., 2017; Nabi et al., 2017). The findings of the study presented in Chapter 3 showed that a challenging learning environment significantly and positively related to entrepreneurial intentions via entrepreneurial self-efficacy and study engagement. Although teacher-student relationships related to study engagement and study engagement, in turn, fostered entrepreneurial intentions, the indirect effect of teacher-student relationships on entrepreneurial intentions via study engagement was not significant over and above the indirect effect of a challenging learning environment on entrepreneurial intentions via study engagement. The study adds valuable new insights by empirically unveiling the cognitive and affective mechanisms explaining how entrepreneurship course characteristics relate to students’ entrepreneurial intentions.

Study engagement, as an indicator of student well-being (Maricuțoiu & Sulea, 2019), was investigated in the study presented in Chapter 4 as the motivational process through which entrepreneurship programs related to students’ entrepreneurial (career) intentions. Our
findings showed that the indirect effect of student-student relationships on entrepreneurial career intentions via study engagement was not significant over and above the indirect effect of teacher-student relationships on entrepreneurial career intentions via study engagement. The indirect effect of a challenging environment on entrepreneurial career intentions was not significant because no significant relationship was found between a challenging learning environment and study engagement. This is contrary to the results presented in Chapter 3, which might be due to the different nature of the learning environment between more theoretical-oriented courses (Chapter 3) and more practical-oriented programs (Chapter 4) as was explained before.

In addition to the motivational processes discussed in Chapter 2 to Chapter 4, a behavioral process was also found to be an explanatory process (Shemueli et al., 2020). Our longitudinal study presented in Chapter 5 is one of the first studies that proposed and examined the role of student feedback seeking within the experiential learning context of a lean startup-based entrepreneurship program. The findings showed that participation in entrepreneurship programs significantly enhanced students’ entrepreneurial self-efficacy. The indirect effect of student-student relationships on entrepreneurial self-efficacy via feedback seeking behavior was not significant over and above the indirect effect of the perceived value of feedback on entrepreneurial self-efficacy via feedback seeking behavior.

*Question 3: If students are expected to benefit from entrepreneurship education and develop positive entrepreneurship outcomes, do different types of students benefit differently and if so, how?*

Although some studies have shown a favorable impact of entrepreneurship education on students’ entrepreneurship outcomes (e.g., Liu et al., 2021), existing research offers little insights into whether and why some students may benefit more than others and does not focus on the moderating role of students’ differences (Nabi et al., 2017). Moreover, the mixed findings as concerns the impact of entrepreneurship education (Hahn et al., 2020) also indicate there may be individual differences in students’ responses to entrepreneurship education.

Building on the person-environment fit theory (Kristof-Brown et al., 2005), the studies presented in Chapter 2 and Chapter 3 extended previous studies by introducing and investigating the moderating role of students’ personal needs. More specifically, the study presented in Chapter 2 showed that a university’s supportive environment for entrepreneurship related stronger to attitudes toward entrepreneurship, subjective norms, and entrepreneurial self-efficacy for students with a high need for autonomy. Within the context of an entrepreneurship course, we extended the insights gained in Chapter 2 and focused on two other types of needs, namely need for achievement and need for affiliation.
Summary

(Chapter 3). The results showed that need for achievement strengthened the positive relationship between a challenging learning environment and study engagement. Supportive teacher-student relationships were significant in fostering entrepreneurial self-efficacy for students with a high need for affiliation.

The study presented in Chapter 4 focused on another individual difference variable, namely regulatory focus. In line with the results of Liu et al. (2020) and extending their findings to entrepreneurship programs, our findings showed that promotion focus positively, and prevention focus negatively related to study engagement. Besides, and unexpectedly, this study showed that both promotion and prevention focus boosted the positive effect of student-student relationships on study engagement. Prevention focus attenuated the positive effect of teacher-student relationships on study engagement. The findings enrich the literature with respect to students’ different responses to program resources. Also, this is among the first studies that unveiled the moderating role of regulatory focus in the JD-R model in the context of experiential entrepreneurship programs. Overall, the study presented in Chapter 4 adds to the literature by pointing out the relevance of regulatory focus for study engagement and subsequently being relevant to the future career development of students.

Conclusion

To conclude, the number of entrepreneurship courses and programs in higher education has grown rapidly worldwide, and this growth reflects the increasing recognition that university-based support and education should foster students' entrepreneurship outcomes. While most studies showed the importance of entrepreneurship education, little attention has been paid to the differential impact of different educational characteristics, the mechanisms through which these characteristics may have their impact, and whether and how students respond to these characteristics differently. Building on various theoretical perspectives, the studies presented in this dissertation help advance entrepreneurship education literature and practice. This dissertation shows that supportive social resources are more essential in experiential entrepreneurship programs, as compared to more traditional courses. Though both teacher-student and student-student relationships foster study engagement, regarding more practical feedback seeking process, collaborations between students contribute better than guidance from teachers. In contrast, in more traditional courses offering more challenging assignments plays a more important role. Previous studies have investigated the cognitive pathways through which entrepreneurship support and education relate to students’ entrepreneurship outcomes, whereas affective and behavioral processes have received scant attention in the literature. Our research is among the first that disentangle the affective and behavioral mechanisms from various theoretical perspectives. Furthermore, a one-size-fits-all solution may not be appropriate. Our studies show that psychological needs and regulatory focus are moderators of the way the study environment relates to study
outcomes. Besides providing new insights, several new and unexplored research avenues have been recommended for future studies that may help further advance theoretical and practical implications.
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Nederlandse Samenvatting

