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# Why more males? Differences in entrepreneurial intentions of male and female university students and graduates

Ulrike Köpke<sup>1</sup> · Eva Schmitt-Rodermund<sup>2</sup>

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## Abstract

The persistently lower participation of women in entrepreneurial activities constitutes a significant economic and societal problem. This study investigates the entrepreneurial intentions (EI) of university students and graduates from the University of Applied Sciences Potsdam from a gender-specific perspective, with the central aim of identifying the reasons for the continuing differences in EIs between men and women. The theoretical framework is based on the Theory of Planned Behavior (TPB), which was extended in this study by the construct of entrepreneurial self-identity to gain a more comprehensive understanding of EI. Using structural equation modeling, an analysis was conducted for the entire cohort as well as stratified by gender, examining how attitude, social norms, perceived behavioral control, and entrepreneurial self-identity influence EI. The results of the online survey, in which 414 students and graduates participated between June 2nd and July 14th, 2023, show that men exhibit significantly higher EIs than women. Furthermore, it was demonstrated that risk-taking propensity contributes to these gender differences. Moreover, perceived behavioral control and parental role models proved to be crucial determinants for the EIs of women, while these factors did not significantly relate to the intentions of men. The analysis underscores the complexity of gender differences in EIs and implies that considering gender-specific factors in targeted support measures for universities can help reduce gender differences and thus better leverage the entrepreneurial potential of women.

**Keywords** Entrepreneurial intentions · Gender · University of Applied Sciences · Personality · Entrepreneurial self-identity

## Introduction

Why do women still initiate self-employment<sup>1</sup> less frequently? This question has been a focal point of entrepreneurship research for decades (e.g., Kourilsky & Walstad, 1998; Singh et al., 2023; Xanthopoulou & Sahinidis, 2024) and remains an essential aspect of ongoing research. Understanding why women are generally less inclined to pursue

self-employment is crucial for both politics and the economy. The implementation of entrepreneurial ventures contributes to economic growth and productivity (Obschonka & Schmitt-Rodermund, 2019). The current decline in startup numbers (Metzger, 2023) requires the active involvement of less inclined groups, including women, in entrepreneurship (Brixy et al., 2016; Metzger, 2024). Consequently, political initiatives aim to uncover the reasons behind fewer female enterprises, leading to the establishment of specific programs to support women (e.g., BMWK 2022). Furthermore, entrepreneurship education programs have been widely implemented in colleges and universities worldwide, with the goal of increasing the inclination toward entrepreneurship among high-potential college and university graduates (Thomas, 2023). These programs, developed for the business context, are also government-supported (Martin et al., 2013). However, the benefits of increased female entrepreneurship extend beyond politics and the economy, offering advantages such as improved work-life balance and higher earnings (OECD, 2017; Pejvak et al., 2009) compared to

<sup>1</sup> In line with other studies (e.g., Obschonka et al., 2014), the terms entrepreneurship, self-employment, and business startup are used interchangeably.

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traditional employment. Yet gender inequalities persist in these aspects, as women often face the challenge of choosing between career and family, while men typically have the opportunity to balance both without compromise (Donaldson et al., 2023; Zimmermann, 2020). Given these gender-specific differences, research efforts should not only address the lower intention for entrepreneurship among women but also explore whether they are inclined toward self-employment for different reasons than men. Therefore, it is crucial to examine gender-related differences in motives and incentives for entrepreneurship.

Current entrepreneurship research (e.g. Gallegos et al., 2024; Golik & Wasilczuk, 2025; Villanueva-Flores et al., 2023) emphasizes the significance of entrepreneurial intention (EI), as it best reflects the behavior of potential entrepreneurs (Gomes et al., 2021; Trettin & Welter, 2011). The Theory of Planned Behavior (TPB) provides an excellent framework for examining factors influencing EI. The TPB model was expanded by Obschonka et al. (2015) to include self-identity, allowing for the investigation of a range of potential factors specifically related to EI.

The current study examines students and graduates of a German University of Applied Sciences, focusing on fields prone for self-employment such as architecture and design, as it remains particularly unclear which factors relate to EI in this target group. Previous studies (e.g. Bordean et al., 2025; Maes et al., 2014; Wang et al., 2019) that examine students have primarily focused on business students. Moreover, these studies have mainly concentrated on the TPB variables and have largely neglected the role of self-identity in explaining gender differences in entrepreneurship. New research on TPB (e.g., Bordean et al., 2025) has not addressed the gendered dynamics of entrepreneurship. Particularly in the context of Universities of Applied Sciences with start-ups at hand in their applied approach entrepreneurship education is expanding, but the mechanisms of EI remain largely underexplored. Furthermore, while there is some empirical evidence of student and/or graduate entrepreneurship, it is mainly restricted to emerging or developing countries.

The present study expands the TPB framework by integrating self-identity factors to provide a more nuanced understanding of how gender influences EIs in higher education. By focusing on students and graduates in applied fields, it fills a critical gap in the literature, offering insights into entrepreneurial activities in the context of the German higher education landscape. Given that universities play a crucial role in fostering entrepreneurship through resources, mentorship, and networking opportunities, understanding students' EI is essential for designing effective support structures. Prior research highlights that EI is shaped by educational experiences, family background, and social environment (Xanthopoulou & Sahinidis, 2024), while entrepreneurship education and the university climate can further enhance EI (Sieger et al., 2021).

Particularly at Universities of Applied Sciences, where disciplines such as engineering, architecture, and design emphasize practical application, entrepreneurship represents a viable career path for the entire student body. This setting provides an ideal backdrop to examine gender-specific differences in EI and entrepreneurial activity. Understanding of these differences is crucial for adapting entrepreneurship education and removing barriers that may hinder women despite their high educational attainment and entrepreneurial potential. Enhancing inclusivity in entrepreneurship education can ultimately encourage greater participation, particularly among innovative women, in entrepreneurial activities (Engels, 2020).

## Theory, research status, hypotheses

### Theory of Planned Behavior (TPB)

Developed by Icek Ajzen in 1985, the TPB represents an extension of the Theory of Reasoned Action (Ajzen & Fishbein, 1980). In addition to incorporating the influence of attitude toward a certain behavior and the perceived social norms, the TPB includes the impact of perceived behavioral control on intention. The model integrates an individual's intention to perform a specific behavior by capturing motivational factors influencing behavior. Overall, the model posits that the stronger the intention to engage in a particular behavior, the higher the likelihood of executing that behavior (Ajzen, 1991). Self-employment can be understood as a planned behavior. An individual's intention to choose self-employment as a career is greater with a positive attitude towards entrepreneurship in general, perceptions of social norms favoring entrepreneurial activities, and a perceived behavioral control or self-efficacy to pursue such activities in the course of one's career. However, these three determinants can vary with the contexts and conditions of someone's particular phase of life, additional "nonmotivational factors" (ibid.; p. 182), such as variation in skills and time. Obschonka et al. (2015) expanded the model developed by Ajzen, additionally integrating self-identity within the context of EI. Self-identities refer to social roles expressing identification with a professional role.

Ajzen's TPB provides an excellent framework for analyzing gender-specific reasons for or against self-employment, as individual beliefs and intentions are taken into account. In contrast to often-used Rational Choice Theories (e.g., Caliendo et al., 2011; Obschonka et al., 2014), which focus on the rational weighing of costs and benefits without incorporating social contexts and personal requirements, TPB focuses on the supportiveness of someone's social net and perceived individual capabilities, thereby taking into account somewhat variable and short-term conditions for the existence of EI.

## Gender-specific differences

Ajzen (2005) regards demographic factors such as gender or age as social background information which is associated with or exert influence on an individual's beliefs. Crucial to this explanation is the notion that individuals grow up in different social environments, receiving varying information about the range of available options. This information, in turn, shapes a person's beliefs regarding the consequences of behavior, normative expectations, and obstacles that may hinder them from engaging in specific behaviors. In this way, women and men may differ in their planned behaviors. Thus, gender indirectly determines the behaviors through normative beliefs and control beliefs a person pursues. It can be inferred that gender itself does not cause gender differences in behaviors such as self-employment; rather, it is influenced by factors indirectly affected by gender. Ajzen supports this notion, stating "In short, general background factors of various kinds can influence intentions and behavior, but this influence is usually mediated by more specific beliefs and attitudes concerning the behavior of interest" (ibid., p. 136). This aligns with the Doing-Gender theory, which argues that "gender" is understood as the performance of situated behavior, influenced by normative ideas of attitudes and activities considered appropriate for a particular gender category. As a result, certain "gender activities" emerge, reinforcing affiliation with a gender category (West and Zimmerman 1987: 127). Thus, the Doing-Gender theory complements Ajzen's assumptions. It highlights that gender differences in behavior are not simply attributed to gender as an isolated factor but rather to the social processes that construct gender and shape gender roles and expectations (ibid.). Several studies support that gender differences in self-employment are less biologically and more socially constructed, significantly influenced by society, and that gender identity contributes to the choice of behavior (Feldmann et al., 2022; Perez-Quintana et al., 2017).

Over the years, it has been consistently observed that women engage in entrepreneurship less frequently than men, as evidenced by the proportion of all enterprises (e.g., Fritsch & Wyrwich, 2021; Sternberg, 2022). This also seems to be the case in university graduates (Sieger et al., 2021). According to Ajzen's theory (1991), intention precedes the actual implementation of entrepreneurship. EI determines the actual realization of self-employment (Kolvereid & Isaksen, 2006; Liñán et al., 2018), and findings show that male students exhibit a higher EI than female students (Díaz-García & Jiménez-Moreno, 2010; Overwien et al., 2024). The following section will give an overview to the findings concerning the influence of TPB variables on EI in general, as well as considering gender in particular. Maes et al. (2014) successfully applied the model to explain gender differences in EI. Findings from their survey conducted among Belgian business students suggest that gender relates to EI

through personal attitudes and perceived behavioral control, rather than social norms. To uncover gender differences, they utilize a deeper-level measurement model, which incorporates not only the common TPB items but also indicators of achievement (entrepreneurship challenges and money) and balance (work-life balance and autonomy). In contrast, we additionally integrate entrepreneurial self-identity and potential predictors of self-identity, alongside the common TPB variables, to explore gender disparities.

