

Diskussionspapier des
Instituts für Organisationsökonomik

3/2024

**The Influence of Role Models on Women's
Entrepreneurial Intention and Behaviour**

Lilo Seyberth/Anja Overwien

Discussion Paper of the
Institute for Organisational Economics

**Diskussionspapier des
Instituts für Organisationsökonomik
3/2024**

März 2024

ISSN 2750-4476

**The Influence of Role Models on Women's
Entrepreneurial Intention and Behaviour**

Lilo Seyberth/Anja Overwien

Abstract

Entrepreneurship is an important economic source for any country. However, the share of female entrepreneurs is still low with an entrepreneurial gender gap in most countries, meaning growth potential remains untapped. Relying on previous findings in the (women) entrepreneurship literature, we build on social learning theory (Bandura 1973) and argue that role models positively relate to an individual's aim to become an entrepreneur. To broaden the current understanding of role models' promotion of entrepreneurship, we distinguish different types of role models. We hypothesize that different role models have different effects on female students' entrepreneurial intention and behaviour. To investigate these hypotheses empirically, we rely on cross-sectional survey data of 2,237 students from 127 higher education institutions in Germany. Our findings suggest that entrepreneurial role models can help reduce gender gaps, highlighting the importance of entrepreneurial role models for the intention of women to become entrepreneurs as well as them actually doing so. Investigating different role model types, we further find a larger effect for having entrepreneurial role models within the family, especially closer familial ties.

JEL Codes: D91, J16, L26, M13

Keywords: Entrepreneurship, Gender, Germany, Role Models, Social Learning Theory

Der Einfluss von Vorbildern auf die Absicht von Frauen und deren Umsetzung, Unternehmerin zu werden

Zusammenfassung

Unternehmertum ist eine wichtige wirtschaftliche Quelle für jedes Land. Allerdings ist der Anteil weiblicher Unternehmer immer noch gering und in den meisten Ländern besteht eine Kluft zwischen den Geschlechtern im Unternehmertum, was bedeutet, dass Wachstumspotential ungenutzt bleibt. Wir stützen uns auf frühere Erkenntnisse in der Literatur des (Frauen-) Unternehmertums, bauen auf der Theorie des sozialen Lernens (Bandura 1973) auf und argumentieren, dass Vorbilder positiv mit dem Ziel einer Person verbunden sind, Unternehmerin zu werden. Um das aktuelle Verständnis der Förderung von Unternehmertum durch Vorbilder zu erweitern, unterscheiden wir verschiedene Arten von Vorbildern. Wir gehen davon aus, dass unterschiedliche Vorbilder unterschiedliche Auswirkungen auf die unternehmerische Absicht und das unternehmerische Verhalten von Studentinnen haben. Um diese Hypothesen empirisch zu untersuchen, stützen wir uns auf Querschnittsbefragungsdaten von 2.237 Studierenden aus 127 Hochschulen in Deutschland. Unsere Ergebnisse legen nahe, dass unternehmerische Vorbilder dazu beitragen können, Geschlechterunterschiede zu verringern, und unterstreichen die Bedeutung unternehmerischer Vorbilder sowohl für die Absicht von Frauen, Unternehmerinnen zu werden, als auch dafür, dass sie dies tatsächlich umsetzen. Bei der Untersuchung verschiedener Vorbildtypen stellen wir außerdem fest, dass es einen größeren Effekt gibt, wenn unternehmerische Vorbilder innerhalb der Familie vorhanden sind, insbesondere bei engeren familiären Bindungen.

Im Internet unter:

http://www.wiwi.uni-muenster.de/io/forschen/downloads/DP-IO_03_2024

DOI: 10.17879/27998448705

Universität Münster
Institut für Organisationsökonomik
Scharnhorststraße 100
D-48151 Münster

Tel: +49-251/83-24303 (Sekretariat)
E-Mail: io@uni-muenster.de
Internet: www.wiwi.uni-muenster.de/io

The Influence of Role Models on Women's Entrepreneurial Intention and Behaviour

1. Introduction

Only a third of all high-growth entrepreneurs in the world are women (GEM 2023, BMWK 2022). Even though the gender gap in entrepreneurship starts to decrease, there is still a gender difference in most countries. In Germany, only 7.1 % of women are early-stage entrepreneurs and 2.6% have an established business whereas the share of male entrepreneurs is 11.0 % and 4.5 %, respectively (GEM 2023). Furthermore, within the German entrepreneurial ecosystem, only 17.7 % of the founders are female (BMWK 2022). Thus, governmental organisations argue that an inclusive entrepreneurship culture with programs supporting women is needed (OECD 2020). One reason for the gender gap could lie in the social roles assigned to women and thus their perceived social pressure.

In many societies, entrepreneurship is often associated with male-typed traits, leading to barriers for women in entrepreneurship (Shinnar et al. 2012, Haus et al. 2013). To overcome such barriers, various approaches have been tested and established, especially in the context of higher education. According to social learning theory (Bandura 1973), people develop their behaviour when they study other people's behaviour and the consequences of their behaviour (Bandura 1973, Mungai and Velamuri 2011). Role models are such other people being observed and learned from. In entrepreneurship these role models are (successful) entrepreneurs. The access to such role models helps increase the overall intention of students to become entrepreneurs (Marques et al. 2018, Boldureanu et al. 2020). This is particularly important with regard to women in entrepreneurship, as women are more prone to increase their entrepreneurial intention through external stimuli such as entrepreneurial role models (Botha 2020, Shahin et al. 2021). Moreover, gender-specific studies suggest that entrepreneurial role models can bridge the gender gap in entrepreneurship (Lockwood 2006, van Ewijk and Belghiti-Mahut 2019).

First studies show that the effect of role models differs based on the type of role model (Linan et al. 2022), with same-gender role models and entrepreneurial parents affecting female students' entrepreneurial intention more than male students (Lockwood 2006, Kyrgidou et al. 2021). However, the understanding of different role model types is still insufficient. Furthermore, most role model studies focus on the impact of role models on either entrepreneurial

intention or entrepreneurial behaviour (Zapkau et al. 2017, Abbasianchavarie and Moritz 2021).

We aim to broaden the understanding of the part entrepreneurial role models play in reducing the gender gap in entrepreneurship. In particular, we investigate the relationship of various role model types with entrepreneurial intention and entrepreneurial behaviour. We tackle the following research questions: Can entrepreneurial role models reduce the entrepreneurial gender gap? And does their impact differ across different types of role models? To answer these questions, we investigate cross-sectional survey data of 2,237 students from 127 higher education institutions in Germany. Our findings broaden the current understanding of role models in entrepreneurship by distinguishing role model types and comparing not only their relation to students' entrepreneurial intention but also to actual entrepreneurial behaviour. While we emphasise that having any entrepreneurial role model implies higher intention and behaviour than having none, we also find that close (familial) entrepreneurial role models have a stronger impact than those more distant.

The remaining paper is structured as follows. Next, we use a short overview over current literature on entrepreneurial intention and role models to develop our hypotheses. Then, we describe our sample data and the econometric method used to analyse it. Afterwards we present and discuss of our findings. We conclude with our contribution, limitations of this study and possible future research paths.

2. Theoretical Background and Hypotheses Development

2.1. Women in Entrepreneurship

Women entrepreneurship and gender equality affect countries' economic development (Sarfraz et al. 2014). However, only a third of all high growth entrepreneurs worldwide are female (GEM 2023, BMWK 2022). One reason for this effect could be that certain social behaviours are linked to social roles which differ between men and women (for social role theory see Eagly et al. 2000, Eagly and Wood 2016). These roles are connected with expected behaviour derived from the observation of male or female individuals and their behaviour (social identification), leading to an identification with and adoption of traits like assertiveness within men and friendliness within women (Anglin et al. 2022).