(Summary in Dutch)
De werkgelegenheid onder jongeren is zwaar getroffen door de wereldwijde pandemie. Jongeren krijgen moeilijk toegang tot de arbeidsmarkt en ondernemerschap is daarom een belangrijk alternatief geworden (Zhang & Huang, 2021). Ondernemerschap is essentieel omdat het waarde creëert voor de maatschappij, innovaties op de markt brengt, de economische groei versterkt, nieuwe banen creëert en de werkgelegenheid op peil houdt (Zhao et al., 2005). Het voorbereiden van jonge studenten op het succesvol opzetten van ondernemingen in de nieuwe wereldmarkt wordt daarom in het hoger onderwijs als een belangrijke verantwoordelijkheid beschouwd (Sowmya et al., 2010). Ondernemerschapsondersteuning en -onderwijs zijn belangrijke instrumenten die beschikbaar zouden moeten zijn voor alle studenten om hen de mogelijkheden te bieden om hun potentieel als ondernemer te verkennen.

Ondanks het belang van ondernemerschap voor de maatschappij en de groeiende nadruk op ondernemerschapsonderwijs, is nog niet duidelijk hoe effectief de huidige onderwijsbenaderingen zijn en hoe ondernemerschap effectiever onderwezen kan worden (Bell, 2022; Liu et al., 2021). Om beter te kunnen verklaren hoe ondernemerschapsonderwijs bevorderlijk kan zijn voor de ontwikkeling van ondernemerschap van studenten, zal ik in dit proefschrift antwoord geven op drie vragen die in eerdere studies nog niet volledig zijn behandeld. Ten eerste, wat zijn de kenmerken van effectief ondernemerschapsonderwijs binnen het hoger onderwijs? Ten tweede, wat zijn de mechanismen die de relatie tussen ondernemerschapsonderwijs en studie-uitkomsten van studenten verklaren? Ten derde, als verwacht wordt dat studenten baat hebben bij ondernemerschapsonderwijs en hierdoor positieve resultaten behalen, hebben verschillende typen studenten daar dan in verschillende mate profijt van en zo ja, hoe? De verwachting is dat de antwoorden op deze vragen ons begrip kunnen vergroten van hoe ondernemerschapsondersteuning en -onderwijs geëvalueerd en verbeterd kunnen worden.

**Vraag 1: Wat zijn de kenmerken van effectief ondernemerschapsonderwijs binnen het hoger onderwijs?**

Studies naar de impact van ondernemerschapsonderwijs op de resultaten van studenten in het hoger onderwijs hebben gemengde bevindingen opgeleverd (Hahn et al., 2020; Nabi et al., 2017). Ook is er weinig bekend over de differentiële impact van verschillende kenmerken van ondernemerschapsonderwijs (Yang et al., 2021). Door verschillende theoretische perspectieven toe te passen en meerdere empirische studies uit te voeren, is in dit proefschrift een geïntegreerde poging gedaan om zowel de impact van de ondernemerschapsondersteuning vanuit universiteiten als de kenmerken van onderwijscurssussen en -programma's aan te tonen.
Voortbouwend op de theorie van gepland gedrag (TPB, Ajzen, 1991) en deels overeenkomend met eerdere studies (e.g., Feola et al., 2019; Saeed et al., 2019), toonden de resultaten van Hoofdstuk 2 aan dat waargenomen universitaire steun voor ondernemerschap positief samenhangt met attitudes ten aanzien van ondernemerschap, subjectieve normen, en self-efficacy met betrekking tot ondernemen. Gezien de toenemende aandacht voor ondernemerschapsondersteuning vanuit de universiteit (Yang et al., 2021), draagt de studie beschreven in Hoofdstuk 2 bij aan ons begrip door een geïntegreerd model te testen waarin omgevingsfactoren en drie TPB motivationele constructen zijn opgenomen.