## Attitude

Following the TPB model, the intention to perform a specific behavior is influenced by several factors, including the attitude (AT) toward the perception of opportunities and inconveniences of a particular choice. In this context, the decision to pursue self-employment as a professional career is shaped by whether an individual perceives it positively or negatively (Ajzen, 1991). Research indicates that a generally positive AT toward entrepreneurship enhances EI (Bordean et al., 2025; Slomski et al., 2024). In this regard, the AT toward self-employment can also be influenced by an individual's life goals, such as the desire for a high income or a good work-family balance. For instance, if an individual values a high income (Donaldson et al., 2023; Górány et al., 2021; Kirkwood, 2009) or a good work-family balance (Dawson & Henley, 2012; St-Jean & Duhamel, 2020) as crucial for their future career and expects that entrepreneurship can help to achieve these outcomes, it can be assumed that they evaluate self-employment positively and, consequently, become involved in activities related to founding a business (Donaldson et al., 2023; Leroy et al., 2009).

Taking into account Ajzen's assumption (2005) that gender also indirectly influences behavioral beliefs, it can be assumed that women and men differ in their goals for self-employment or choose it for different reasons. Compared to men, women's personal ATs have less direct influence on EI (Gomes et al., 2021), a pattern observed among students as well (Karimi et al., 2013; Vamvaka et al., 2020). A study focusing on university graduates indicates that, irrespective of EI, men are more interested in achieving a higher income (Fabian et al., 2016). Additionally, a qualitative study from the UK reveals that men more frequently cite the desire for higher income as a key motive for starting a business, whereas women tend to focus more on non-monetary factors (Dawson & Henley, 2012). Further findings from Europe and the USA suggest that monetary incentives are less crucial for women in entrepreneurship, with work-family balance considerations being a more significant motivating factor (Georgellis & Wall, 2005; Maes et al., 2014). In fact, for women, and particularly for female university graduates, achieving a better work-family balance is a prominent reason for pursuing entrepreneurship (Adda, 2022; Fabian et al.,

2016; Maes et al., 2014; Ribes-Giner et al., 2019). Consequently, we posit the following hypothesis:

**H1:**For men, career goals such as generating a high income primarily lead to a higher EI, while for women, the desire for work-family balance predominantly results in a higher EI (moderation).

## Social norms

Another influencing factor on an individual's intention is the social norms (SN), i.e., the perceived social pressure from others to engage in or refrain from the target behavior (Ajzen, 1991). Disapproval of self-employment in someone's social environment is likely to be mirrored by the rejection of entrepreneurial activity by the individual (Leroy et al., 2009). Specifically, for Germany, it is assumed that entrepreneurship is highly valued, with students often receiving substantial support from both their peers and instructors (Bordean et al., 2025). Some studies have found that SN indeed influence EIs (Obschonka et al., 2015; Xanthopoulou & Sahinidis, 2024), although this influence is sometimes modest (Kolvereid and Isaksen 2006). Others find no significant correlation between SN and EI (Ceresia & Mendola, 2020; Liñán & Chen, 2009).

Taking into account Ajzen's assumptions (2005) that gender acts as social background information and entrepreneurial activities are often perceived as male activities (Bullough et al., 2022; Dabic et al., 2012), it can be assumed that reference persons in an individual's social environment are more likely to direct entrepreneurial expectations toward men while perceiving women as less suited for such activities. Furthermore, studies indicate that women are more willing to follow the opinions of close individuals which could have a stronger influence on their EIs (Balakrishnan & Low, 2016; Leroy et al., 2009). This phenomenon is also observed among students, where social norms may exert a stronger influence on women's EIs compared to men's (Karimi et al., 2013). Overall, we propose the following hypothesis:

**H2:**Women are more strongly influenced by SN regarding EI than men (mediation).

## Perceived behavioral control

Another factor influencing the intention of planned behavior is perceived behavioral control (PBC). This refers to an individual's assessment of their ability to carry out the intended behavior (Ajzen, 1991). If a person believes they are capable of meeting the requirements of self-employment, the likelihood of EI should increase. Studies confirm that PBC contributes to predicting self-employment (Andrade & Carvalho, 2023; Bordean et al., 2025; Karimi et al., 2013).

Here, considering Ajzen's assumptions (2005) that potential obstacles are perceived differently by men and women, it could be hypothesized that women assess their entrepreneurial capabilities less favorably than men. Research shows that women, and specifically female university students, have less confidence in their entrepreneurial abilities compared to their male counterparts (Arquisola & Muanar, 2019; Brixy et al., 2015; Maes et al., 2014). This is partly attributed to societal perceptions that portray entrepreneurial activities as male-dominated, which may influence women's self-assessment of their capabilities (Bullough et al., 2022; Dabic et al., 2012; Donaldson et al., 2023). Furthermore, the gender effect on EI appears to be mediated by perceived know-how and self-efficacy (Leroy et al., 2009). Gomes et al. (2021) also note that PBC has a positive and greater impact on EI in women than in men, potentially due to the greater need for women to overcome perceived barriers. Consequently, we posit the following assumption:

**H3:**Since women assess their entrepreneurial activities less favorably than men, they less frequently exhibit an EI (mediation).

## Entrepreneurial self-identity

Self-identity can serve as an additional predictor in conjunction with the TPB (Fishbein & Ajzen, 2010; Terry et al., 1999). Identity theories posit that identity involves categorizing oneself within a specific role (Stets & Burke, 2000). Attached to this role are certain meanings and expectations that guide or motivate an individual's behavior (Saka et al., 2008). Self-identities describe how individuals, for example, identify with a professional role (entrepreneurial self-identity), which in turn may be shaped, for instance, by personality traits, role models, or past entrepreneurial experiences (Obschonka et al., 2015). It is essential to highlight that self-identity differs from the other three predictors of the TPB model because it is grounded in a different motivation, namely "to confirm one's own ideas about oneself" (Ceresia & Mendola, 2020: 4). Previous studies show that a stronger entrepreneurial self-identity, and consequently a greater identification with an entrepreneurial role, increases the likelihood of EI (Malmström & Öqvist, 2024; Ndofirepi, 2022; Paunovic & Deimel, 2024) and exerts a stronger influence on EI than the other TPB predictors (Obschonka et al., 2015).

Considering the earlier presented Doing-Gender Theory and the assumption that entrepreneurial activities are more characterized by male stereotypes (Perez-Quintana et al., 2017), belonging to a gender category could result in a more pronounced entrepreneurial self-identity among men than women (Gupta et al., 2009; Perez-Quintana et al., 2017). In this context, identification with the male gender role appears to foster a stronger entrepreneurial self-identity, as shown by



international studies demonstrating that men's identification with the male gender role leads to higher EI, while women's identification with the female gender role does not show the same effect (Díaz-García and Jiménez-Moreno, 2010; Perez-Quintana et al., 2017; Liñán et al., 2022). Obschonka et al. (2015) also observe that men exhibit higher values in entrepreneurial self-identity concerning EI. Consistent with earlier research, we posit the following assumption:

**H4:** Since women show a lower entrepreneurial self-identity than men, they also possess a lower EI (mediation).

### Parental entrepreneurship

Obschonka et al. (2015) suggest that parental entrepreneurship could be an important predictor of an entrepreneurial self-identity and, thus, relate to EI. Consequently, it can be assumed that children of entrepreneurial parents have a self-concept "that fits with enterprising behavior" (ibid: 778). The importance of entrepreneurial role models is supported by empirical results (e.g. Metzger, 2024; Overwien et al., 2024; Passavanti et al., 2024): People with entrepreneurial parents are much more likely to pursue self-employment compared to those whose parents are employed, even when they do not inherit a family business (Brixy et al., 2015). The EI is greatest when both mother and father are entrepreneurial (ibid.; Palmer et al., 2021). If only one parent is or was self-employed, the influence of the father is greater (Fritsch & Wyrwich, 2021; Velilla, 2020), and the influence of the mother disappears when the father's entrepreneurial activity is considered (Chlosta et al., 2012).

Now, incorporating Ajzen's assumption (2005) that gender acts as social background information, it could be presumed that parental entrepreneurship as a predictor of self-identity differentially influences the entrepreneurial activities of men and women by conveying gender-specific roles to children. Assuming that starting a business is classified as more masculine (Dabic et al., 2012; Hua et al., 2022), it could be speculated, in line with previous studies (e.g., Metzger, 2024; Passavanti et al., 2024), that the entrepreneurship of fathers particularly influences the entrepreneurial activities of their sons. This suggests that fathers, who traditionally embody masculine entrepreneurial roles, are more likely to serve as entrepreneurial role models for their sons, reinforcing gendered expectations. If mothers pursue an entrepreneurial career, it might be assumed that they are less likely to adhere to traditional gender roles and would encourage their daughters to venture into entrepreneurship. Chlosta et al. (2012) highlight that the influence of parental entrepreneurship is generally lower for women than for men. On the other hand, Passavanti et al. (2024) and Metzger (2024) show that role models in general (including those in the academic field) have a greater influence on the EI of women.

Furthermore, research indicates that a same-gender transfer is often observed. Entrepreneurial fathers positively influence the entrepreneurial activities of sons, while entrepreneurial mothers especially positively influence the entrepreneurial activities of daughters (Metzger, 2024; Velilla, 2020). In this study, considering parental entrepreneurship as a predictor of self-identity, we assume the following:

**H4a:** Entrepreneurial mothers have a positive influence on women, and entrepreneurial fathers have a positive influence on men in terms of entrepreneurial self-identity, which, in turn, positively affects EI (moderation).

Moreover, empirical results confirm that families pass on cultural norms and values (Bullough et al., 2017) but can also challenge societal stereotypes (Feldmann et al., 2022). Therefore, continuing with the assumption that parental entrepreneurship is a predictor of self-identity, we hypothesize:

**H4b:** Entrepreneurial parents have a positive relationship to ATs, SNs, and PBC, which, in turn, positively affects EI (mediation).