Entrepreneurship is often perceived as a masculine field and some societies believe that it requires stereotypically masculine qualities (Welter et al. 2006, Gupta et al. 2009). This leads

to men being more likely to show entrepreneurial behaviour than women (Bruni et al. 2004, Yordanova and Tarrazon 2010, Haus et al. 2013). Such societally induced gender role attribution can lead to gender categorisation in the workplace, affect individuals' occupational preferences, and create barriers to women entrepreneurship (Shinnar et al. 2012, Wieland et al. 2019).

2.2. Social Learning Theory

To overcome the gender gap and benefit from women's ideas and skills, the rate of women who show entrepreneurial behaviour by becoming entrepreneurs needs to rise. But how can we induce such a change in women's behaviour? According to social learning theory (Bandura 1973), human behaviour is based on cognitive, environmental, and behavioural determinants (Bandura 1977). The development of individuals' behaviour arises from the observation of other peoples' behaviour and the corresponding consequences (Bandura 1973, Mungai and Velamuri 2011). Moreover, parents affect the career choices of their children, especially during early adulthood as children learn from their behaviour (Johnson 2002, Halaby 2003). Apart from one's upbringing, people are drawn towards individuals who can support them in their skill development, suggesting that they are interested in positive role models (Gibson 2004). Thus, we suggest that entrepreneurial behaviour can be learned through the observation of entrepreneurs who function as role models. However, entrepreneurial behaviour does not necessarily appear directly. Therefore, Liñán and Chen (2009) developed the entrepreneurial intention (EI) framework to predict entrepreneurial behaviour. EI measures the motivation of individuals to become entrepreneurs, with a higher EI level indicating a higher likelihood to show the actual behaviour (Liñán and Chen 2009, Maresh et al. 2016). Previous studies show that entrepreneurial intention is affected by gender with women having in general lower EI than men (Zhang et al. 2014, Nowiński et al. 2019, Estelami 2020, Polin 2023) and thus a higher need for inspiration.

2.3. Role Models

Previous research shows that entrepreneurial role models have an indirect positive impact on students' EI (Karimi et al. 2013, 2014). They motivate people to become entrepreneurs as they convey that start-ups can be successful and thus entrepreneurship a successful career (Bosma et al. 2012, Byrne et al. 2019). Moreover, entrepreneurial role models have a positive effect on students' EI levels (Van Auken et al. 2006, Engle et al. 2011, Karimi et al. 2014, Liñán and Fayolle 2015, Nowiński and Haddoud 2019, Wannamakok and Chang 2020) and

can help overcome gender stereotypes that associate entrepreneurs with male attributes (Díaz-García and Jiménez-Moreno 2010, Dao et al. 2021, Bueno Merino and Duchemin 2022). Women are more prone to increase their EI through external stimuli such as entrepreneurial role models (Botha 2020, Shahin et al. 2021) with a perceived lack of role models leading to a decrease in women's EI (Laguía et al. 2022, Achtzehn et al. 2023). Thus, the relevance of role models for female students has been highlighted by various studies (BarNir et al. 2011, Camelo-Ordaz et al. 2016, Choukir et al. 2019, Dao et al. 2021, Shahin et al. 2021), suggesting that, in accordance with social learning theory, role models play a key role in forming entrepreneurial behaviour of women. Hence, we hypothesize as follows:

H1a: Female students with entrepreneurial role models have higher entrepreneurial intention than female students without role models.

H1b: Female students with entrepreneurial role models are more likely to engage in entrepreneurial behaviour than female students without role models.

As mentioned above, social learning theory posits that children learn by observing others (Johnson 2002, Halaby 2003). This works better the more time they spend with the person they are observing and learning from and the more they identify with this person (Urbano et al. 2011, Hoffmann et al. 2015, Adamus et al. 2021). We assume that having familial ties equates to spending more time and identifying more with the respective role models, especially due to closer relations when growing up (Johnson 2002, Halaby 2003).

Bosma et al. (2012) find that family role models often take a mentoring role compared to colleague or non-relative entrepreneurs and Kyrgidou et al. (2021) state that having an entrepreneurial family background significantly affect the businesses success of women entrepreneurs. Furthermore, studies show that students with an entrepreneurial family background have higher EI levels than students without role models (Jaén and Liñán 2013, Ahmed et al. 2021, Lara-Bocanegra et al. 2022).

Contrary, Liñán et al. (2022) find that family role models have no effect on women's EI while some non-relative role models (workmates) do. Similarly, Botha (2020) investigates general role models and argues that they encourage women to become entrepreneurs. Zhang et al. (2014) hypothesize that non-family entrepreneurs such as friends can also positively affect students' EI. We agree that non-family role models are important and can positively affect EI. Yet, following social learning theory, we argue that role models within the family have a

greater effect than role models outside of the family. Therefore, our second hypothesis reads as follows:

H2a: Having entrepreneurial role models within the family has a greater impact on female students' entrepreneurial intention than having non-family role models.

H2b: Having entrepreneurial role models within the family has a greater impact on female students' likelihood to engage in entrepreneurial behaviour than having non-family role models.

Looking deeper into family role models suggest a further distinction into parents and other relatives, with social learning theory suggesting that children's career choices are especially affected by their parents (Banduar 1997, Johnson 2002, Halaby 2003). Furthermore, the interaction with parents is in general more frequent, enabling children to observe and adapt their parents' behaviour over a longer period of time than other family members (Mungai and Velamuri 2011). Additionally, parents that own a business themselves could influence their children more directly by actively helping them with advice and potentially money in their entrepreneurial endeavours.

Having entrepreneurial parents is seen as particularly important for women (Entrialgo and Inglesias 2017), suggesting that women entrepreneurs receive support and advice from their parents (Kirkwood 2007). However, studies on the impact of parental role models on individuals EI is contradicting. Some studies find that entrepreneurial parents positively affect individuals' EI (Kirkwood 2007, Mungai and Velamuri 2011, Botha 2020, Oggero et al. 2023) or female students' EI (Engle et al. 2011, Amofah and Saladrigues 2022). Other studies show no significant impact of entrepreneurial parents (Nguyen 2018, Neneh 2020). Similarly, Linan et al. (2022) find that neither an entrepreneurial mother, father, nor other entrepreneurial relatives affect women's EI. Therefore, we hypothesize the following:

H3a: Having entrepreneurial parents has a greater impact on female students' entrepreneurial intention than having other entrepreneurial relatives.

H3b: Having entrepreneurial parents has a greater impact on female students' likelihood to engage in entrepreneurial behaviour than having other entrepreneurial relatives.

Introducing the social role theory to the concept of the social learning theory suggests that women are more strongly influenced by the behaviour of their mothers and men by their fathers' behaviour (Bandura 1973, Eagly et al. 2000, Mungai and Velamuri 2011, Eagly and

Wood 2016, Aglin et al. 2022). Furthermore, students' EI positively relates to individuals' identification with successful entrepreneurs, who are often attributed with male stereotypes (Adamus et al. 2021). Same-gender role models can help overcome these stereotypes and increase women's EI (Lookwood 2006, Bueno Merino and Duchemin 2022).

Oggero et al. (2023) argue that daughters' likelihood to become an entrepreneur is positively affected by both parental role models. Hoffmann et al (2015) find gendered effects of self-employed parents on students' EI, with mothers having a higher impact on daughters than fathers. We thus hypothesize as follows:

H4a: Having an entrepreneurial mother has a greater impact on female students' entrepreneurial intention than having an entrepreneurial father.

H4b: Having an entrepreneurial mother has a greater impact on female students' likelihood to engage in entrepreneurial behaviour than having an entrepreneurial father.