In studies in het hoger onderwijs is uitgebreid gekeken naar de kenmerken van onderwijsonderdelen en -programma’s en hun relatie met de studieresultaten van studenten (e.g., Kember & Leung, 2008; Yin et al., 2015). Echter, methoden om de effectiviteit van ondernemerschapsonderwijs te onderzoeken en beoordelen zijn nog schaars (Nabi et al., 2017). Voortbouwend op de sociaal-cognitieve theorie (Bandura, 1986), introduceren we in Hoofdstuk 3 de concepten van een uitdagende leeromgeving en ondersteunende docent-student relaties als belangrijkste aspecten van een effectieve ondernemerschaps cursus. Onze bevindingen bevestigen de resultaten van eerdere studies in andere onderwijssettings (e.g., Brouwer et al., 2016, Xerri et al., 2017), en laten zien dat een uitdagende leeromgeving positief samenhangt met studiebetrokkenheid en self-efficacy met betrekking tot ondernemen. Ondersteunende docent-student relaties blijken positief samen te hangen met studiebetrokkenheid, maar niet met self-efficacy.

Om meer inzicht te krijgen in programmakenmerken en studiebetrokkenheid, werden in Hoofdstuk 4 een uitdagende leeromgeving en de docent-studentrelaties, zoals bestudeerd in Hoofdstuk 3, bestempeld als uitdagingseisen en hulpbronnen. Deze kenmerken zijn vervolgens onderzocht vanuit het perspectief van de Job Demands-Resources (JD-R) theorie (Bakker & Demerouti, 2007, 2008). De resultaten toonden aan dat docent-student en student-student relaties (als ondersteunende hulpbronnen) positief en significant samenhangen met studiebetrokkenheid, maar een uitdagende leeromgeving (die uitdagingeisen stelt) niet. Het niet-significante effect van een uitdagende leeromgeving is in tegenspraak met de resultaten gerapporteerd in Hoofdstuk 3, die wel een significante relatie aantoonden tussen een uitdagende leeromgeving en studiebetrokkenheid.

Een mogelijke verklaring zou een plafondefense voor uitdagingseisen kunnen zijn, omdat de bestaande ervaringsgerichte ondernemerschapsprogramma’s reeds meer uitdagend van aard zijn (Hoofdstuk 4), in vergelijking met meer traditionele ondernemerschaps cursussen (Hoofdstuk 3). Het is aannemelijk dat wanneer studenten een meer traditionele en theoretisch georiënteerde cursus volgen, zij meer in hun comfortzone blijven dan wanneer zij een programma met ervaringsleren volgen. Daarom hebben zij bij meer traditioneel onderwijs mogelijk meer uitdagende opdrachten nodig om hen in de leerzone te trekken.
Ervaringsgerichte ondernemerschapsprogramma’s stellen studenten bloot aan een “echte” ondernemerschapscontext en op deze manier trekken de uitdagingen de meeste, zo niet alle studenten uit hun comfortzone naar de groeizone (leerzone) waar leren en groei plaatsvinden (cf. het leerzonemodel; Senninger, 2000; Vygotsky, 1978). Ervaringsgerichte programma’s stimuleren studenten om te handelen en risico’s te nemen, waardoor ze in hun leerzone stappen. In deze context kunnen leerlingen meer ondersteuning nodig hebben van docenten en studiegenoten (peers) tijdens de overgang van de comfortzone naar de groeizone, om te voorkomen dat ze in de paniekzone terechtkomen (Young et al., 2018). Begeleiding van docenten en samenwerking met studiegenoten helpt studenten om te reflecteren op wat ze hebben geleerd. Ook kunnen studenten hierdoor studiebetrokkenheid ervaren, een affectief-motiverende staat die daadkracht, toewijding en absorptie omvat.

Niet alleen de motivationele constructen die in Hoofdstuk 3 en Hoofdstuk 4 zijn bestudeerd, maar ook de impact van programmakkenmerken op gedragsconstructen ontbrak in de literatuur. Daarom richtte Hoofdstuk 5 zich op programmakkenmerken vanuit het perspectief van feedback zoeken (e.g., Anseel et al., 2015, 2016). We leerden van werk- en organisatieonderzoek en onderzochten de impact van kosten-waardepercepties en sociaal kapitaal op het feedback zoekende gedrag van studenten. De bevindingen bevestigden de resultaten van eerdere studies (Sung & Choi, 2021) en suggereerden dat wanneer studenten de potentiële waarde van feedback (baten) als positief ervaren, ze vaker feedback zoeken. De verwachting was dat wanneer studenten de kosten van feedback zoeken hoog inschatten, ze minder geneigd zouden zijn om feedback te vragen. Het effect van waargenomen kosten van feedback zoeken was echter niet significant (Anseel et al., 2015). Een mogelijke verklaring zou de praktische module van ervaringsgerichte programma’s kunnen zijn. Studenten worden gestimuleerd om het gebouw uit te gaan en moeten in dit geval feedback vragen van potentiële klanten, ongeacht hoe hoog of laag de kosten zijn om dit te doen. Wanneer studenten de feedback van potentiële klanten als waardevol ervaren voor de ontwikkeling van het bedrijf, zullen zij misschien meer doen dan vereist en vaker feedback zoeken.