### Personality

Furthermore, Obschonka et al. (2015) posit that personality can be a predictor of self-identity, as previous research has shown that personality influences identity formation, and identity, in turn, shapes personality (Helson & Srivastava, 2001; Ozer & Benet-Martinez, 2006). Moreover, an empirical connection between entrepreneurial self-identity and personality traits is confirmed (Obschonka et al., 2015). Additionally, research indicates that the influence of role models and social learning can be attenuated by specific personality traits. Therefore, personality traits and the effects of role models should be considered together rather than independently when examining their impact on personal EIs (Chlosta et al., 2012). It is also evident that parental entrepreneurship and personality traits are closely related, as parents can pass on entrepreneurship-relevant personality traits (Fritsch & Wyrwich, 2021). Therefore, detached from the assumption that personality traits are predictors of self-identity, we assume the following:

**H4c:** Parental entrepreneurship positively relates to higher levels of entrepreneurial personality traits.

Ajzen (1991) asserts that personality traits play a central role in everyone's behavior, but this influence can only be recognized when observing the breadth of behavior. The influence of personality traits on specific actions is weakened by additional factors. Ajzen argues that personality

traits only have an indirect influence on certain behaviors “by influencing some of the factors that are more closely linked to the behavior in question” (Ajzen, 1991, p. 181). Various studies confirm a connection between specific personality traits and EI or entrepreneurial activity (Caliendo et al., 2015; Laouiti et al., 2022; Obschonka et al., 2014). The Big Five personality model, which includes Conscientiousness, Extraversion, Agreeableness, Openness to Experience, and Neuroticism, is one of the most well-known instruments for measuring personality (Rammstedt et al., 2014). Often, the variable-oriented approach to measuring personality is used by examining the influence of individual factors. Another option is the person-oriented approach, which forms an index (and thus an entrepreneurial personality profile) from the individual Big Five factors, which, as studies show, can be considered more robust and consistent (Obschonka et al., 2014, 2015). The results show that a more pronounced entrepreneurial profile leads to a higher likelihood of being self-employed (Obschonka et al., 2014). Various studies report a connection between gender-specific personality traits and EI and entrepreneurial activity. The results suggest that gender-specific differences in personality traits contribute to gender differences in entrepreneurship worldwide. Men generally exhibit a more pronounced entrepreneurial Big Five personality profile than women, which aligns with societal stereotypes of entrepreneurship being a masculine domain (Obschonka et al., 2014). This gendered variation in personality traits is often reinforced by societal expectations, where entrepreneurial behavior is more frequently associated with masculine traits such as assertiveness and risk-taking (Perez-Quintana et al., 2017). Contrary to this, Caliendo et al. (2015) report that the Big Five personality traits only partially explain gender differences. Identical values in the Big Five personality traits in men and women, according to the study, would even lead to a greater gender gap in entrepreneurship. Overall, we expect:

**H4d:** Less entrepreneurial personality profiles, which are visible in women more frequently than men, contribute to lower levels of entrepreneurial self-identity which in turn relate to lower levels of EIs (mediation).

Caliendo et al. (2011) point out that, in addition to the Big Five personality traits, other specific personality traits are crucial. Factor analysis indicates that risk-taking, trust, and locus of control (LOC)<sup>2</sup> should also be included in the

examination. While various studies confirm that risk-taking has a positive (and independent) impact on EI and founding of a business, as well as entrepreneurial success (Caliendo et al., 2011; Ahmed et al. 2020), others find no connection (Rauch & Frese, 2007). Caliendo et al. (2015) suggest that the observed lower risk-taking propensity of women would explain almost 75% of gender differences in entrepreneurship. The results of another study show that when controlling for differences in risk-taking propensity, gender-specific differences in self-employment indeed decrease. However, while risk-taking propensity partially explains gender differences, it does not completely eliminate them (Caliendo et al., 2011). Therefore, we expect:

**H4e:** Given that women exhibit lower risk-taking propensity compared to men, they are also more likely to show lower levels of entrepreneurial self-identity, resulting in a lower EI (mediation). Moreover, it is hypothesized that risk-taking propensity has a direct impact on EI as well as on TPB variables, including self-identity, which precedes intention.

Concerning LOC, it becomes clear that higher internal and lower external LOC significantly increases the likelihood of entrepreneurship. Furthermore, gender differences can be observed. While a higher internal and lower external LOC significantly increases the likelihood of self-employment in men, no such difference was found for women (Caliendo et al., 2015). However, for trust, no significant influence on entrepreneurial implementation was found for women or men (Caliendo et al., 2011). Therefore, we expect:

**H4f:** The influence of gender on entrepreneurial self-identity is mediated through internal and external LOC.

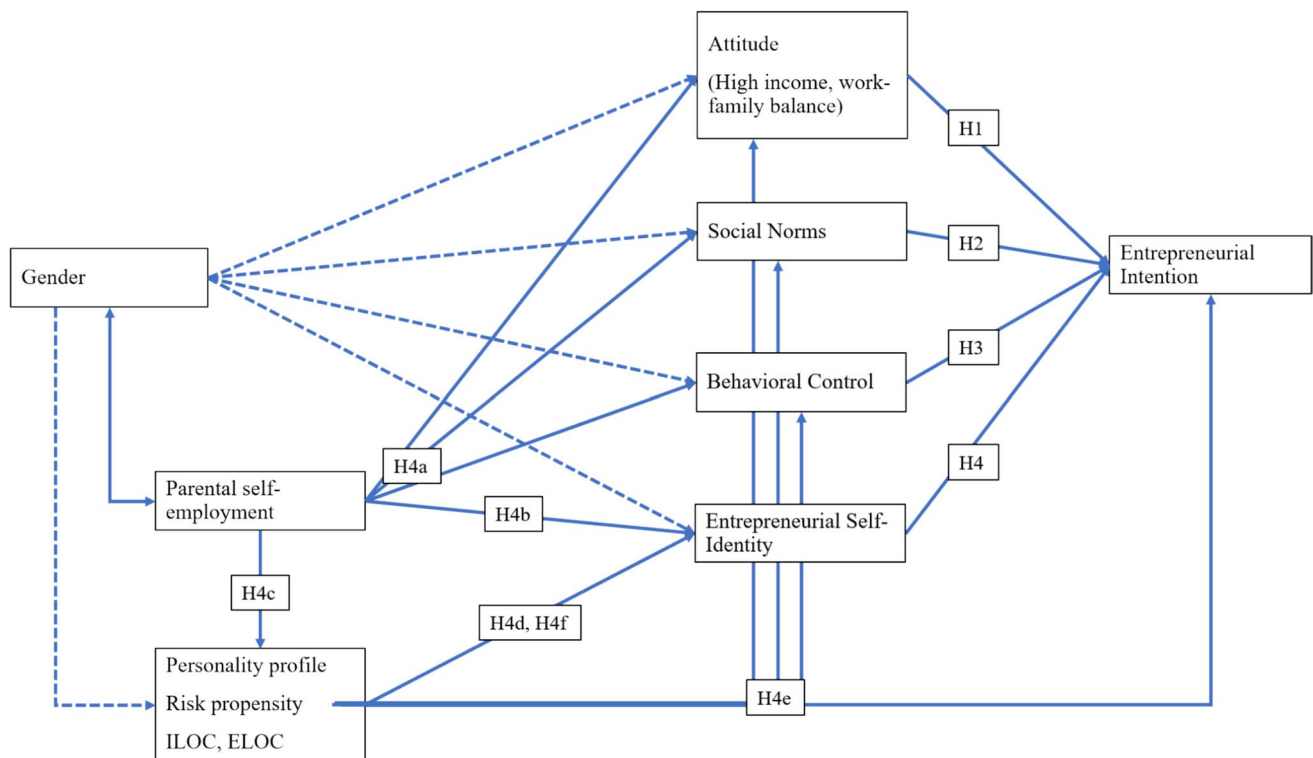
Figure 1 provides an overview of the proposed hypotheses.

## Methods

### Participants

The present study is based on a custom-designed survey aimed at exploring the EI of students and graduates of the University of Applied Sciences Potsdam, Germany. The target population included current students as well as graduates who obtained their professional qualification degree from the University within the last 3 years. Participation in the survey did not require a pre-existing interest in entrepreneurship and was accessible to everyone through an individual survey link. The cross-sectional

<sup>2</sup> The LOC is divided into internal and external LOC. Individuals possess an internal LOC when they believe that they can influence their lives through their own behavior (e.g., skills, efforts). Individuals who believe that their behavior has little or no influence on life events (because it is determined by chance or luck) have an external LOC (Jakoby and Jacob 2001).



**Fig. 1** Presentation of the proposed hypotheses, own illustration. Thin dashed arrows indicate the indirect effect of gender on the TPB variables and personality traits. Double-headed arrows represent covari-

ances. Bold dashed arrows illustrate the mediation hypotheses, while bold solid arrows denote the moderation hypotheses

study included specific questions about EI, inquiries about career and life goals, and personality traits.<sup>3</sup> Additionally, existing consulting needs related to current or prospective self-employment were identified through the survey. The online survey took place from June 2 to July 14, 2023, and was pre-tested<sup>4</sup> to ensure clarity and answerability. All students and the graduates in the time window of 3 years were contacted via email and invited to participate in the survey. Furthermore, three reminder emails (at 2, 5, and 6 weeks after the start of the fieldwork) were specifically sent to those who had not participated or had begun but not completed the survey. Additionally, the survey was promoted through various channels (social media, website, etc.). The response rate was 10.0% ( $n = 485$ ). All received responses were directly imported into SPSS from the survey software as a.csv-file. Subsequently, data verification

and cleansing were performed, resulting in a final sample of 414 individuals.<sup>5,6</sup>

The sample included participants from various disciplines (e.g., design, architecture, and Social and Educational Sciences) to capture a broad spectrum of EIs. Both students and graduates were included to represent diverse experiences. Although the sample was not stratified or tested for general population representativeness, it was compared with university demographics (gender, age, academic discipline) for alignment with the broader student body. In the winter term of 2022/2023, the University of Applied Science Potsdam registered 63.7% female and 36.3% male students and graduates. Consequently, the current study, with a composition of 76.1% female and 23.9% male participants, is slightly overrepresented in terms of the female gender. Concerning the majors, the sample was representative for the university, as the comparison for the different

<sup>3</sup> The questionnaire was based on the Theory of Planned Behavior (TPB) and included validated items on EI (adopted from Liñán and Chen (2009) and Obschonka et al. (2015)), career and life goals (DZHW Graduate Panel), personality traits (BFI-10), risk propensity (R-1), and locus of control (IE-4).