2.4. Control Variables

To identify the gender-specific relation between role models and EI, we control for determinants that already showed an impact in previous research.

Entrepreneurship Education Activities

Several studies show that entrepreneurship education activities (EEA) positively affect students' EI and have a stronger impact on female students (Nowiński et al. 2019, Bhatti et al. 2021, Pergelova et al. 2023). Van Ewijk and Belghiti-Mahut (2019) even state that gender difference in EI became insignificant when students attended EEA. Contrary, Salavou et al. (2021) find a negative effect of EEA on women's affinity to entrepreneurship and Ahmed et al. (2017) argue that female students gained lower perceived benefits through EEA.

Field of Study

Goldschmid (1967) argues that students' personality characteristics are related to their chosen major, and Feist (1998) identified differences between scientists and non-scientists as well as artists and non-artists. Various studies indicate that students' gender and field of study relate to their EI (López-Delgado et al. 2019). Polin (2023) finds that business and engineering students have the highest EI levels but that gender differences are almost non-existent within

different majors. Similarly, Dao et al. (2021) state that gender differences cannot be found in all fields of studies and identified a gender gap in engineering but not in business.

Age

Some studies state a negative relationship between students' EI and their age (Lévesque and Minniti 2006, Sahut et al. 2015, Olarewaju et al. 2022), while others find no significant relation (Ferrerias-Garcia et al. 2021, Polin 2023). Borges et al. (2021) argue that students' age affects their EI levels. Similarly, Ali et al. (2023) suggest that age affects individuals' likelihood to become entrepreneurs.

Work Experience

Studies on the impact of students' work experience on their EI are contradictory. Bignotti and le Roux (2020) find that work experience positively affects young people's EI, while Ahmed et al. (2021) argue that students' work experience has no significant impact on EI, and Liang et al. (2022) state that work experience negatively affects EI. Chukhray et al. (2021) suggest that work experience has a positive impact on students' EI and their confidence in their own entrepreneurial abilities.

University Type

Zhang et al. (2014) show that the university type significantly affects students' EI. Moreover, Sánchez-Queija et al. (2023) identify gender differences for perceived employability among university students but not among vocational education and training students. Comparing private and public higher education institutions (HEI), Barral et al. (2018) find that students from private universities have higher EI compared to students from public universities. Other studies find no significant difference between EI of public and private HEI students (Canever et al. 2017, Meeralam and Adeinat 2022).

Migration/Culture

The impact of role models on individuals' EI development has been examined across countries, showing differences between cultures but also contradicting findings (Engle et al. 2011, Zapkau et al. 2017, Abbasianchavari and Moritz 2021). Urbano et al. (2011) find that role models of similar ethnic background have a positive effect on individuals' EI.

Other research examined the entrepreneurial intention of students across different countries finding no significant relation (Vankov et al. 2022, Kyriakopoulos et al. 2024) or suggest that culture characteristics affect students' EI (Shinnar et al. 2012, Shneor et al. 2013, Jaén and Linan 2013, Fleck et al. 2021, Gupta et al. 2022).

3. Data and Methods

3.1. Data Description

3.1.1. Data Collection

This research is based on individual level cross-sectional data gathered through a survey amongst higher education students conducted previously by one of the authors. The aim of the survey was to examine students' interest in starting a business and their start-up competencies in order to investigate how to promote start-ups and entrepreneurship. The survey was conducted between 08.12.2021 and 02.02.2022. 3,176 students from 148 German higher education institutions participated. Appendix 1 provides further information on the variables used, in addition to the following description. All data is self-reported by the respondents.

Role Models

Our explanatory variables of interest stem from a survey question in which participants were asked if they know any founders personally, which we take as the existence of entrepreneurial role models (BarNir et al. 2011). Multiple answers on the relationship with these founders were possible. The answers were coded as dummy variables equal to 1 if such a role model exists.

The variable *Role Model* captures the existence of entrepreneurial role models in general. We further differentiate between several types of role models ranging from broader groups to specific ones, all coded likewise. *RM Family* captures the existence of role models within the family, while *RM no Family* those outside of the family. Within the family-based role models we separate *RM Parents* and *RM Relatives*, to investigate whether at least one¹ of the parents or other relatives constitute role models. Lastly, we inspect the parents' group more closely to investigate the individual part mother and father play as role models with *RM Mother* and *RM*

¹ 27 of the female students in our sample report having both their parents as entrepreneurial role models (22 of those are non-founders, 5 of them are founders). Given the limited number of observations in this subgroup, we do not investigate them separately. They are part of the *RM Parents* group.

Father. Participants can be part of more than one group, for example have role models within the family as well as without the family.

Entrepreneurial Intention

Our dependent variable *Intention* is an aggregated measure of four self-assessment survey items, based on Liñán and Chen (2009) (originally six items). Participants rated (a) “I am ready to do anything to be an entrepreneur.”, (b) “I will make every effort to start and run my own firm.”, (c) “I am determined to create a firm in the future.” and (d) “I have the firm intention to start a firm someday.” on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). *Intention* captures the mean of the four individual scores. The scale of *Intention* ranges from 1 (very little entrepreneurial intention) to 5 (very high entrepreneurial intention).

Entrepreneurial Behaviour

Our alternative dependent variable *Founder* measures exhibited entrepreneurial behaviour, containing whether or not the respondent is or has been involved in a founding process. The variable is coded as a dummy variable with 1 referring to those students who have already founded a company or are in the founding phase. Those coded 0 have not founded (yet) and thus have not shown entrepreneurial behaviour (yet). The latter group we call non-founders.

Control Variables

Following previous research on entrepreneurial intention (Engle et al. 2011, van Ewijk and Belghiti-Mahut 2019, Polin 2023) we include individual level controls on entrepreneurial education, age, field of study, type of higher educational institution, nationality and work experience. We measure *Education* using a binary variable indicating whether or not entrepreneurship education activities (such as curriculum courses, start-up talks or entrepreneurship workshops) have been attended. *Age* is the self-reported age in years. For the categorical variable *Field of Study*, we differentiate between *Maths/CS (Computer Sciences)*, *Engineering*, *Natural Sciences* and *Humanities*, the baseline group being *Business Administration*. We further differentiate twofold between types of higher educational institution (HEI): *Public HEI* indicates if the respondent attends a public HEI (=1) or a private one (=0); *Applied HEI* specifies if the attended HEI is a university (=0) or university of applied sciences (=1). Furthermore, *German* measures if the respondent is born in Germany (=1), reflecting migration, while the binary coded *Work Experience* captures any kind of previous work experience (=1).

3.1.2. Descriptive Statistics

Our full sample, shown in Table 1, consists of 2,237 students from 127 higher education institutions in Germany. 49 % of the sample identify as women, there are no nonbinary students in this sample. The female students in this study report on average less intention to become an entrepreneur than their male counterparts. Furthermore, the percentage of women that state they have already founded a business is less than half that of men. These ratios are similar to the results of the global entrepreneurship monitor for Germany: 7.1 % of the women and 11.0 % of the men surveyed were early-stage entrepreneurs, while 2.6 % and 4.5 % were entrepreneurs with an established business, respectively (GEM 2023). Regarding entrepreneurial role models, 56 % of female students and 65 % of male students in our sample report knowing at least one entrepreneur personally.