In tegenstelling tot de resultaten in Hoofdstuk 4 en eerdere studies die zijn uitgevoerd in het hoger onderwijs, waarin zowel docent-student als student-student relaties belangrijk bleken te zijn voor studie-uitkomsten (e.g., Brouwer et al., 2016), vonden wij in onze longitudinale studie in Hoofdstuk 5 dat student-student relaties significant en positief gerelateerd waren aan feedback zoekend gedrag, terwijl de impact van docent-student relaties niet significant was. Een verklaring hiervoor zou kunnen liggen in de verschillende uitkomstmaten die in de studies in Hoofdstuk 4 en Hoofdstuk 5 zijn gebruikt. Hoewel zowel docent-student als student-student relaties bevorderlijk waren voor studiebetrokkenheid (Hoofdstuk 4), leverde bij het meer praktische proces van feedback zoeken de discussie en samenwerking met medeleerlingen een betere bijdrage dan de instructies en begeleiding van docenten (Hoofdstuk 5).
Vraag 2: Wat zijn de mechanismen die de relatie tussen ondernemerschapsonderwijs en de studie-uitkomsten van studenten verklaren?

Empirische studies naar de indirecte effecten van ondernemerschapsondersteuning vanuit de universiteit en ondernemerschapsonderwijs op de intenties van studenten om ondernemer te worden zijn schaars (Eesley et al., 2021; Saeed et al., 2015). Ook blijft ons begrip van de mechanismen waarmee ondernemerschapsondersteuning en -onderwijs hun impact kunnen hebben beperkt. Er zijn daarom bredere theoretische onderbouwingen nodig om dit gat op te vullen en het onderzoek naar ondernemerschapsonderwijs te verrijken (Carpenter & Wilson, 2022; Martínez-Gregorio et al., 2021). Voortbouwend op het motivationele en gedragsproces zoals beschreven in verschillende theoretische perspectieven, zijn de studies in dit proefschrift naar ons weten de eerste die nieuwe inzichten verschaffen in hoe ondernemerschaps-ondersteuning en -onderwijs via verschillende processen de resultaten van studenten bevorderen.

De studie in Hoofdstuk 2 toonde aan dat de ervaren universitaire steun voor ondernemerschap positief en significant samenhangt met de ondernemersintenties van studenten via subjectieve normen en self-efficacy met betrekking tot ondernemen. Daarnaast bleek de ervaren universitaire ondersteuning significant en positief samen te hangen met attitudes ten aanzien van ondernemerschap, en onverwacht bleken attitudes ten aanzien van ondernemerschap niet significant samen te hangen met ondernemersintenties. Hoewel universitaire ondersteuning indirect relevant is bevonden voor ondernemersintenties via attitudes ten aanzien van ondernemerschap (Feola et al., 2019) en self-efficacy (Saeed et al., 2015), zijn studies die de rol van universitaire ondersteuning in een geïntegreerd model onderzoeken vanuit de TPB, waarbij alle drie de motivationele indicatoren worden meegenomen schaars (Lortie & Castogiovanni, 2015). De bevindingen van Hoofdstuk 2 vullen de resultaten van eerder onderzoek aan door omgevingsfactoren te introduceren in de TPB en te laten zien dat universitaire ondersteuning ondernemersintenties bevordert via subjectieve normen en self-efficacy.

Resultaten van de studie gepresenteerd in Hoofdstuk 2 leveren ook bewijs voor de cross-culturele toepasbaarheid van de TPB in een collectivistische cultuur. We geven daarmee gehoor aan eerdere oproepen van bijvoorbeeld Shiri et al. (2017), dat meer studies in diverse contexten de generaliseerbaarheid van de TPB zouden moeten beoordelen. Onze bevindingen toonden aan dat attitude ten opzichte van ondernemerschap geen significante voorspeller was van ondernemersintenties terwijl subjectieve normen dat wel waren, wat consistent is met andere studies uitgevoerd in een Chinese collectivistische context en in tegenspraak met studies uitgevoerd in meer individualistische contexten (Siu & Lo, 2013). De tegenstrijdige resultaten met betrekking tot de voorspellende waarde van attitudes ten aanzien van ondernemerschap en subjectieve normen worden meestal toegeschreven aan de
culturele context waarin het onderzoek werd uitgevoerd (Al-Jubari et al., 2017).

Eerdere studies beschreven uitgebreid de relatie tussen ondernemerschapsonderwijs en studentuitkomsten in termen van “koude” cognitieve processen, zoals via de in Hoofdstuk 2 bestudeerde verhoogde self-efficacy met betrekking tot ondernemen. “Warme” affectieve processen komen zelden in beeld (Healey et al., 2017; Nabi et al., 2017). De bevindingen van de studie gepresenteerd in Hoofdstuk 3 toonden aan dat een uitdagende leeromgeving significant en positief gerelateerd was aan ondernemersintenties via self-efficacy en studiebetrokkenheid. Hoewel docent-student relaties gerelateerd waren aan studiebetrokkenheid en studiebetrokkenheid op haar beurt ondernemersintenties bevorderde, was het indirecte effect van docent-student relaties op ondernemersintenties via studiebetrokkenheid niet significant, nadat het indirecte effect van een uitdagende leeromgeving op ondernemersintenties via studiebetrokkenheid al aan de vergelijking was toegevoegd. De studie levert waardevolle nieuwe inzichten op door op empirische wijze de cognitieve en affectieve mechanismen bloot te leggen die verklaren hoe kenmerken van de cursus ondernemerschap samenhangen met de ondernemersintenties van studenten.