<sup>4</sup> A pretest with 15 participants (students and staff) was conducted to assess item clarity, completion time, and filter logic. Feedback led to minor wording adjustments; original scale formats were retained.

<sup>5</sup> Of 702 survey participants, 607 completed the questionnaire (86%). After excluding staff ( $n = 485$ ) and cleaning demographic data, the final analysis sample included 414 students and graduates.

<sup>6</sup> If fewer than ten missing values were identified for any of the included variables, they were removed from the sample. If there were more than nine missing values, they were treated as a missing category in the analysis.



departments indicates.<sup>7</sup> An analysis of non-respondents was conducted to address potential biases, and reminder emails were sent to boost participation.

## Variables

The coding of the variables (see Appendix; Table 2) is based on two different sources. Firstly, we followed Liñán and Chen (2009). They developed a questionnaire for measuring entrepreneurial intentions (EI) to address shortcomings in earlier research instruments. This approach allows for application across different countries and cultures. Studies demonstrate the suitability of the developed questionnaire as an adequate instrument for measuring EIs (ibid.; Lee-Ross, 2017). The advantage lies in collecting TPB variables using scales that capture multiple items, considered more reliable than scales with only one item (Liñán & Chen, 2009). To keep our questionnaire concise, we relied on the assessment of TPB variables. This approach is analogous to Obschonka et al. (2015) and aligns with publications by Ajzen (e.g., Ajzen, 2002; Ajzen & Madden, 1986). In some cases, they use fewer items per variable compared to Liñán and Chen (2009).

Table 1 presents the descriptive statistics of the analysis sample. The focal event of this work is the *EI*. This was measured, akin to Liñán and Chen (2009), using six items and a seven-point scale each (1 = strongly disagree; 7 = strongly agree). The items were then averaged ( $M = 2.92$ ). In total, 29 missings were identified regarding the dependent variable and were subsequently deleted.

## Independent variables

*Gender* (0 = males; 1 = females) was treated as a dichotomous variable in the analysis.

Four five-point bipolar adjective scales measured respondents' *ATs* toward self-employment analogous to Obschonka et al. (2015), which were then averaged.

Theory and prior research suggested that *goals related to balancing work and family life* and *desiring higher income* could explain gender differences in self-employment. Importance was assessed, similar to the German Centre for Higher Education Research and Science Studies (DZHW) Graduate Panel ("How important are the following career and life goals to you?"), separately for both career and life

goals on a 5-point rating scale from 1 (not important at all) to 5 (very important).

*SN* were measured, akin to Liñán and Chen (2009), using three items. We added "or fellow students" to the last item, assuming from our sample that not everyone has colleagues. Agreement was to be indicated on a 7-point rating scale. Finally, the three variables were averaged.

*PBC*, as in Obschonka et al. (2015), was assessed using three items on a five-point scale. Subsequently, the three variables were averaged.

*Self-identity* was measured using three items on a five-point scale, following Obschonka et al. (2015). The first two items were reversed, and then all three items were averaged.

Predictors for self-identity were identified, following Obschonka et al. (2015). *Self-employment of parents* was utilized. Respondents were asked to separately indicate for father and mother whether they are/were self-employed. Individuals whose mothers/fathers were not self-employed constituted the respective reference category. The resulting variables for mother's and father's self-employment were dummy-coded for the analysis.

Using the Big Five Inventory (BFI-10) scale (Rammstedt et al., 2012), *personality traits* in the form of the Big Five factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience) were assessed. The advantage of the BFI-10 short scale lies in the brief assessment of personality traits (average of 108 s), making it a temporally economical instrument for personality measurement. Derived from the 44-item BFI by John et al. (1991), the short scale is regarded as objective, reliable, and valid (Rammstedt et al., 2012). Furthermore, the widely known personality measurement instrument, the NEO-PI-R, correlates highly with the BFI-10, making it an appropriate measure. Two items represent each of the five dimensions of personality, answered on a five-point rating scale from 1 "does not apply at all" to 5 "applies completely".<sup>8</sup> In line with previous research (e.g., Obschonka et al., 2013, 2014), we calculated an entrepreneurial personality profile from the Big Five factors capable of representing the intraindividual constellation of the Big Five. Compared to the measurement of the individual factors, the entrepreneurial profile provides a more consistent and robust prediction concerning various indicators of entrepreneurship, such as EI or success (Obschonka et al., 2014). The profile was calculated from an index resulting from the joint consideration of all Big Five factors. Individuals with high levels of Extraversion, Openness, and Conscientiousness, and simultaneously low values in Agreeableness and Neuroticism, are considered maximally entrepreneurial.<sup>9</sup> The closer the calculated

<sup>7</sup> In the winter semester of 2022/2023, 34.5% of students and graduates belonged to the Department of Social and Educational Sciences, 21.3% to the Department of City/Building/Culture, 15.4% to the Department of Civil Engineering, 15.3% to the Department of Design, and 13.5% to the Department of Information Sciences (for comparison see Table 1).

<sup>8</sup> For coding, see Rammstedt et al. (2012).

<sup>9</sup> For the calculation of the profile, refer to Obschonka et al. (2013).

**Table 1** Descriptive statistics

Variable	Value	Total		Men		Women	
		N	%	N	%	N	%
Gender	Men	99	23.9	99	100.0	-	-
	Women	315	76.1	-	-	315	100.0
Age	Mean in years	28.55	100.0	30.27	100.0	28.01	100.0
Academic status	Student	248	59.9	54	54.5	194	61.6
	Graduate	166	40.1	45	45.5	121	38.4
Department	Social and educational sciences	158	38.2	22	22.2	136	43.2
	City Building Culture	76	18.4	24	24.2	52	16.5
	Civil engineering	49	11.8	22	22.2	27	8.6
	Design	53	12.8	14	14.1	39	12.4
	Information sciences	78	18.8	17	17.2	61	19.4
Entrepreneurial INT	Mean	2.92	100.0	3.48	100.0	2.75	100.0
Attitude	Mean	3.62	100.0	3.74	100.0	3.58	100.0
LG: work-life balance	(Very) unimportant	21	5.1	7	7.1	14	4.4
	Neutral	41	9.9	9	9.1	32	10.2
	(Very) important	352	85.0	83	83.8	269	85.4
LG: higher income	(Very) unimportant	29	7.0	6	6.1	23	7.3
	Neutral	92	22.2	25	25.3	67	21.3
	(Very) important	293	70.8	68	68.7	225	71.4
Social norms	Mean	5.07	100	5.17	100.0	5.03	100.0
Perceived control	Mean	3.06	100	3.25	100.0	3.00	100.0
Self-identity	Mean	3.22	100	3.36	100.0	3.18	100.0
Paternal self-employment	Yes	124	30.0	32	32.3	92	29.2
	No	279	67.4	64	64.6	215	68.3
	No information/unk	11	2.7	3	3.0	8	2.5
Maternal self-employment	Yes	74	17.9	15	15.2	59	18.7
	No	340	82.1	84	84.8	256	81.3
Big Five personality profile	Mean	- 18.96	100.0	- 17.97	100.0	- 19.28	100.0
Risk propensity	Mean	3.56	100.0	3.85	100.0	3.47	100.0
Int. locus of control	Mean	4.07	100.0	4.01	100.0	4.09	100.0
Ext. locus of control	Mean	2.16	100.0	2.07	100.0	2.18	100.0
Total		<b>414</b>	<b>100.0</b>	<b>99</b>	<b>100.0</b>	<b>315</b>	<b>100.0</b>

indicator is to 0, the better the personality profile fits the defined statistical reference profile (Obschonka et al., 2013). Initially, 61 missings were present. To maintain validity and representativeness, missing values were imputed using a mean imputation strategy provided by AMOS27, see below for details. Table 1 shows the corresponding mean values for the total group as well as separated by gender.

Previous research has shown that when considering gender-specific differences in EI, *risk taking propensity* should also be examined. Respondents were asked to assess their risk-taking propensity on a seven-point rating scale from 1 “not at all risk-averse” to 7 “very risk-averse.” The risk-taking propensity short scale (R-1), considered reliable and valid, was developed specifically for social science surveys aiming to measure risk propensity in the shortest time possible. The individual value of a

person simultaneously represents the scale value, ranging between 1 and 7 (Beierlein et al., 2015). Initially, 57 missing entries were present. Similar to the entrepreneurial profile, missing values were imputed by encoding them into the mean.

Other personality characteristics include *internal (ILOC)* and *external (ELOC)* locus of control, each consisting of two items and collected using a five-point rating scale (1) “does not apply at all” to (5) “applies completely.” ILOC included the statements “I have control over my life” and “If I make an effort, I will succeed.” ELOC comprised the statements “Whether in private or professional life, my life is largely determined by others” and “My plans are often thwarted by fate.” The coding of these variables followed the validated short scale Internal–External Locus of Control-4 (IE-4) by Kovaleva et al. (2012). Subsequently, separate mean values

were calculated for ILOC and ELOC (ibid.). Similar to the entrepreneurial profile, missing values<sup>10</sup> were imputed.

### Control variables (CV)

Age was included as a CV in the study. Respondents were asked to state their current age in years, so no recoding was necessary. Two individuals did not provide information on age and were therefore excluded from the analyses. To facilitate interpretation, the age variable was additionally centered. The mean age is 28.55 years. In addition, the departmental affiliation of students and graduates from the university was considered a CV and entered the analysis as a dummy variable. The Department of Design served as the reference category, as preliminary investigations showed that it is most closely associated with EI.