	Full Sample				Female				Male			
	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean
Female	2,237	0	1	0.49	-	-	-	-	-	-	-	-
Founder	2,237	0	1	0.09	1,092	0	1	0.05	1,145	0	1	0.12
Intention	2,237	1	5	2.60	1,092	1	5	2.27	1,145	1	5	2.91
Education	2,237	0	1	0.16	1,092	0	1	0.12	1,145	0	1	0.19
Age	2,237	17	47	24.60	1,092	18	47	24.48	1,145	17	47	24.72
<i>Field of Study:</i>												
~Business Adm.	2,237	0	1	0.28	1,092	0	1	0.31	1,145	0	1	0.25
~Maths/CS	2,237	0	1	0.11	1,092	0	1	0.07	1,145	0	1	0.16
~Engineering	2,237	0	1	0.24	1,092	0	1	0.14	1,145	0	1	0.34
~Natural Sciences	2,237	0	1	0.20	1,092	0	1	0.22	1,145	0	1	0.18
~Humanities	2,237	0	1	0.16	1,092	0	1	0.26	1,145	0	1	0.07
Public HEI	2,237	0	1	0.89	1,092	0	1	0.90	1,145	0	1	0.88
Applied HEI	2,237	0	1	0.38	1,092	0	1	0.36	1,145	0	1	0.39
German	2,237	0	1	0.87	1,092	0	1	0.86	1,145	0	1	0.89
Work Experience	2,237	0	1	0.88	1,092	0	1	0.87	1,145	0	1	0.88
Role Model	2,237	0	1	0.61	1,092	0	1	0.56	1,145	0	1	0.65
RM Family	2,237	0	1	0.26	1,092	0	1	0.25	1,145	0	1	0.27
RM no Family	2,237	0	1	0.43	1,092	0	1	0.36	1,145	0	1	0.50
RM Parents	2,237	0	1	0.14	1,092	0	1	0.14	1,145	0	1	0.14
RM Relatives	2,237	0	1	0.16	1,092	0	1	0.15	1,145	0	1	0.17
RM Mother	2,237	0	1	0.04	1,092	0	1	0.04	1,145	0	1	0.04
RM Father	2,237	0	1	0.12	1,092	0	1	0.12	1,145	0	1	0.12

Table 1: Descriptive Statistics all Students by Gender (full sample)

In the next step, being interested in the correlations of entrepreneurial intention, education and role models of female students specifically, we exclude all male respondents' observations. For our first round of analysis focusing on students' entrepreneurial intention, we further exclude observations with *Founder* status. We do this as the entrepreneurial intention framework was developed to predict entrepreneurial behaviour (Liñán and Chen 2009) and thus students who already exhibited entrepreneurial behaviour would distort our results. As such we investigate only the non-founder women when looking at entrepreneurial intention. After furthermore removing observations with missing variable values, our first sub sample thus comprises of 1,039 female students from 107 higher education institutions in all 16 German states. Including female students who already founded a start-up (*Founder* status) for our analysis of entrepreneurial behaviour, our second sub sample contains 1,092 female students from 109 German higher education institutions.

Descriptive statistics for the complete sample as well as the non-founder and founder sub-samples are shown in Table 2. The minimum and maximum value of *Intention* show that our sample of non-founders covers the complete range possible for this variable, averaging at 2.27 out of 5. Female students who have already founded make up 5 % of our sample. 56 % of the complete sample report having entrepreneurial role models. Splitting the group by founder status, 94 % of the founders report having an entrepreneurial role model. That is 40 percentage points more than in the non-founder group. This gives first tentative support to our hypotheses. Furthermore, in comparison to the non-founder group, founders are older and have more entrepreneurial education. They are also less likely to be from a public HEI and more likely to be from an applied HEI than non-founders. Additionally, less of the founders report having German nationality and more of them have had previous work experience.

When we split the group into those with and those without role models (see Table 3), we find more founders and a higher entrepreneurial intention amongst those with role models. 8 % of those with but only 1 % of those without entrepreneurial role models have already founded a company or are in the process of doing so. We take this as further tentative indication for the importance of role models we hypothesised. Moreover, those with role models are older and more report having had work experience before. More of them also report having had entrepreneurial education and they are slightly less likely to be from a public HEI than those without role models.

	Complete Sample				Non-Founder				Founder			
	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean
Founder	1,092	0	1	0.05	1,039	0	0	0	53	1	1	1
Intention	1,092	1	5	2.27	1,039	1	5	2.19	53	1.5	5	3.84
Education	1,092	0	1	0.12	1,039	0	1	0.10	53	0	1	0.53
Age	1,092	18	47	24.48	1,039	18	47	24.41	53	18	44	25.94
<i>Field of Study</i>												
~Business Adm.	1,092	0	1	0.31	1,039	0	1	0.30	53	0	1	0.47
~Maths/CS	1,092	0	1	0.07	1,039	0	1	0.06	53	0	1	0.11
~Engineering	1,092	0	1	0.14	1,039	0	1	0.14	53	0	1	0.19
~Natural Sciences	1,092	0	1	0.22	1,039	0	1	0.23	53	0	1	0.09
~Humanities	1,092	0	1	0.26	1,039	0	1	0.27	53	0	1	0.13
RM Family	1,092	0	1	0.25	1,039	0	1	0.24	53	0	1	0.47
RM no Family	1,092	0	1	0.36	1,039	0	1	0.34	53	0	1	0.68
RM Parents	1,092	0	1	0.14	1,039	0	1	0.13	53	0	1	0.36
RM Relatives	1,092	0	1	0.15	1,039	0	1	0.15	53	0	1	0.26
RM Mother	1,092	0	1	0.04	1,039	0	1	0.04	53	0	1	0.15
RM Father	1,092	0	1	0.12	1,039	0	1	0.11	53	0	1	0.30

Table 2: Descriptive Statistics All Female Students by Founder Status

	Complete Sample				No Role Model				Role Model			
	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean	Obs.	Min	Max	Mean
Founder	1,092	0	1	0.05	483	0	1	0.01	609	0	1	0.08
Intention	1,092	1	5	2.27	483	1	5	2.02	609	1	5	2.46
Education	1,092	0	1	0.12	483	0	1	0.05	609	0	1	0.18
Age	1,092	18	47	24.48	483	18	39	23.88	609	18	47	24.96
<i>Field of Study</i>												
~Business Adm.	1,092	0	1	0.31	483	0	1	0.23	609	0	1	0.37
~Maths/CS	1,092	0	1	0.07	483	0	1	0.08	609	0	1	0.06
~Engineering	1,092	0	1	0.14	483	0	1	0.13	609	0	1	0.16
~Natural Sciences	1,092	0	1	0.22	483	0	1	0.28	609	0	1	0.18
~Humanities	1,092	0	1	0.26	483	0	1	0.29	609	0	1	0.24
RM Family	1,092	0	1	0.25	483	0	0	0	609	0	1	0.46
RM no Family	1,092	0	1	0.36	483	0	0	0	609	0	1	0.65
RM Parents	1,092	0	1	0.14	483	0	0	0	609	0	1	0.25
RM Relatives	1,092	0	1	0.15	483	0	0	0	609	0	1	0.28
RM Mother	1,092	0	1	0.04	483	0	0	0	609	0	1	0.08
RM Father	1,092	0	1	0.12	483	0	0	0	609	0	1	0.22

Table 3: Descriptive Statistics all Female Students by Role Model

3.2. Regression Model

Looking at female students only, we perform a linear regression on the collected data. Investigating the correlation between role models and entrepreneurial intention, our regression is expressed in the following regression equation:

$$EntrepreneurX_i = \alpha + RM_i (+ RM2_i) + Controls_i + \varepsilon_i \quad (\text{Equ. 1})$$

EntrepreneurX is our dependent variable in its two dimensions: *Intention* of individual *i* to become an entrepreneur and alternatively *Founder* status of individual *i*. *RM* captures our main explanatory variable indicating the existence of role models in varying forms/groupings. Model (1) includes *Role Model* only. Models (2) to (4) each contain two contrary *RM* sets: *RM Family/RM no Family*, *RM Parents/RM Relatives* and *RM Mother/RM Father*. The *Controls* vector contains our individual-level control variables. α displays the constant and ε the error term of our regression.