Studiebetrokkenheid, als indicator van het welbevinden van studenten (Maricuțoiu & Sulea, 2019), werd in de studie in Hoofdstuk 4 onderzocht als het motivationele proces waardoor ondernemerschapsprogramma’s samenhangen met de ondernemerschaps- (loopbaan) intenties van studenten. Onze bevindingen toonden aan dat het indirecte effect van student-student relaties op ondernemerschapsintenties via studiebetrokkenheid niet significant was, als dit aan de vergelijking werd toegevoegd nadat de relatie tussen docent-student relaties en ondernemersintenties via studiebetrokkenheid al aan de vergelijking was toegevoegd. Het indirecte effect van een uitdagende leeromgeving op ondernemersintenties was niet significant, omdat er geen significant verband werd gevonden tussen een uitdagende leeromgeving en studiebetrokkenheid. Dit is in tegenspraak met de resultaten gepresenteerd in Hoofdstuk 3. Dit is mogelijk te wijten aan verschillen in leeromgeving tussen meer theoretisch georiënteerde opleidingen (Hoofdstuk 3) en meer praktijkgerichte opleidingen (Hoofdstuk 4), zoals eerder werd uitgelegd.

Naast de motivationele processen die in Hoofdstuk 2, 3 en 4 zijn besproken, bleek ook een gedragsproces een verklarend proces te zijn (Shemueli et al., 2020). Onze longitudinale studie, gepresenteerd in Hoofdstuk 5, is een van de eerste studies die de rol van feedback zoeken door studenten binnen de ervaringsgerichte leercontext van een lean startup-gebaseerd ondernemerschapsprogramma heeft voorgesteld en onderzocht. De bevindingen toonden aan dat deelname aan ondernemerschapsprogramma’s de self-efficacy met betrekking tot ondernemen van studenten significant verbeterde. Het indirecte effect van student-student relaties op self-efficacy via feedback zoeken was niet significant naast het indirecte effect van de waargenomen waarde van feedback op self-efficacy via feedback zoeken.
Vraag 3: Als verwacht wordt dat studenten baat hebben bij ondernemerschapsonderwijs en positieve resultaten behalen, hebben verschillende typen studenten daar dan in verschillende mate profijt van en zo ja, hoe?

Hoewel sommige eerdere studies een gunstig effect van ondernemerschapsonderwijs op de ondernemerschapsuitoekomen van studenten hebben aangetoond (e.g., Liu et al., 2021), biedt bestaand onderzoek weinig inzicht in de vraag of en waarom sommige studenten er meer baat bij hebben dan anderen. Ook richt het zich niet op de modererende rol van verschillen tussen studenten (Nabi et al., 2017). Bovendien wijzen de gemengde bevindingen met betrekking tot de impact van ondernemerschapsonderwijs (Hahn et al., 2020) er ook op dat er individuele verschillen kunnen zijn in de reacties van studenten op ondernemerschapsonderwijs.

Op basis van op de persoon-omgeving fit theorie (Kristof-Brown et al., 2005), hebben de studies gepresenteerd in Hoofdstuk 2 en Hoofdstuk 3 voortgebouwd op eerdere studies door de modererende rol van persoonlijke behoeften van studenten te introduceren en te onderzoeken. Meer specifiek, de studie in Hoofdstuk 2 toonde aan dat de ondersteuning vanuit de universiteit sterker gerelateerd was aan ondernemerschapsattitudes, subjectieve normen, en self-efficacy voor studenten met een hoge behoefte aan autonomie. Binnen de context van een ondernemerschaps cursus hebben we de inzichten uit Hoofdstuk 2 uitgebreid en ons gericht op twee andere typen behoeften, namelijk de behoefte aan prestatie en de behoefte aan verbondenheid (Hoofdstuk 3). De resultaten toonden aan dat de behoefte aan prestatie de positieve relatie tussen een uitdagende leeromgeving en studiebetrokkenheid versterkte. Ondersteunende docent-student relaties waren significant in het bevorderen van ondernemende zelfredzaamheid voor studenten met een hoge behoefte aan verbondenheid.