### Statistical analyses

Data analysis was conducted using SPSS27 and AMOS27. Initially, the included variables were checked for multicollinearity (see Appendix, Table 3). Structural equation modeling (SEM) was employed to analyze the hypotheses, focusing first on testing the mediation effect. Additionally, in line with Maes et al. (2014) and Gomes et al. (2021), multigroup analyses were performed to examine the moderation hypotheses. This model allowed investigating the relationship between the constructs of planned behavior (AT, SN, BC) and entrepreneurial self-identity and intended behavior within a specific target group, comparing results across different gender groups. In general, structural equation models provide the opportunity to test multiple hypotheses simultaneously (Reinecke & Pöge, 2010). Typically, structural equation model construction occurs in two steps, initially assessing the adequacy of the measurement<sup>11</sup> instruments and subsequently testing the direct or indirect relationships between the constructs (McDonald & Ho, 2002). To estimate model parameters and evaluate the fit of the theoretical model to the empirical data, the maximum likelihood estimation method was applied. Additionally, several goodness-of-fit indices, such as the chi-square test, comparative fit index (CFI),<sup>12</sup> and root mean square error

of approximation (RMSEA),<sup>13</sup> were used to assess model quality and verify the fit to the data. The model fitted the data nicely. The CFI was 0.95, directly on the cut-off point. The RMSEA was 0.06, below the cut-off point of 0.08 (Reinecke & Pöge, 2010). Due to included missing values, the SRMR (standardized root mean square residual) could not be reported.

Subsequently, we tested our model separately for men ( $n=99$ ) and women ( $n=315$ ), with path coefficients being constrained to be equal for both groups. For men, non-significant RMSEA (0.05) and CFI (0.96) were obtained, while for women, a CFI of 0.94 and an RMSEA of 0.06 were observed. To achieve an acceptable model fit, ILOC and ELOC had to be removed from the model. Additionally, due to the low sample size, parental self-employment and the desire for high income were excluded from the analysis. The respective variables were chosen, as these associations worsened the model fit.

### Results

Table 3 (see Appendix) shows strong and significant associations between the variables. The closest link is observed between EI and self-identity (Cramér's  $V=0.687$ ,  $p<0.001$ ). Strong associations are also found between EI and PBC ( $r=0.539$ ,  $p<0.001$ ) as well as between EI and AT ( $r=0.473$ ,  $p<0.001$ ). Furthermore, AT and self-identity (Cramér's  $V=0.552$ ,  $p<0.001$ ) and PBC and self-identity (Cramér's  $V=0.594$ ,  $p<0.001$ ) show substantial overlaps. While these correlations are theoretically consistent and underline the central role of self-perception, attitudes, and control beliefs in the development of entrepreneurial intentions, their magnitude remains below the commonly cited threshold of 0.70 that would indicate problematic multicollinearity (Dormann et al., 2013). Thus, the observed associations reflect meaningful conceptual connections rather than statistical redundancy, and they do not pose a serious threat to the stability of the regression analyses.

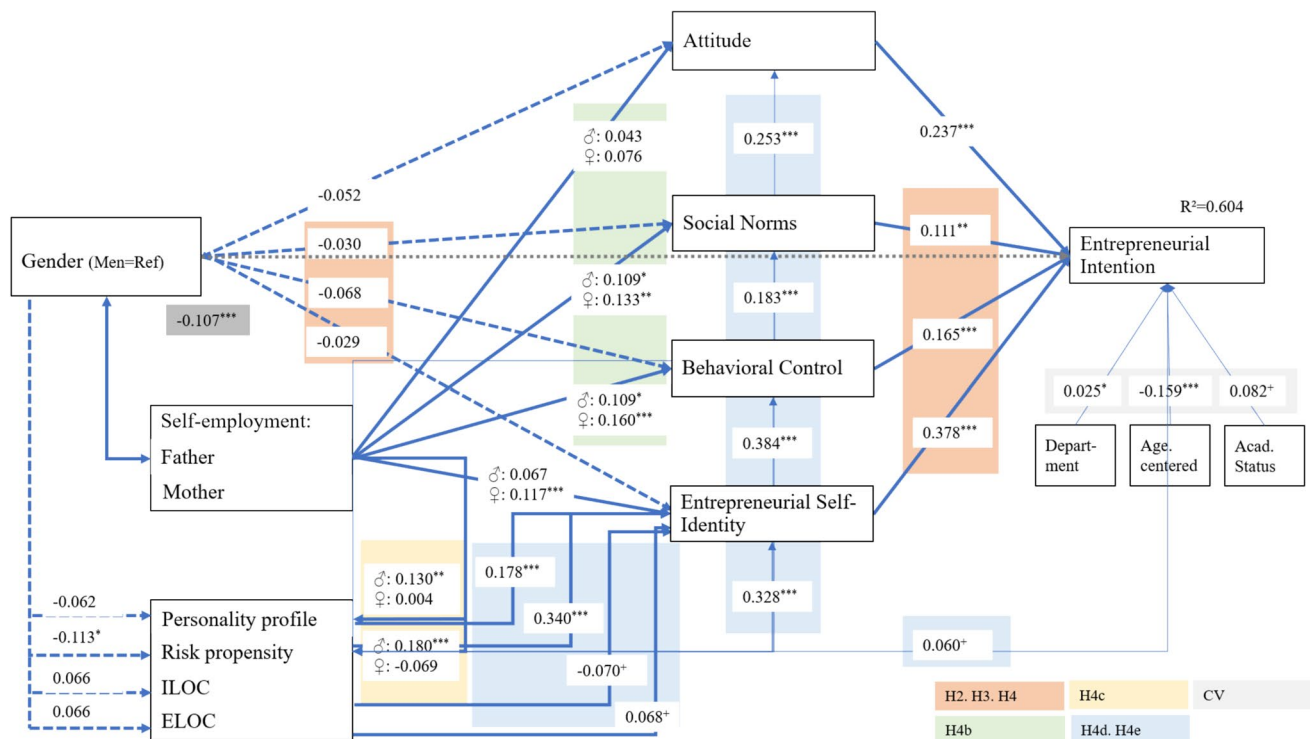
We also examined the direct effect of gender on EI, which proved to be highly significant ( $\beta=-0.107$ ,  $p<0.001$ ), suggesting that women generally seem to have a lower EI than men. As expected, higher ATs toward self-employment, SN, PBC, and entrepreneurial self-identity related to higher EIs. Subsequently, these factors are examined in more detail to gain a comprehensive understanding of the mechanisms behind the observed effects.

<sup>10</sup> The ILOC included 57 missings, and the ELOC included 56 missings.

<sup>11</sup> The assessment of the suitability of the measurement instruments could be omitted for this analysis, as only manifest variables were included.

<sup>12</sup> The CFI provides information on how well the estimated model parameters are suited to deviate from an extremely poor null model (Reinecke and Pöge 2010).

<sup>13</sup> The RMSEA provides similar information to the SRMR, offering insights into the overall difference between observed and predicted correlations. Additionally, it considers model complexity by accounting for the number of degrees of freedom (Leroy et al., 2009).



**Fig. 2** Structural equation model of the entire group. Note: + $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

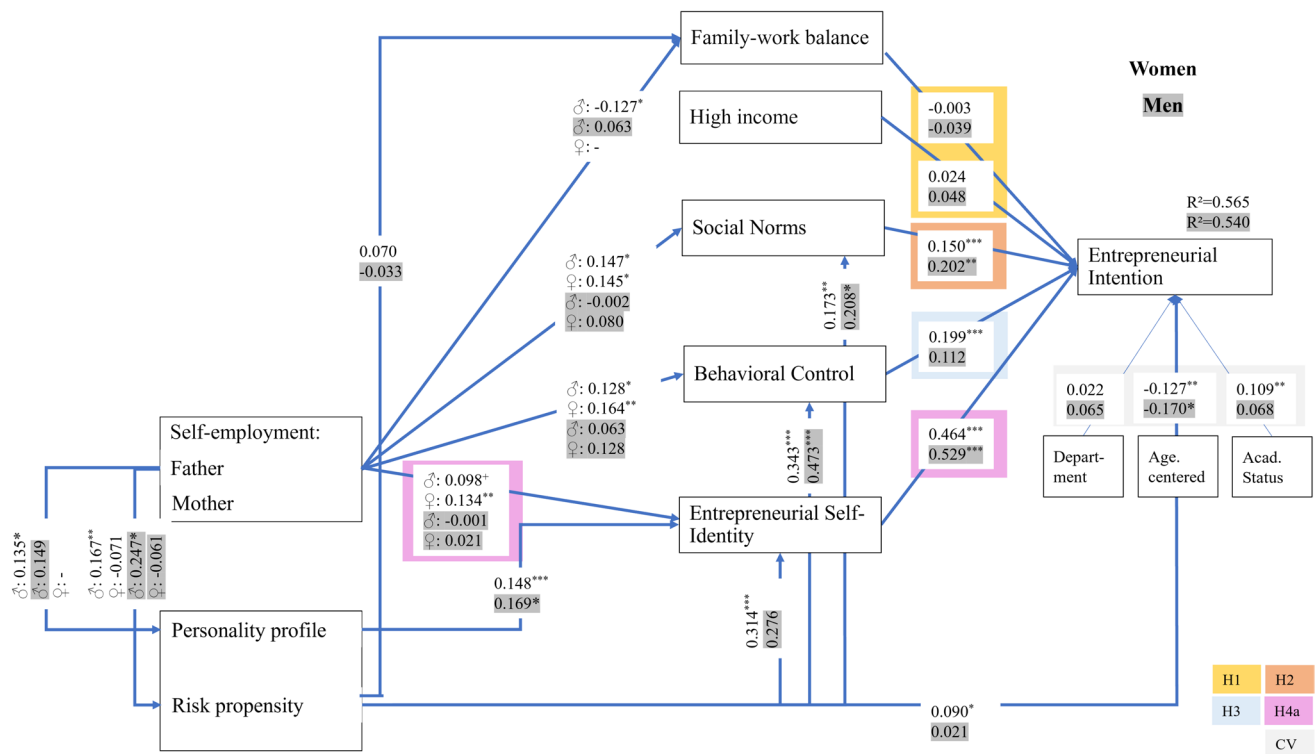
Figure 2 provides an overview of the standardized  $\beta$ -coefficients of the structural equation model for the entire group with tests of the mediation hypotheses (H2–H4, H4b–H4f, see Table 4 for detailed results and Table 6 for the hypotheses and confirmation/rejection). The results indicate a tendency for women to demonstrate slightly lower values in SN compared to men ( $\beta = -0.030$ ). Higher values in SN are associated with increased likelihood of EIs ( $\beta = 0.111$ ). However, the relationship between women's SN and EIs was not statistically significant; thus, H2 could not be significantly confirmed. Additionally, there was a tendency for women to exhibit slightly lower values in PBC compared to men ( $\beta = -0.068$ ). Higher values in PBC are linked to higher EIs ( $\beta = 0.165$ ). However, the association between gender and PBC was statistically insignificant, resulting in the rejection of H3. Similar trends were noted concerning entrepreneurial self-identity, where women displayed slightly lower values ( $\beta = -0.029$ ). Once more, this relationship was statistically insignificant, failing to confirm the expectation that entrepreneurial self-identity mediates the relationship between gender and EI (H4).