4. Results

4.1. Main Results

4.1.1. Role Model Differences Intention

Our regression results for *Intention* are displayed in Table 4, each model containing a different role model (pair) [(1) *Role Model*, (2) *RM Family/RM no Family*, (3) *RM Parents/RM Relatives*, (4) *RM Mother/RM Father*]. In Model 1, we find a highly significant positive effect of having a role model on female students' entrepreneurial intention ($\beta = 0.288$, $p = 0.000$). This is giving support to Hypothesis 1a, indicating that role models do indeed play an important part in shaping women's entrepreneurial intention.

Looking at a first distinction in Model 2, we find both *RM Family* and *RM no Family* to be significant and positively associated with *Intention*. However, having a role model in the family is highly significant and the effect is stronger ($\beta = 0.345$, $p = 0.000$) than having a role model without familial relations, which is only significant at the 5 % level ($\beta = 0.179$, $p = 0.014$). As such we find support for Hypothesis 2a.

Further investigating familial role models in Model 3, shows a highly significant and positive association of *RM Parents* as well as *RM Relatives* with our dependent variable. However, in line with Hypothesis 3a the effect of parental role models is stronger ($\beta = 0.360$, $p = 0.000$) than that of other relatives ($\beta = 0.289$, $p = 0.002$).

Lastly, we examine gender differences on the level of parents in Model 4. Interestingly, only the effect of *RM Father* is significant ($\beta = 0.307$, $p = 0.006$) while *RM Mother* is not ($\beta = 0.223$, $p = 0.216$). Hence, we find an indication to reject Hypothesis 4a.

VARIABLES	(1) Intention	(2) Intention	(3) Intention	(4) Intention
Role Model	0.288*** (0.069)			
RM Family		0.345*** (0.077)		
RM no Family		0.179** (0.073)		
RM Parents			0.360*** (0.099)	
RM Relatives			0.289*** (0.093)	
RM Mother				0.223 (0.180)
RM Father				0.307*** (0.111)
Education	0.183 (0.113)	0.187* (0.113)	0.221** (0.112)	0.229** (0.113)
Age	-0.022*** (0.008)	-0.021** (0.008)	-0.017** (0.008)	-0.018** (0.008)
Field of Study				
<i>Maths/Computer Sciences</i>	-0.161 (0.147)	-0.184 (0.146)	-0.189 (0.146)	-0.194 (0.147)
<i>Engineering</i>	-0.002 (0.107)	-0.011 (0.107)	-0.026 (0.107)	-0.023 (0.108)
<i>Natural Sciences</i>	-0.284*** (0.103)	-0.276*** (0.103)	-0.296*** (0.102)no	-0.315*** (0.103)
<i>Humanities</i>	-0.288*** (0.097)	-0.281*** (0.097)	-0.293*** (0.097)	-0.305*** (0.097)
Public HEI	-0.482*** (0.121)	-0.486*** (0.120)	-0.510*** (0.120)	-0.505*** (0.121)
Applied HEI	0.196** (0.080)	0.192** (0.080)	0.186** (0.080)	0.179** (0.080)
German	-0.654*** (0.097)	-0.620*** (0.097)	-0.612*** (0.097)	-0.624*** (0.098)
Work_Experience	-0.075 (0.102)	-0.077 (0.102)	-0.049 (0.101)	-0.026 (0.101)
Constant	3.697*** (0.256)	3.655*** (0.256)	3.616*** (0.256)	3.682*** (0.257)
Observations	1,039	1,039	1,039	1,039
R-squared	0.136	0.143	0.143	0.132

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(1) General Role Models, (2) Family vs no Family, (3) Parents vs other Relatives, (4) Mother vs Father

Table 4: Regression Results for Entrepreneurial Intention of Female Students

4.1.2. Role Model Differences Behaviour

Our regression results for *Founder* are displayed in Table 5, again each model containing a different role model (pair) [(1) *Role Model*, (2) *RM Family/RM no Family*, (3) *RM Parents/RM Relatives*, (4) *RM Mother/RM Father*]. Our dependent variable comprehends those

female students who already founded a company and thus showed entrepreneurial behaviour versus those that have not. Overall, this further analysis confirms the results we found when investigating *Intention*.

VARIABLES	(1) Founder	(2) Founder	(3) Founder	(4) Founder
Role Model	0.050*** (0.013)			
RM Family		0.044*** (0.014)		
RM no Family		0.037*** (0.014)		
RM Parents			0.067*** (0.018)	
RM Relatives			0.025 (0.017)	
RM Mother				0.091*** (0.032)
RM Father				0.044** (0.020)
Education	0.168*** (0.020)	0.169*** (0.020)	0.175*** (0.020)	0.175*** (0.020)
Age	0.003** (0.002)	0.003** (0.002)	0.004** (0.002)	0.004** (0.002)
Field of Study				
<i>Maths/Computer Sciences</i>	0.041 (0.027)	0.037 (0.027)	0.037 (0.027)	0.036 (0.027)
<i>Engineering</i>	0.017 (0.020)	0.016 (0.020)	0.013 (0.020)	0.012 (0.020)
<i>Natural Sciences</i>	-0.001 (0.020)	-0.000 (0.020)	-0.004 (0.019)	-0.007 (0.019)
<i>Humanities</i>	0.000 (0.018)	0.001 (0.018)	-0.001 (0.018)	-0.004 (0.018)
Public HEI	-0.010 (0.022)	-0.009 (0.022)	-0.013 (0.022)	-0.013 (0.022)
Applied HEI	0.035** (0.015)	0.035** (0.015)	0.033** (0.015)	0.032** (0.015)
German	-0.028 (0.018)	-0.023 (0.018)	-0.021 (0.018)	-0.022 (0.018)
Work Experience	-0.008 (0.020)	-0.007 (0.020)	-0.000 (0.019)	0.003 (0.019)
Constant	-0.055 (0.048)	-0.056 (0.048)	-0.064 (0.048)	-0.058 (0.048)
Observations	1,092	1,092	1,092	1,092
R-squared	0.110	0.111	0.112	0.113

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

(1) General Role Models, (2) Family vs no Family, (3) Parents vs other Relatives, (4) Mother vs Father

Table 5: Regression Results for Founder Status of Female Students

We again find a highly significant positive effect of having a role model in general (Model 1: $\beta = 0.0502$, $p = 0.000$), supporting Hypothesis 1b. Equally, H2b is supported: we find *RM Family* and *RM no Family* (Model 2) to be highly significant, with the effect of a role model

in the family being stronger ($\beta = 0.044$, $p = 0.002$) than that of non-family role models ($\beta = 0.037$, $p = 0.007$).

For Model 3 we find a significant and positive effect only for parents as role models ($\beta = 0.067$, $p = 0.000$). Other relatives are not statistically significant ($\beta = 0.025$, $p = 0.154$), strengthening our previous indication of support for Hypothesis 3b.

Interestingly, for Model 4, we now see significant and positive effects of both RM Father and RM Mother. Even more so, mother as role model is stronger and more significant ($\beta = 0.091$, $p = 0.004$) than father ($\beta = 0.044$, $p = 0.028$), giving support to Hypothesis 4b.

4.2. Robustness Checks

4.2.1. Gender Differences without Role Models

We want to confirm that our sample displays the gender differences we have seen in various prior studies (Bruni et al. 2004, Nowiński et al. 2019, Polin 2023). Hence, we run a regression on our full sample of female and male students without any role model variables but with a gender dummy *Female*. The results are shown in Appendix 2 (Equ. 2 & Table A.1). We indeed, too, find these differences, with being female resulting in significantly lower entrepreneurial *Intention* (Model 1) and significantly lower likelihood to be a *Founder* (Model 3).