De studie in Hoofdstuk 4 richtte zich op een ander individueel verschil, namelijk regulatieve focus. In lijn met de resultaten van Liu et al. (2020) en hun bevindingen uitgebreid naar ondernemerschapsprogramma’s, toonden onze bevindingen aan dat promotiefocus positief, en preventiefocus negatief gerelateerd was aan studiebetrokkenheid. Onverwacht toonde deze studie ook aan dat zowel promotie- als preventiefocus het positieve effect van student-student relaties op studiebetrokkenheid versterkten. Preventiefocus verzwakte het positieve effect van docent-student relaties op studiebetrokkenheid. De bevindingen verrijken de literatuur met betrekking tot de verschillende reacties van studenten op de middelen (resources) die studieprogramma’s bieden. Ook is dit een van de eerste studies die de modererende rol van regulatieve focus in het JD-R model in de context van ervaringsgerichte ondernemerschapsprogramma’s heeft onthuld. Over het geheel genomen draagt de studie in Hoofdstuk 4 bij aan de literatuur door te wijzen op de relevantie van regulatieve focus voor studiebetrokkenheid, wat relevant is voor de toekomstige loopbaan van studenten.
Nederlandse Samenvatting

Conclusie

Concluderend kan worden gesteld dat het aantal cursussen en programma's op het gebied van ondernemerschap in het hoger onderwijs wereldwijd snel is toegenomen. Deze groei weerspiegelt de toenemende erkenning dat onderwijs en ondersteuning vanuit de universiteit de resultaten van studenten op het gebied van ondernemerschap zouden moeten bevorderen. Hoewel de meeste studies het belang van ondernemerschapsonderwijs hebben aangetoond, is er weinig aandacht besteed aan de differentiële impact van verschillende onderwijskenmerken, de mechanismen waardoor deze kenmerken hun impact kunnen hebben, en of en hoe studenten verschillend reageren op deze kenmerken. Voortbouwend op verschillende theoretische perspectieven, helpen de studies die in dit proefschrift worden gepresenteerd de literatuur en praktijk van het ondernemerschapsonderwijs vooruit. Deze dissertatie toont aan dat ondersteunende sociale hulpbronnen essentiëler zijn in ervaringsgerichte ondernemerschapsprogramma's dan in meer traditionele cursussen. Hoewel zowel docent-student als student-student relaties studiebetrokkenheid bevorderen, dragen samenwerkingen tussen studenten beter bij aan het meer praktische feedback zoekproces dan begeleiding door docenten. In meer traditionele programma's speelt het aanbieden van uitdagende taken een grotere rol. Eerdere studies hebben de cognitieve paden onderzocht waarlangs ondernemerschaps-ondersteuning vanuit de universiteit en ondernemerschapsprogramma's gerelateerd zijn aan de ondernemerschapsresultaten van studenten, terwijl affectieve en gedragsprocessen nauwelijks aandacht hebben gekregen in de literatuur. Ons onderzoek is één van de eerste die de affectieve en gedragsmatige mechanismen ontrafelt vanuit verschillende theoretische perspectieven. Bovendien lijkt op basis van de resultaten een one-size-fits-all oplossing niet geschikt. Onze studies tonen aan dat psychologische behoeften en regulatieve focus de manier waarop de studieomgeving samenhangt met studie-uitkomsten modereren. Naast het verschaffen van nieuwe inzichten, zijn er verschillende nieuwe en onontgonnen onderzoeksrichtingen aanbevolen voor toekomstige studies die kunnen bijdragen aan verdere theoretische en praktische implicaties.
Curriculum
Vitae
Curriculum Vitae

Maike Liu was born on April 1993 in Henan, China. From 2011 to 2015, she studied Land Resource Management and obtained her bachelor’s degree in Management at Huazhong Agricultural University (HZAU) in Wuhan, China, and a minor degree in accounting at Wuhan University (WHU). From 2015 to 2018, she was recommended to the master’s program in public administration at the University of Science and Technology of China (USTC) in Hefei, China and obtained her master’s degree of management. During the master’s period, she also gained extensive experiences in teaching assistances, conferences, grants applications, and finished her degree thesis entitled “How students’ entrepreneurial motivation fosters nascent entrepreneurial behavior: Entrepreneurship learning as mediator”. In September 2018, she started her PhD research at the Department of Psychology, Education & Child Studies at Erasmus University Rotterdam (EUR). In this dissertation, her studies about entrepreneurship education, in collaboration with Fontys Center for Entrepreneurship and universities in China, are presented.

Publications


Papers submitted for publication

Liu, M., Gorgievski, M. J., Zwaga, J., & Paas, F. Understanding and Motivating Student Feedback Seeking: An Insight from the Lean Startup Based Entrepreneurship Program.

Liu, M., Gorgievski, M. J., Zwaga, J., & Paas, F. Entrepreneurship Programs, Student Well-being, and Entrepreneurial Career Intentions: A Longitudinal Study.
Conference Presentations


Courses

- English academic writing for PhD candidates (edition 3; Mar 2019) 2 ECTS
- Self-presentation: focus, structure, interaction, and visualization (Nov 2019) 2.5 ECTS
- How to get your article published (Sep 2020) 2.5 ECTS
- Shut up and write (Dec 2020) 1 ECTS
- Professionalism and integrity in research (Mar 2021) 1.5 ECTS
- Making an academic poster that stands out (Apr 2021) 1.5 ECTS
- Data Analysis with R (March 2022) 2.5 ECTS
“Il n’y a qu’un héroïsme au monde: c’est de voir le monde tel qu’il est, et de l’aimer.”