However, H4b was at least partially confirmed: Self-employed parents had a positive and significant impact on SN (mothers:  $\beta = 0.133$ ; fathers:  $\beta = 0.109$ ) and PBC (mothers:  $\beta = 0.160$ ; fathers:  $\beta = 0.109$ ). However, no significant relationship between parental self-employment

and AT (mothers:  $\beta = 0.076$ ; fathers:  $\beta = 0.043$ ) was found. Effects were mixed concerning extent to which parental self-employment influences specific personality traits (H4c): Only paternal self-employment significantly increased the entrepreneurial personality profile ( $\beta = 0.130$ ) and risk-taking propensity ( $\beta = 0.180$ ), while maternal self-employment had no effect ( $\beta = 0.004$ ;  $\beta = -0.069$ ). Moreover, the relationship between ILOC and ELOC and self-employed parents was insignificant (not shown), partially confirming H4c.

Despite the indication that women's personality profiles leaned slightly less towards entrepreneurship ( $\beta = -0.062$ ), this association did not achieve statistical significance. Nevertheless, a higher entrepreneurial personality profile led to a higher entrepreneurial self-identity ( $\beta = 0.178$ ;  $p < 0.001$ ), which, in turn, increased EIs ( $\beta = 0.378$ ;  $p < 0.001$ ). However, since the relationship between gender and entrepreneurial profile was insignificant, H4d could not be significantly confirmed.

The assumptions of H4e were confirmed, indicating that women exhibited significantly lower risk-taking propensity compared to men ( $\beta = -0.113$ ,  $p < 0.05$ ). Furthermore, it was found that each standard deviation increase in risk-taking propensity led to a significantly 0.340 higher entrepreneurial self-identity ( $p < 0.001$ ). This enhanced entrepreneurial self-identity, in turn, had a positive impact on EIs ( $\beta = 0.378$ ;  $p < 0.001$ ).



**Fig. 3** Structural equation model for men and women. Note: + $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

It was evident that risk-taking propensity directly related to the TPB variables and EIs. Specifically, a higher level of risk-taking propensity significantly increased AT by 0.253, SN by 0.183, PBC by 0.384, entrepreneurial self-identity by 0.328 units ( $p < 0.001$ ), and EIs by 0.060 units, although the latter was weakly significant ( $p < 0.1$ ).

Statistically, no distinctions emerged between women and men regarding ILOC and ELOC ( $\beta = 0.066$ ), resulting in the inability to confirm H4f. However, a lower ILOC ( $\beta = -0.070$ ) and a higher ELOC ( $\beta = 0.068$ ) related to a tendency of higher entrepreneurial self-identity ( $p < 0.05$ ).

Subsequently, we tested our moderation hypotheses (H1, H4a). The results are presented in Fig. 3 (see Table 5 for detailed results and Table 6 for formulated hypotheses and their confirmation/rejection).

The assumption stating a higher EI in men when desiring a high income and in women when desiring a balance between work and family (H1) could not be confirmed. Contrary to the expectations, an increased importance of desiring a higher income and an increased importance of balancing family and career did not relate to any specific levels of EIs both for women and men.

The influence of gender on EI through PBC through a mediational effect (H3) could not be confirmed. However, the results revealed significant moderation effects, indicating that higher values in PBC predicted a significantly higher EI in women ( $\beta = 0.199$ ,  $p < 0.001$ ).

Furthermore, the anticipated associations regarding parental entrepreneurship, entrepreneurial identity, and EI were only partially confirmed (H4b). Maternal entrepreneurship had a positive impact on the entrepreneurial identity of women ( $\beta = 0.134$ ,  $p < 0.01$ ), which, in turn, related to higher levels of EI ( $\beta = 0.464$ ,  $p < 0.001$ ). The relationship between paternal entrepreneurship and entrepreneurial identity was positive and tendentially significant for women as well ( $\beta = 0.098$ ,  $p < 0.1$ ). For male participants, no effects of parental entrepreneurship were found. Moreover, and as expected, the entrepreneurial identity predicted EI for men ( $\beta = 0.529$ ,  $p < 0.001$ ).

Turning back to the equation model for the entire group, women and men of our sample clearly had different levels of EIs, with male participants being much more likely to express ideas to start a business in the future. The respective effect of gender in a model without any additional predictor variables was  $\beta = -0.74$  ( $p < 0.001$ ,  $R^2 = 0.030$ ), explaining 3% of the variance in EI. With all predictor variables included in the model, as depicted in Fig. 3, the respective  $\beta$  was clearly reduced but still significant ( $\beta = -0.107$ ,  $p < 0.001$ ), and all variables together amounted to an explained variance in EI of 60% ( $R^2 = 0.604$ ). Taken together, even though we were not able to fully explain the differences in EI related to gender, we could find a number of significant contributors to the intention to start a business, and we explained the effects of gender at least in part.



## Discussion

The creation of businesses is a key part of a positive economic development, growth, and innovation in a given region. Even though the gap has been narrowing during the past years, women still found fewer businesses than men. For example, according to data from the Global Entrepreneurship Monitor (GEM), a worldwide study of entrepreneurial activity, the gender gap in entrepreneurship persists in many countries. Women entrepreneurial activity may be more difficult for several reasons. They often face challenges in accessing the necessary capital to start and grow their businesses, experience bias and discrimination when seeking funding, networking opportunities, or mentorship, or have backgrounds in industries and sectors less prone for entrepreneurship.

Universities of Applied Sciences often focus on practical, hands-on learning and emphasize the application of knowledge in real-world settings. Graduates from these institutions typically have practical skills and experience relevant to specific industries or fields, making male and female graduates well-prepared to start businesses in those areas. The present study was based on a sample of students and graduates of the University of Applied Sciences Potsdam, Germany. The main aim was to determine whether and for what reasons female students and graduates at a German University of Applied Sciences exhibit a lower intention for entrepreneurship as compared to their male counterparts. We intended to explore potential incentives that could motivate young women and men to consider starting their own businesses. The assumption was that the model of the TPB, along with the extension of entrepreneurial self-identity and their respective predictors (parental entrepreneurship, personality traits), could predict gender differences in EIs. In particular, we had expected that differences in motivation, affect, perceived behavioral control, social norms, and personality would explain gender differences, at least to some extent.

Indeed, and in line with previous research (e.g., Gomes et al., 2021; Overwien et al., 2024; Xanthopoulou & Sahinidis, 2024), we found the women in our sample to report lower levels of EI, even though they had the same educational background like their male counterparts. The application of TPB indicators as the mediators of gender effects on the levels of EIs and activity helped to explain some of the observed gender differences, but their overall explanatory power proved to be limited. In line with this, our findings also indicate that gender itself does not necessarily function as a mediator—a conclusion supported by other studies (e.g. Chin et al., 2024; Haus et al., 2013; Steinmetz et al., 2021). This suggests that the explanatory power of TPB-based models is limited not only with regard to gender-specific mediation but also more generally. Meta-analyses, for example, indicate

that TPB constructs typically account for only around 28 to 30% of the variance in entrepreneurial career intentions (Gorjievski et al., 2018). This means that a substantial share of variance remains unexplained, pointing to the importance of additional determinants beyond AT, SN, and PBC. This limited explanatory power suggests that other factors beyond AT, SN, and PBC play an important role. For example, research with Chinese university students showed that creativity significantly influenced EI and moderated the effects of PBC and SN (Shi et al., 2020). This highlights the need to incorporate contextual or domain-specific factors into TPB-based models, particularly in fields where creativity and project-based work are central, such as design, architecture, or the social sciences.

A possible explanation might lie in the chosen sample: we investigated both students with an average study duration of 4.8 semesters and graduates who obtained their degree at the University of Applied Science Potsdam within the last 3 years. However, Sieger et al. (2021) pointed out that while only 18% of students consider entrepreneurial activities immediately after graduation, this percentage nearly doubles 5 years after graduation. This could explain the comparatively low values in EI in our sample ( $M = 2.92$ ).<sup>14</sup> Nevertheless, our study also revealed that female graduates exhibited a higher EI than female students, a difference which was not observable in males. While previous studies predominantly focus on business students (e.g., Slomski et al., 2024), our sample consists of students and graduates from applied fields such as architecture, design, and social and educational sciences. In these disciplines, EI may be driven less by traditional TPB factors—such as profit orientation or perceived behavioral control in a business context—and more by motives like creative self-realization or project-based work, as has been shown previously, which could explain the limited explanatory power of the TPB framework in our study. The strong influence of academic discipline on EIs has already been demonstrated in a systematic literature reviews, showing that economics and engineering students tend to be more entrepreneurially inclined than those in other fields (Ismail et al., 2024). Moreover, several German studies reveal that low levels of entrepreneurial activity are largely due to a business culture characterized by the stigmatization of failure (Donaldson et al., 2023). “Fear of business failure refers to the unwillingness of individuals to take entrepreneurial risks” (Bordean et al., 2025: 10). Cultures with higher levels of uncertainty avoidance are more likely to experience a greater fear of business failure (ibid.). This cultural tendency towards risk aversion, combined with

<sup>14</sup> Leroy et al. (2009) and Maes et al. (2014), for instance, report a mean EI of 3.63. However, it is important to note that they specifically use business students as their sample.

the specific characteristics of the fields represented in our sample, may explain why most of our hypotheses, which were based on traditional entrepreneurial models, had to be rejected.