4.2.2. Gender Differences with Role Models

We again investigate the full sample of students now using an interaction term of our gender variable *Female* and the variable *Role Model*, capturing the existence of at least one personal role model in entrepreneurship. The baseline of the interaction are male students with no entrepreneurial role model. The results are shown in Appendix 2 (Equ. 2 & Table A.1).

Model (2) examines the interaction effect on the dependent variable *Intention*. We are mainly interested in the effect of female students with entrepreneurial role model in comparison to the baseline of male students without a role model. This coefficient is not statistically significant ($\beta = -0.066$, $p = 0.387$), indicating that women with role models have similar *Intention* levels to men without role models. This is further supported in Model (4) investigating the *Founder* status. Here women with role models in entrepreneurship are marginally significantly more likely to be founders than men without them ($\beta = 0.030$, $p = 0.086$).

5. Discussion, Implications, Limitations and Further Research

5.1. Discussion

This study aims to investigate the part entrepreneurial role models play with regard to entrepreneurial intention and entrepreneurial behaviour. To do this, we utilise social learning theory (Bandura 1973, Mungai and Velamuri 2011) and draw on previous insights from entrepreneurship and role model literature. Conducting empirical analyses on survey data on 2,237 students from 127 higher education institutions in Germany, our findings suggest that role models in general positively affect entrepreneurial intention and entrepreneurial behaviour of female students.

Looking at the effect of different types of role models, we find support for all but one of our predictions. We find a larger effect of family-based role models for entrepreneurial intention as well as entrepreneurial behaviour than for role models outside of the family. The latter still show a significant positive effect. This stresses the importance of having entrepreneurial role models within the family while highlighting that non-familial role models are not to be neglected. Our finding that parents are more important than other relatives for entrepreneurial intention and behaviour, additionally show the importance of closer relations to role models. These results also give further support to the relevance of social learning theory (Bandura 1973, Mungai and Velamuri 2011). Interestingly, when looking at the different impacts of entrepreneurial mothers and fathers on *Intention*, our coefficient for *RM Mother* is insignificant while *RM Father* is showing a highly significant positive effect. As such our Hypothesis 4a is not supported. Conversely, when looking at entrepreneurial behaviour (*Founder*) both role model types show significant positive effects. More so, entrepreneurial mother plays a larger and more significant role than an entrepreneurial father, supporting Hypothesis 4b. One explanation for these mixed findings could be the smaller sample size of female students with entrepreneurial mothers in the non-founder subsample ($n = 40$) leading to insignificant findings. With a larger sample including female founders and non-founders, the share of female students with entrepreneurial mothers is slightly larger (4%) and thus the effect size is visible.

Furthermore, we find that entrepreneurial intention of women with role models do not significantly differ from men without role models in entrepreneurship, indicating that women with role models have similar *Intention* levels to men without role models. One reason could be women's, societally conditioned, initially low entrepreneurial intention (Qazi et al. 2022), being increased through role models. Additionally, we find that having entrepreneurial role models can lead to women displaying more entrepreneurial behaviour than men without such

role models. This indicates that role models could help reduce the gender gap in entrepreneurship. Moreover, our findings support previous suggestions that role models enable female students to overcome gender categorisation in the workplace (Wieland et al. 2019). Thus, having entrepreneurial role models can reduce existing gender differences also supporting the arguments of Lockwood (2006) and van Ewijk and Belghiti-Mahut (2019).

Lastly, entrepreneurial mothers have a positive and significant effect for female founders but not for female students who have not yet founded a company. This suggests that entrepreneurial mothers play an especially important role in the support of their daughters to display entrepreneurial behaviour and become entrepreneurs rather than their motivation and thus intention to do so. Thus, our findings indirectly support Schoon and Duckworth (2012) who argue that for women, the parental support and access to resources (financial support) plays an important role regarding entrepreneurial behaviour.

5.2. Implications

Our study offers important implications. First, we support previous findings that role models can reduce the gender gap in entrepreneurship. Furthermore, our findings indicate that entrepreneurs are not necessarily born but rather made (opposing e.g. Looi and Khoo-Lattimore 2015) as role models other than parents and even those outside the family also have a positive impact on entrepreneurial intention and behaviour. Important is the individual's environment and having any role model is better than having none. As such, policy makers aiming for more women entrepreneurs should attempt to provide students with potential entrepreneurial role models (e.g. include talks from entrepreneurs/former students, provide mentoring opportunities) from as young an age as possible. Further, making everyday people in entrepreneurship more visible, could enable students to get to know entrepreneurs they can identify with.

Relevant particularly for researchers, we offer further insights into the part different types of role models play for women entrepreneurs, contributing to entrepreneurship and role model literature. Having role models impacts women's entrepreneurial intention and entrepreneurial behaviour positively. Yet, the type of role model determines effect size and significance. Especially role models with closer (familial) ties to the individual are of importance, with entrepreneurial parents having a sizable impact on intention as well as behaviour.

5.3. Limitations and Future Research

We are able to utilize a new and comparatively extensive data source. However, our data is limited to these available based on the previously conducted survey. As mentioned above, we have few observations in the subgroups reporting having entrepreneurial mothers. Furthermore, we do not have any data on the gender of role models other than mother and father. Given that we can (to some extent) observe the gendered effect of role models on the parent level and previous research suggests further effects of same gender role models for women in particular (Lookwood 2006), this would be an interesting and relevant topic for further research.

An additional limitation to the data is that it was collected during the COVID-19 pandemic which could influence results particularly regarding entrepreneurial intention. Equally, as an online survey, the data are likely subject to self-selection bias. Hence, the representativeness of this cross-sectional study based on this single survey is limited to the investigated cohort. Here, as well, lies potential for further research when panel data becomes available.

Furthermore, self-reported measures can be subject to self-reporting bias (Donaldson and Grant-Vallone 2002). However, our second analysis looking at founders focusses on the existence of role models as well as founder status and a measurement error here is unlikely. As these findings support our previous ones, we assume these to also include only little such bias, if any.

Moreover, in this study we focus on students in Germany. Given the importance different institutional environments can play especially when looking at gender effects (Estrin and Mickiewicz 2011, Hoch and Seyberth 2022), an international sample could give interesting insights into the gender effects of role models in entrepreneurship in different countries.

6. Conclusion

We show the effect of different types of role models on women's entrepreneurial intention and entrepreneurial behaviour. We provide evidence that, in line with social learning theory (Bandura 1973), close (familial) entrepreneurial role models have a stronger impact on women's intention to become entrepreneurs as well as their actual behaviour, than those more distant. However, having a role model is in any case more important than not having one. To summarise, our study highlights the importance of different types of entrepreneurial role models for women in entrepreneurship.