Romain Rolland
Acknowledgements
Acknowledgements

“Those times when you get up early and you work hard;
those times when you stay up late and you work hard;
those times when you don’t feel like working, you are too tired, you do not want to push yourself,
but you do it anyway;

It is not the destination; it is the journey.”

When I start writing this very final chapter of my dissertation, I know this marks the end of my PhD journey and “student” career. It has been a long journey, being alone in another country, being away from my parents and him. But that is the meaning of the journey, full of adventure, and adventure is worthwhile in itself.

Every now and then, I could not stop questioning myself and the decisions I have made. But deep inside, I have never regretted any choices and decisions I have ever made, especially the decision to come here for my PhD. Looking back on the past four years, I have learned so much and grown up a lot. Being a Chinese PhD studying in the Netherlands, I experienced many good moments, created some unforgettable memories, learned about different cultures, and sparked different ideas with my supervisors and colleagues in discussions and brainstorms. This journey has made me more open-minded, inclusive, enterprising, and enthusiastic, which will be the most precious treasure of my life.

Experiences and memories in the past four years are hard to be concluded in one sentence. If I must do, I would say thank you to everyone who has made this journey possible. I am grateful to get financial support from China Scholarship Council (CSC). Back in 2017 September at USTC, there were a bunch of friends preparing for applying PhD programs abroad. We interchanged information and experiences with each other, received accept and/or reject letters together, shared many smiles and many tears, and most importantly, got each other’s back. Jia Zhang and Wei Huang, at this special time period of a PhD program, best of luck to my friends.

I would like to express my deepest appreciation to a supportive and multidisciplinary supervisory team that provided me with the opportunity to continue pursuing and exploring entrepreneurship education research. Fred, thank you for accepting me being your PhD. Old memories like first a few communications via emails and discussions about how my proposal can fit psychology department after are still in front of my eyes. That is how this journey started and I am grateful for all your support and valuable feedback. Your help is not only in academic, but also in many other aspects. All the encouraging words and catch-ups helped me be more confident and persistent along this journey. When I was struggled with future career, you were always right there to offer help and advice. It is also fun to understand or
misunderstand your dark humors.

Marjan, thank you for being my daily supervisor. You were always right there helping me out when I got confused about how to continue. Under your unreserved help, we made our manuscripts and this very dissertation better as version number grows. I learned a lot from you about how to write the research proposal, how to respond to reviewers decently (Facebook group about Reviewer 2 was exactly a wonderful community), how to make a balance between work and life, how to prepare job interview, ..., and most importantly, how to survive the PhD.

Further, I would like to thank my committee members, Josette Dijkhuizen, Dimitri van der Linden, Sabine Severiens, Bjorn de Koning, and Ingrid Verheul, for the time and effort in reading and evaluating my dissertation.

Data collection is an essential and the most challenging part of our research. In the first two years of my PhD, we spent a lot of time collecting survey data despite many times of failures (trial and error, debug, error and trial). I am grateful for all the support I received during data collection. Specifically, Jun Qi, thank you for coordinating the data collection for my first and second studies at your university and providing me a savior start of my PhD project. It was also a great experience and opportunity to participate in the entrepreneurship competition with your team.

Besides, I sincerely appreciate the support from Fontys Center for Entrepreneurship, which made the following two studies possible. Stijn vd Hoogen, thank you for your kind replies to my emails and we were glad to see you at EUR. Paul van Schelt, thank you for scheduling the interview and the warm welcoming. Clover, thank you for being a student assistant and helping me with the interview. The day we started data collection was exactly the day of the first lockdown in the Netherlands. It was a such pity that the first round of data collection failed but we made it eventually. Jacques Zwaga, thank you for coordinating the following three rounds of data collection. Marjolein Bouter, Victor van der Linden, and Bas van de Broek, thank you for helping me out during data collection.

I would also like to thank all the Chinese and Dutch students who were willing to participate in my interviews and surveys. You are the ones who made these studies possible. Thank you Marjan for translating the questionnaires into Dutch.

I am grateful to be part of O&O group. Sabine, Bjorn, Huib, Kim, Martine, Jingshu, Liying, Jacqueline, Lara, Yi, Lerenzo, Robert, and Sander, thank you for the talks and catch-ups during our meetings, lunch breaks, and outing. Rob, Isil, and Lois, thank you for organizing Ping-Pong, our normal routine at 3.00 pm on T16 before the pandemic. I have to say I am really
good at saying “Ping” (proud face). Romina, Tessa and Brechtje, we shared one office, and it was a great time working together. We also talked a lot about movies, TV shows, travels, and fun gossips. I will not share what we discussed but research shows that we can reap benefits by learning into harmless office chit-chat (grinning face). Together with Pieter, Aike, Sabrina, and Kristine, we shared a lot of fun chats and catchups together. Aysegul, you witnessed my roller coaster ride, down and up, start and end. Thank you for always supporting me.