When it comes to the explanation for differences between male and female respondents concerning their EIs, our findings underline the importance of risk-taking propensity. Previous studies, too, have shown that risk propensity has an independent impact on EI (Bordean et al., 2025; Caliendo et al., 2011) and can lead to significant gender differences (Caliendo et al., 2015; Garza-Sáenz et al., 2019). Research suggests that women generally and on average may be more risk-averse than men. When it comes to entrepreneurship, this is potentially leading them to pursue more conservative business opportunities or hesitate to take the necessary risks to grow their ventures (Golik & Wasilczuk, 2025). We found for male and female respondents alike that having a father involved in entrepreneurial activity has a positive effect on own risk-taking behavior. This aligns with previous findings showing risk-taking propensity to be transmitted from fathers to their offspring (Salavou et al., 2025). Without wanting to start a discussion on nature or nurture, learning experiences with an entrepreneurial role model may help to develop a somewhat more relaxed perspective on potentially risky decisions. Interestingly, entrepreneurial activities of mothers in our sample did not have such an effect. A plausible explanation for these findings could be the tendency of women to more frequently establish smaller businesses in part without a breadwinning function for the family. Such small businesses typically perceived as less risky than starting larger enterprises (Fritsch & Wyrwich, 2021). An avenue for future research could be to systematically examine the size of parents' businesses and the effects of (parental) role modeling on children's risk-taking propensity.

While the paternal model relates to risk-taking propensity for men and women alike, according to our study, paternal entrepreneurial role models only influenced the entrepreneurial personality profile of women, not men. Additionally, entrepreneurially active parents, in general, only promoted the entrepreneurial self-identity of women, not men. This contradicts previous research results, which show that the influence of the role model is generally lower for women (Amofah & Saladrighes, 2022; Brixy et al., 2015). A potential explanation for our findings could be that women more often assess their entrepreneurial skills pessimistically compared to men (*ibid.*). However, with entrepreneurial role models present in the family environment, young women can put some more self-confidence in their abilities and thus develop a more advantageous personality for self-employment (Passavanti et al., 2024). Men tend to trust in their entrepreneurial skills regardless of the presence of such role models. This is supported by our study's finding that a higher PBC, the assessment of a person's ability to engage in self-employment, positively related to EI only in

women. The nuanced understanding of entrepreneurial self-identity, particularly affected by paternal role models, challenges the general assumption in traditional TPB models, as noted by Ajzen (1991), indicating a critical need to consider familial influence in shaping personality profiles.

The second initial question, which explored the possibility that men and women might be inclined toward entrepreneurship for different reasons, could only be partially confirmed. Overall, the desire for work-life balance (independent of EI) appears to be equally significant for the surveyed young men and women—unlike in previous studies (e.g., Fabian et al., 2016): 83.8% of male and 85.4% of female respondents considered this desire as (very) important. Self-employment does not seem to be considered as allowing a particular amount of freedom concerning time management at least for the group of young academics we studied for the purpose of the paper. The importance of traditional gender roles, where women are expected to prioritize family obligations over work (Dinh et al., 2021), may decline, as suggested by Gagauz and Chivaciuc (2021). Balancing family commitments with entrepreneurial pursuits can be particularly difficult without adequate support systems in place independent of gender. Whether self-employment creates or reduces freedom also depends on the form of self-employment (freelancer vs. business owner with a physical store) (Hilbrecht & Lero, 2014).

Women in the current sample slightly more often emphasized the importance of a higher income compared to men. Specifically, 71.4% of the surveyed women prioritized a higher income, compared to 68.7% of men. Moreover, this prioritization of income did not correspond with higher EIs, which deviates from previous research findings (e.g. Fabian et al., 2016; Xanthopoulou & Sahinidis, 2024). The present findings suggest that the composition of the studied sample may provide a plausible explanation. The range of fields offered at the University of Applied Sciences Potsdam, such as the Design department, could result in graduates in these fields earning relatively less as entrepreneurs compared to graduates from other universities with programs in fields like Law or Medicine. This could lead to a lower inclination towards desiring higher income from the outset.

## Limitations

Creating a custom survey often results in a smaller sample size. Nevertheless, a self-designed survey allows for a more precise alignment with the target audience and facilitates the collection of current, specific data that is particularly relevant to the research question. One limitation of the study regarding EI is the lack of a more in-depth exploration of entrepreneurial self-identity, which plays a significant role in shaping EI. Due to time constraints aimed at increasing the response rate, the survey was kept short, limiting the questions on

entrepreneurial self-identity to key factors such as parental self-employment and personality traits. Expanding the scope to include additional predictors, as suggested by previous research (e.g., Obschonka et al., 2015), could provide a more nuanced understanding of how younger generations develop their entrepreneurial self-concept. Additionally, the participants were asked to assess their own personality, which may introduce potential biases in the responses.

## Conclusion

Universities of Applied Sciences can be considered as one of the breeding spots for business start-ups. Yet not every graduate aims at an entrepreneurial career. In line with others, key findings of the present study indicate that a positive attitude toward self-employment, social support, confidence in one's abilities, and a strong entrepreneurial self-identity foster entrepreneurial intentions (EI) among male and female students and graduates alike. Risk aversion, on the other hand, hinders especially women's entrepreneurial motivation. Entrepreneurial parents, particularly fathers, play a crucial role in shaping women's entrepreneurial self-identity, risk tolerance, and personality. Fathers who provide a role model for entrepreneurial activities have daughters who are somewhat more likely to develop start-up ideas during or shortly after graduation. These insights underscore the importance of addressing both cognitive and contextual factors to understand and foster women's entrepreneurial activities.

## Implications for women's entrepreneurship education

Despite existing politically supported programs specifically targeting women with business ideas, these initiatives have not yet convincingly increased female entrepreneurship. The focus of such programs and university curricula on entrepreneurship alike has mainly been on providing information about the start-up process and the creation of business plans (de Sousa et al., 2024). However, these aspects potentially miss the main points in the formation of female entrepreneurship intentions and might not cover what women lack (Overwien et al., 2024). Justus (2021) notes that current academic entrepreneurship education programs do not effectively engage female students, highlighting the need for further research to identify the specific needs of potential female entrepreneurs. What can be done overall to reduce existing gender-specific barriers, which also occur at universities offering the advantage of applied knowledge prone for entrepreneurship and courses in entrepreneurship education? Initially, it seems important to encourage women

with a university degree regarding their self-assessment of entrepreneurial skills, maybe in the same way like one would imagine the role of a father involved with his own company. Targeted coaching for women could take the place rather than more general information, providing role modeling for relevant personality traits and concrete techniques for handling unforeseen situations, thus mitigating risk aversion as an obstacle to entrepreneurship. The additional integration of hands-on, emotional and positive experiences into the curricula of entrepreneurship programs could help familiarize women early on with the real challenges and opportunities of entrepreneurial settings. Internships and projects in collaboration with companies could serve to convey practical knowledge and strengthen self-confidence in entrepreneurial contexts.

On a broader level, role models seem to be of particular importance for entrepreneurship development (Passavanti et al., 2024). To encourage women without entrepreneurial parents, other role models are needed. Regular lectures by successful female entrepreneurs could be beneficial, offered both within and outside the realm of entrepreneurship education. Positive examples of successful start-ups, reports about failures and mishaps followed by better solutions and success may help to gather courage for an own start-up project especially for women without other role models. As part of current recommendations for action for German universities, internal and regional visibility of reports on successful female business founders are considered crucial (bga 2023) in order to create more role models. Increasing the visibility of female role models could indeed contribute to a long-term shift that narrows gender gaps in entrepreneurship and enhances diversity in the business sector.

What may be missing the most in women's and girls' entrepreneurship education is courage. Courage grows when examples are available, when others get involved, when emotional support is provided, and when there is a safety net in case something goes wrong. In this context, the formation of entrepreneurial teams could play a crucial role, as team startups allow for shared risks and responsibilities (Hühn & Davis, 2024). The diversity of team members could also help balance potential "weaknesses" in individual personalities. Additionally, platforms within universities that facilitate connections between female and male students from different disciplines, allowing them to exchange ideas, collaborate, and form diverse entrepreneurial teams, could provide a broader support network. Only through the creation of a stable infrastructure can women be encouraged to explore and build self-employment opportunities during their studies, ultimately contributing to a more gender-equitable landscape for entrepreneurship development. Future research should focus on contexts that help to build up entrepreneurial courage. Team startups, particularly those with mixed-gender teams, could play such a role by providing diversity and shared responsibilities.

## Appendix

**Table 2** Assessment of variables in the questionnaire

Gender	0	1					
Please indicate your gender.	male	female					
Entrepreneurial Intention	1	2	3	4	5	6	7
How much do you agree with the following statements?	Strongly disagree						Strongly agree
I am willing to do anything to be self-employed or to be an entrepreneur.							
My professional goal is to be self-employed/ to become an entrepreneur.							
I will strive to be self-employed or to establish and manage my own company.							
I am determined to be self-employed or to start a company in the future.							
I have seriously considered being self-employed or starting a company.							
I am determined to be self-employed or start a company one day.							
Attitude							
My attitude towards self-employment is that it is...	1	2	3	4	5		
	uninteresting				interesting		
	unattractive				attractive		
	boring				exciting		
	time-wasting				investing as much time as necessary		
Life Goals							
How important are the following work and life goals to you?	1	2	3	4	5		
	Not important at all				Very important		
Balancing work and family							
Desiring high income							
Social Norms							
If you were to decide to start a company or be self-employed, would the people in your immediate surroundings approve of this decision?	1	2	3	4	5	6	7
	Strongly disagree						Strongly agree
The immediate family							
My friends							
My colleagues or fellow students.							
Perceived Behavioral Control							
Please provide your assessment of following statements.	1	2	3	4	5		
	Not at all correct				Completely correct		
I believe that I can meet the requirements of self-employment.							
I am convinced that, in general, I would find it easy to be self-employed.							
If I were to pursue self-employment, I am confident that I would be successful.							
Self-Identity							
The idea of being self-employed...	1	2	3	4	5		
	Not at all correct				Completely correct		
...does not align with my self-concept.							