Literature

- Abbasianchavari, A., & Moritz, A. (2021): The impact of role models on entrepreneurial intentions and behavior: A review of the literature. *Management Review Quarterly*, 71(1), pp. 1-40.
- Achtzehn, S., Treanor, L., & Amess, K. (2023): Do enterprise education competitions have gendered outcomes amongst STEM early-career researchers? *International Small Business Journal: Researching Entrepreneurship*, 41(8), pp. 801-824.
- Adamus, M., Cavoiová, V., & Šrol, J. (2021): The impact of stereotyped perceptions of entrepreneurship and gender-role orientation on Slovak women's entrepreneurial intentions. *Gender in Management: An International Journal*, 36(6), pp. 745-761.
- Ahmed, T., Chandran, V., & Klobas, J. (2017): Specialized entrepreneurship education: Does it really matter? Fresh evidence from Pakistan. *International Journal of Entrepreneurial Behavior & Research*, 23(1), pp. 4-19.
- Ahmed, T., Klobas, J. E., & Ramayah, T. (2021): Personality traits, demographic factors and entrepreneurial intentions: Improved understanding from a moderated mediation study. *Entrepreneurship Research Journal*, 11(4), 20170062.
- Ali, J., Shabir, S., & Shaikh, A. (2021): Exploring antecedents of entrepreneurial intentions among females in an emerging economy. *International Journal of Social Economics*, 48(7), pp. 1044-1059.
- Amofah, K., & Saladrignes, R. (2022): Impact of attitude towards entrepreneurship education and role models on entrepreneurial intention. *Journal of Innovation and Entrepreneurship*, 11(36).
- Anglin, A. H., Kincaid, P. A., Short, J. C., & Allen, D. G. (2022): Role theory perspectives: Past, present, and future applications of role theories in management research. *Journal of Management*, 48(6), pp. 1469-1502.
- Bandura, A. (1973): *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1977): *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- BarNir, A., Watson, W. E., & Hutchins, H. M. (2011): Mediation and moderated mediation in the relationship among role models, self-efficacy, entrepreneurial career intention, and gender. *Journal of Applied Social Psychology*, 41(2), pp. 270-297.
- Barral, M. R. M., Ribeiro, F. G., & Canever, M. D. (2018). Influence of the university environment in the entrepreneurial intention in public and private universities. *RAUSP Management Journal*, 53(1), pp. 122-133.
- Bhatti, M. A., Doghan, M. A., Saat, S. A., Juhari, A. S., & Alshagawi, M. (2019): Entrepreneurial intentions among women: Does entrepreneurial training and education matters? (Pre- and post-evaluation of psychological attributes and its effects on entrepreneurial intention). *Journal of Small Business and Enterprise Development*, 28(2), pp. 167-184.
- Bignotti, A. &. (2020): Which types of experience matter? The role of prior start-up experiences and work experience in fostering youth entrepreneurial intentions. *International Journal of Entrepreneurial Behavior & Research*, 26(6), pp. 1181-1198.

- Bloemen-Bexk, M., Voordeckers, W., Remery, C., & Schippers, J. (2019): Following in parental footsteps? The influence of gender and learning experiences on entrepreneurial intentions. *International Small Business Journal: Researching Entrepreneurship*, 37(6), pp. 642-663.
- BMWK (2022): *Die Start-up-Strategie der Bundesregierung*. Berlin: Bundesministerium für Wirtschaft und Klimaschutz (BMWK).
- Boldureanu, G., Ionescu, A. M., Bercu, A.-M., Bedrule-Grigoruta, M. V., & Boldureanu, D. (2020): Entrepreneurship education through successful entrepreneurial models in higher education institutions. *Sustainability*, 12(1267).
- Borges, A. P., Lopes, J. M., Carvalho, C., Vieira, B. M., & Lopes, J. (2021): Education as a key to provide the growth of entrepreneurial intentions. *Education + Training*, 63(6), pp. 809-832.
- Bosma, N., Hessels, J., Schutjens, V., Van Praag, M., & Verheul, I. (2012): Entrepreneurship and role models. *Journal of Economic Psychology*, 33(2), pp. 410-424.
- Botha, M. (2020): Prior entrepreneurial exposure and action of women entrepreneurs: Exploring the moderation effects of entrepreneurial competencies in a developing country context. *Frontiers in Psychology*, 11(922).
- Bruni, A., Gherardi, S., & Poggio, B. (2004): Entrepreneur-mentality, gender and the study of women entrepreneurs. *Journal of Organizational Change Management*, 17(3), pp. 256-268.
- Bueno Merino, P., & Duchemin, M.-H. (2022): Contribution of psychological entrepreneurial support to the strengthening of female entrepreneurial intention in a women-only incubator. *M@n@gement*, 25(4), pp. 64-79.
- Camelo-Ordaz, C., Diáñez-González, J. P., & Ruiz-Navarro, J. (2016): The influence of gender on entrepreneurial intention: The mediating role of perceptual factors. *Business Research Quarterly*, 19, pp. 261-277.
- Canever, M. D., Barral, M. R. M., & Ribeiro, F. G. (2017): How does the public and private university environment affect students' entrepreneurial intention? *Education + Training*, 59(6), pp. 550-564.
- Chen, J., Kolmos, A., & Clausen, N. R. (2023): Gender differences in engineering students' understanding of professional competences and career development in the transition from education to work. *International Journal of Technology and Design Education*, 33, pp. 1121-1142.
- Choukir, J., Aloulou, W. J., Ayadi, F., & Mseddi, S. (2019): Influence of role models and gender on Saudi Arabian freshman students' entrepreneurial intention. *International Journal of Gender and Entrepreneurship*, 11(2), pp. 186-206.
- Chukhray, N., Greguš, M., Karyy, O., & Halkiv, L. (2021): Formation of the entrepreneurial potential of student youth: A factor of work experience. *Mathematics*, 9(13).
- Dao, T. K., Bui, A. T., Doan, T. T., Dao, N. T., Le, H. H., & Le, T. T. (2021): Impact of academic majors on entrepreneurial intentions of Vietnamese students: An extension of the theory of planned behavior. *Heliyon*, 7(3), e06381.

- Díaz-García, M. C., & Jiménez-Moreno, J. (2010): Entrepreneurial intention: The role of gender. *International Entrepreneurship and Management Journal*, 6(3), pp. 261-283.
- Donaldson, S. I., & Grant-Vallone, E. J. (2002): Understanding self-report bias in organizational behavior research. *Journal of Business and Psychology*, 17(2), pp. 245-260.
- Eagly, A. H., & Wood, W. (2016): Social role theory. In: Naples, N. A., Hoogland, R. C., Wickramasinghe, M., & Wong, W. C. (eds.): *The Wiley Blackwell encyclopedia of gender and sexuality studies*, Malden, MA: Wiley-Blackwell, pp. 458-476.
- Eagly, A. H., Wood, W., & Diekmann, A. B. (2000): Social role theory of sex differences and similarities: A current appraisal. In: Eckes, T., & Trautner, H. M. (eds.): *The developmental social psychology of gender*, Mahwah, NJ: Lawrence Erlbaum Associates, pp. 123-174.
- Engle, R. L., Schlaegel, C., & Delanoe, S. (2011): The role of social influence, culture, and gender on entrepreneurial intent. *Journal of Small Business and Entrepreneurship*, 24(4), pp. 471-492.
- Entrialgo, M., & Iglesias, V. (2017): Are the intentions to entrepreneurship of men and women shaped differently? The impact of entrepreneurial role-model exposure and entrepreneurship education. *Entrepreneurship Research Journal*, 8(1), 20170013.
- Estrin, S., & Mickiewicz, T. (2011): Institutions and female entrepreneurship. *Small Business Economics*, 37(4), 397-415.
- Feist, G. J. (1998): A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, 2(4), pp. 290-309.
- Ferreras-Garcia, R., Sales-Zaguirre, J., & Serradell-López, E. (2021): Developing entrepreneurial competencies in higher education: A structural model approach. *Education + Training*, 63(5), pp. 720-743.
- Fleck, E., Kakouris, A., & Winkel, D. (2021): Cultural traits of entrepreneurship education: A cross-national study. *Journal of Entrepreneurship in Emerging Economies*, 10(5), pp. 838-863.
- GEM (Global Entrepreneurship Monitor) (2023): *Global Entrepreneurship Monitor 2022/2023 global report: Adapting to a "new normal"*. London: Global Entrepreneurship Research Association, London Business School.
- Gibson, D. E. (2004): Role models in career development: New directions for theory and research. *Journal of Vocational Behavior*, 65(1), pp. 134-156.
- Goldschmid, M. L. (1967): Prediction of college majors by personality tests. *Journal of Counselling Psychology*, 14(4), pp. 302-308.
- Gupta, A., Batra, S., & Gupta, V. K. (2022): Gender, culture, and implicit theories about entrepreneurs: A cross-national investigation. *Small Business Economics*, 58(2), pp. 1073-1089.
- Gupta, V. K., Turban, D. B., Wasti, S. A., & Sikdar, A. (2009): The role of gender stereotypes in perceptions of entrepreneurs and intentions to become an entrepreneur. *Entrepreneurship Theory and Practice*, 33(2), pp. 397-417.