Brechtje and Shirong, thank you for being my paranymphs. Brechtje, we shared a lot of catchups, coffee, drinks, and cakes. It was such a memorable time we spent together when we were the only ones in T16. Thank you for the friendship, accompaniment and sweet words, also the proofreading of my Dutch summary. Shirong, you were always there when I needed help. Thank you for being by my side and keeping me company during this journey. You also showed warm welcome to Yu Zhang when he was in the Netherlands, and we truly appreciated your friendliness, generosity and kindness.

I am grateful to join the I/O meetings and activities, in which I got to see the advantage of doing multi-discipline research. Arnold, thank you for letting me join the weekly lab meeting and sharing your experiences with us. Dimitri, Paris, Daantje, Heleen, Janice, Sarina, Yaila, Feng, thank you for all the warm greetings and chats. Danyang, when I started my PhD, you were about to defend your thesis, that was my “first lecture” to learn what a PhD would be like. Thank you for sharing all your experiences with me. My former office roomies, Gloria and Julia, we spent a lot of fun roomie times together (big hug). I do miss the time seeing you face-to-face in the office. I wish Benjamin a healthy and happy childhood. Wei and Roger, thank you for always helping me solve the puzzles and sharing your perspectives. I enjoyed our outings, lunches, dinners, talks, and other relaxing times together. Yuri and Tom, thank you for your suggestions and brainstorms on my research. Hairong and Jixin, you started PhD during the pandemic, and we met each other at the empty T16 for the first time. It looked untrue like a game, hope you defeat the monsters, level up and finally win the game. PhD journey is exactly an adventurous game.

My PhD colleagues, Andre, Arnout, Eline, Emily, Mehmet, Miranda, Novika, we always saw each other when we were all at T16 and when life was “normal”. Nouran, you always encouraged me to do/say what I was too shy to do/say, and we even shared a same birthday! Marcelo, in our first year here, we had a lot of fun playing ping-pong together. It was really great we could just knock on the door, cool off from work, and enjoy fun times. Yiyun, I am proud to be your paranymph and thank you for your support, especially at the final stage of my PhD. I will not always see Hugo at sport center and join Zumba with you together (crying face). Mannan and Jianan, when I was new in this department, you always shared your perspectives and experiences. Thank you for the encouragement, advice, and sweet words.
I am also grateful for those friends who are always there for me. Wenjie, we started our PhD at EUR together. Thanks for sharing all your experiences in RSM. Our talks on job hunting and future career were very useful. Friends from EMC, Dawei, Luojie, Yuchan, Pengfei, we started our PhD at same time and all the best for your (upcoming) new journey. Yuan, you know I am not a good chef but a Wreck-It Ralph in the kitchen. Thank you for sharing tasty foods. Bingting, good luck with you PhD and finding a job you will love. Huatian, Peikei, Shuai, it was nice to meet you at the seminar and WAOP and share our studies and lives. Wenrui, we started and finished our PhD at almost same time. I was lucky to have you by my side. My friends in China, Yueyue, thank you for the virtual but real company and support. Wenjun and Jinmei, our friendship started in 2015 and back then, we were master students studying in the Strategic Management & Entrepreneurship lab. Thank you for the warmest and frankest support.

This journey will never start or end without the love from Victor Yu Zhang. Thank you for being at my side on this journey. I appreciate how much support you have given me in past eight years. Though we spent almost four years being apart in the Netherlands and the US, you did whatever you can to make everything easier for me. Sometimes I felt strongly that it would be better if you were with me in real life, not on the other side of Facetime, especially during the pandemic. Meanwhile, being alone allowed me to spend more time on research and enabled me to finish this dissertation on time. Thank you for leaving me alone (I am not lying). We should not make (too much) compromises for each other but make progress together, flourish and thrive in our own careers.

This dissertation is also a gift for you. I used your favorite NASA pictures (the truth is I have no idea how to design a fancy cover and the newly-released James Webb images are cool ideas for you who is doing astrophysical research). Also, these words from Kobe, I know they inspire you a lot and have a lifelong impact on you, and me as well. Finally, this dissertation is dedicated to my parents for their endless love and support. Every step I made, there were always suggestions, help, support and encouragement from my parents. Thank you for raising me up and always being there to share all my struggles and happiness.

Life is like a train ride and there are a lot of stops on the way. We get on and we get off. We meet people and we say goodbye to people. Here comes my stop at EUR, I get off and then I will get on a new journey. Thank you to everyone I met here. I sincerely appreciate your help and support.

Dank u en ik wens u het allerbeste.

Maike, Sep 2022
Rotterdam
感谢生命中遇到的每一个人

感谢张宇同学过去八年的支持和陪伴

父母永远是我坚强的后盾，感谢爸妈对我十一年求学生涯的支持、包容和理解
希望我能成为你们的骄傲