**Table 2** (continued)

...is entirely foreign to me.			
...fits well into the image I have of myself and my professional future.			
Self-employment of parents	yes	no	unknown
Is/Was your mother self-employed?			
Is/Was your father self-employed?			
Personality			
To what extent do the following statements apply to you?	1		5
I see myself as someone who is reserved. (E)	Does not apply at all		Applies completely
I see myself as someone who is generally trusting. (A)			
I see myself as someone who tends to be lazy. (C)			
I see myself as someone who is relaxed, handles stress well. (N)			
I see myself as someone who has few artistic interests. (O)			
I see myself as someone who is outgoing, sociable. (E)			
I see myself as someone who tends to find fault with others. (A)			
I see myself as someone who does a thorough job. (C)			
I see myself as someone who gets nervous easily. (N)			
I see myself as someone who has an active imagination. (O)			
Locus of Control			
The following statements may apply to you to varying degrees. Please indicate for each statement how much it applies to you personally.	1		5
I have control over my life (ILOC)	Does not apply at all		Applies completely
If I make an effort, I will succeed (ILOC)			
Whether in private or professional life, my life is largely determined by others (ELOC)			
My plans are often thwarted by fate. (ELOC)			



**Table 3** Multicollinearity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-	V = 0.252 p = 0.854	V = 0.061 p = 0.212	V = 0.238 p < 0.001	V = 0.381 p = 0.027	V = 0.262 p = 0.028	V = 0.052 p = 0.568	V = 0.043 p = 0.676	V = 0.223 p = 0.486	V = 0.171 p = 0.515	V = 0.190 p = 0.312	V = 0.040 p = 0.418	V = 0.031 p = 0.533	V = 0.544 p = 0.648	V = 0.230 p = 0.003	V = 0.191 p = 0.111	V = 0.212 p = 0.041
Gender																	
2		-	V = 0.526 p < 0.001	V = 0.291 p = 0.487	V = -0.089 p = 0.069	V = 0.071 p = 0.146	V = 0.250 p = 0.949	V = 0.276 p = 0.711	V = -0.108 p = 0.032	V = 0.119 p = 0.015	V = 0.026 p = 0.595	V = 0.211 p = 0.990	V = 0.276 p = 0.632	V = 0.029 p = 0.554	V = -0.018 p = 0.721	V = 0.031 p = 0.562	V = -0.049 p = 0.351
Age																	
3 academic status			-	V = 0.191 p = 0.005	V = 0.340 p = 0.214	V = 0.243 p = 0.081	V = 0.095 p = 0.154	V = 0.038 p = 0.737	V = 0.276 p = 0.066	V = 0.282 p = 0.002	V = 0.194 p = 0.274	V = 0.047 p = 0.337	V = 0.006 p = 0.906	V = 0.565 p = 0.411	V = 0.107 p = 0.694	V = 0.114 p = 0.799	V = 0.172 p = 0.198
4 Department				-	V = 0.364 p = 0.003	V = 0.272 p < 0.001	V = 0.133 p = 0.067	V = 0.125 p = 0.113	V = 0.253 p = 0.053	V = 0.253 p = 0.001	V = 0.271 p < 0.001	V = 0.133 p = 0.120	V = 0.174 p = 0.016	V = 0.581 p = 0.091	V = 0.161 p = 0.034	V = 0.158 p = 0.242	V = 0.153 p = 0.357
5 Entrepren. intention					-	r = 0.567 p < 0.001	V = 0.326 p = 0.305	V = 0.306 p = 0.619	r = 0.473 p < 0.001	r = 0.539 p < 0.001	r = 0.687 p < 0.001	V = 0.317 p = 0.439	V = 0.355 p = 0.138	r = 0.301 p < 0.001	r = 0.371 p < 0.001	r = 0.172 p < 0.001	r = 0.011 p = 0.862
6 Attitude						-	V = 0.164 p = 0.900	V = 0.177 p = 0.771	r = 0.405 p < 0.001	r = 0.390 p < 0.001	r = 0.552 p < 0.001	V = 0.255 p = 0.041	V = 0.263 p = 0.033	r = 0.166 p < 0.001	r = 0.265 p < 0.001	r = 0.148 p = 0.003	r = -0.062 p = 0.206
7 LG: work-life balance							-	V = 0.078 p = 0.278	V = 0.241 p = 0.233	V = 0.171 p = 0.564	V = 0.136 p = 0.949	V = 0.052 p = 0.568	V = 0.117 p = 0.062	V = 0.528 p = 0.886	V = 0.077 p = 0.988	V = 0.139 p = 0.598	V = 0.122 p = 0.827
8 LG: Higher Income								-	V = 0.220 p = 0.530	V = 0.193 p = 0.230	V = 0.218 p = 0.047	V = 0.102 p = 0.116	V = 0.085 p = 0.233	V = 0.570 p = 0.304	V = 0.159 p = 0.101	V = 0.126 p = 0.782	V = 0.145 p = 0.502
9 Social Norms									-	r = 0.341 p < 0.001	r = 0.467 p < 0.001	V = 0.245 p = 0.243	V = 0.233 p = 0.390	r = 0.092 p = 0.066	r = 0.202 p < 0.001	r = 0.188 p < 0.001	r = -0.074 p = 0.171
10 Behav. Control										-	r = 0.594 p < 0.001	V = 0.207 p = 0.169	V = 0.298 p < 0.001	r = 0.359 p < 0.001	r = 0.407 p < 0.001	r = 0.302 p < 0.001	r = -0.127 p = 0.016
11 Self-Identity											-	V = 0.196 p = 0.259	V = 0.210 p = 0.167	r = 0.362 p < 0.001	r = 0.384 p < 0.001	r = 0.166 p = 0.002	r = -0.031 p = 0.556
12 Mat. Self-employment												-	V = 0.256 p < 0.001	V = 0.499 p = 0.954	V = 0.147 p = 0.258	V = 0.156 p = 0.373	V = 0.158 p = 0.346
13 Pat. self-Employment													-	V = 0.566 p = 0.477	V = 0.195 p = 0.032	V = 0.136 p = 0.592	V = 0.161 p = 0.316
14 Personality Profile														-	r = 0.371 p < 0.001	r = 0.304 p < 0.001	r = -0.217 p < 0.001
15 Risk Propensity															-	r = 0.206 p < 0.001	r = -0.130 p = 0.008
16 ILC																-	r = -0.352 p < 0.001
17 ELC																	-

V, Cramers V; r, Pearson

**Table 4** Results of the structural equation model (mediation hypotheses)

Tested hypotheses (mediation)							
Gender = Mediator				standar-dized	S.E.	C.R.	p
				( $\beta$ )			
H2	Gender	→	SN	−0.030	0.140	−0.626	n.s.
	SN	→	EI	0.111	0.054	3.026	**
H3	Gender	→	PBC	−0.068	0.090	−1.538	n.s.
	PBC	→	EI	0.165	0.074	4.174	***
H4	Gender	→	Self-identity	−0.029	0.108	−0.645	n.s.
	Self-identity	→	EI	0.378	0.078	8.527	***
H4b	Mother self-employed	→	AT	0.076	0.111	1.545	n.s.
	Mother self-employed	→	SN	0.133	0.161	2.661	**
	Mother self-employed	→	PBC	0.160	0.114	3.523	***
	Father self-employed	→	AT	0.043	0.094	0.848	n.s.
	Father self-employed	→	SN	0.109	0.137	2.140	*
	Father self-employed	→	PBC	0.109	0.097	2.351	*
H4c	Mother self-employed	→	Personality profile	0.004	0.070	0.636	n.s.
	Father self-employed	→	Personality profile	0.130	0.163	2.663	**
H4d	Gender	→	Personality profile	−0.062	0.969	−1.270	n.s.
	Personality profile	→	Self-identity	0.178	0.005	4.749	***
H4e	Gender	→	Risk-taking propensity	−0.113	0.150	−2.352	*
	Risk-taking propensity	→	Self-identity	0.340	0.037	6.990	***
H4f	Gender	→	ELOC	0.066	0.101	1.261	n.s.
	ELOC	→	Self-identity	0.068	0.049	1.760	*
	Gender	→	ILOC	0.066	0.097	1.257	n.s.
	ILOC	→	Self-identity	−0.070	0.052	−1.771	*

C.R., critical ratio; SE, standard-error; <sup>+</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 5** Results of the structural equation model (moderation hypotheses)

Tested hypotheses (moderation)				Standardized coefficients						
Gender = Moderator				Women			Men			
				standar-dized	S.E.	C.R.	standar-dized	S.E.	C.R.	
				(β)				(β)		
H1	High income	→	EI	0.024	0.080	0.619	0.048	0.158	0.667	
	family-work balance	→	EI	−0.003	0.054	2.712	−0.039	0.224	−0.545	
H4a	Mother self-employed	→	Self-identity	0.134**	0.138	2.570	0.021	0.237	0.238	
	Father self-employed	→	Self-identity	0.098+	0.121	1.841	−0.001	0.195	−0.009	
	Self-identity	→	EI	0.464***	0.084	9.139	0.529***	0.186	5.719	

C.R., critical ratio; SE, standard-error; <sup>+</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 6** Overview of confirmation or rejection of the mediation and moderation hypotheses

Mediation hypotheses	Confirmed/ not confirmed
H2	not confirmed
H3	not confirmed
H4	not confirmed
H4b	partially confirmed
H4c	partially confirmed
H4d	not confirmed
H4e	confirmed
H4f	not confirmed
Moderation hypotheses	
H1	not confirmed
H4a	partially confirmed

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## Declarations

**Competing interests** The authors declare no competing interests.

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