- Halaby, C. N. (2003): Where job values come from: Family and schooling background, cognitive ability, and gender. *American Sociological Review*, 68(2), pp. 251-278.
- Haus, I., Steinmetz, H., Isidor, R., & Kabst, R. (2013): Gender effects on entrepreneurial intention: A meta-analytical structural equation model. *International Journal of Gender and Entrepreneurship*, 5(2), pp. 130-156.
- Hoch, F., & Seyberth, L. (2022): How institutions moderate the effect of board gender diversity on firm performance. *Academy of Management Proceedings*, 2022(1).
- Hoffmann, A., Junge, M., & Malchow-Møller, N. (2015): Running in the family: Parental role models in entrepreneurship. *Small Business Economics*, 44(1), pp. 79-104.
- Jaén, I., & Liñán, F. (2013): Work values in a changing economic environment: The role of entrepreneurial capital. *International Journal of Manpower*, 34(8), pp. 939-960.
- Johnson, M. K. (2002): Social origins, adolescent experiences, and work value trajectories during the transition to adulthood. *Social Forces*, 80(4), pp. 1307-1340.
- Karimi, S., Biemans, H. J., Lans, T., Chizari, M., & Mulder, M. (2014): Effects of role models and gender on students' entrepreneurial intention. *European Journal of Training and Development*, 38(8), pp. 694-727.
- Karimi, S., Biemans, H. J., Lans, T., Chizari, M., Mulder, M., & Mahdei, K. N. (2013): Understanding role models and gender influences on entrepreneurial intentions among college students. *Procedia - Social and Behavioral Sciences*, 93, pp. 204-214.
- Kirkwood, J. (2007): Igniting the entrepreneurial spirit: Is the role parents play gendered? *International Journal of Entrepreneurial Behaviour & Research*, 13(1), pp. 39-59.
- Kyrgidou, L., Mylonas, N., Petridou, E., & Vacharoglou, E. (2021): Entrepreneurs' competencies and networking as determinants of women-owned ventures success in post-economic crisis era in Greece. *Journal of Research in Marketing and Entrepreneurship*, 23(2), pp. 211-234.
- Kyriakopoulos, P., Herbert, K., & Piperopoulos, P. (2024): I am passionate therefore I am: The interplay between entrepreneurial passion, gender, culture and intentions. *Journal of Business Research*, 172, 114409.
- Laguía, A., Wach, D., Garcia-Ael, C., & Moriano, J. A. (2022): "Think entrepreneur – think male": The effect of reduced gender stereotype threat on women's entrepreneurial intention and opportunity motivation. *International Journal of Entrepreneurial Behavior & Research*, 28(4), pp. 1001-1025.
- Lara-Bocanegra, García-Fernández, J., Gálvez-Ruiz, P., Grimaldi-Puyana, M., & Gómez-Millán, M. R. (2022): Does background matter? Analysis of the influence of sex, socioeconomic status and the existence of an entrepreneurial family member as a precursor to entrepreneurship in university students of sport sciences. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 31, 100394.
- Liang, C., Liang, C.-T., & Ip, C. Y. (2022): Tenacity in design entrepreneurship: How to stimulate entrepreneurial intention. *International Journal of Technology and Design Education*, 32(1), pp. 717-734.

- Liñán, F., & Chen, Y.-W. (2009): Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33(3), pp. 593-617.
- Liñán, F., Jaén, I., & Martín, D. (2022): Does entrepreneurship fit her? Women entrepreneurs, gender-role orientation, and entrepreneurial culture. *Small Business Economics*, 58(2), pp. 1051-1071.
- Lockwood, P. (2006): “Someone like me can be successful”: Do college students need same-gender role models? *Psychology of Women Quarterly*, 30, pp. 36-46.
- Looi, K. H., & Khoo-Lattimore, C. (2015): Undergraduate students’ entrepreneurial intention: Born or made? *International Journal of Entrepreneurship and Small Business*, 26(1), pp. 1-20.
- López-Delgado, P., Iglesias-Sánchez, P. P., & Jambrino-Maldonado, C. (2019): Gender and university degree: A new analysis of entrepreneurial intention. *Education + Training*, 61(7/8), pp. 797-814.
- Maresch, D., Harms, R., Kailer, N., & Wimmer-Wurm, B. (2016): The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technological Forecasting & Social Change*, 104, pp. 172-179.
- Marques, C. S., Santos, G., Galvão, A., Mascarenhas, C., & Justino, E. (2018): Entrepreneurship education, gender and family background as antecedents on the entrepreneurial orientation of university students. *International Journal of Innovation Science*, 10(1), pp. 58-70.
- Meeralam, E. A., & Adeinat, I. (2022): Understanding the role of universities in fostering female entrepreneurship in the emerging ecosystem. *Gender in Management*, 37(3), pp. 388-404.
- Mungai, E., & Velamuri, S. R. (2011): Parental entrepreneurial role model influence on male offspring: Is it always positive and when does it occur? *Entrepreneurship Theory and Practice*, 35(2), pp. 337-357.
- Neneh, B. N. (2020): Entrepreneurial passion and entrepreneurial intention: The role of social support and entrepreneurial self-efficacy. *Studies in Higher Education*, 47(3), pp. 587-603.
- Nguyen, C. (2018): Demographic factors, family background and prior self-employment on entrepreneurial intention – Vietnamese business students are different: Why? *Journal of Global Entrepreneurship Research*, 8, 10.
- Nowiński, W., & Haddoud, M. Y. (2019): The role of inspiring role models in enhancing entrepreneurial intention. *Journal of Business Research*, 96, pp. 183-193.
- OECD (2020): *Inclusive entrepreneurship policies: Country assessment notes – Germany*. Paris: OECD Publishing.
- Oggero, N., Devicienti, F., Rossi, M., & Vannoni, D. (2023): You can’t be what you can’t see: The role of gender in the intergenerational transmission of entrepreneurship. *Review of Income and Wealth*, 69(3), pp. 755-775.
- Olarewaju, A. D., Gonzalez-Tamayo, L. A., Maheshwari, G., & Ortiz-Riaga, M. C. (2023): Student entrepreneurial intentions in emerging economies: Institutional influences and in-

- dividual motivations. *Journal of Small Business and Enterprise Development*, 30(3), pp. 475-500.
- Pergelova, A., Angulo-Ruiz, F., Manolova, T. S., & Yordanova, D. (2023): Entrepreneurship education and its gendered effects on feasibility, desirability and intentions for technology entrepreneurship among STEM students. *International Journal of Gender and Entrepreneurship*, 15(2), pp. 191-228.
- Polin, B. A. (2023): Disentangling the roles of academic major and gender in determining entrepreneurial intentions among students. *Education + Training*, 65(1), pp. 22-43.
- Qazi, Z., Qazi, W., Raza, S. A., & Yousufi, S. Q. (2022): Investigating women's entrepreneurial intention: The moderating role of family support. *ASR Chiang Mai University Journal of Social Sciences and Humanities*, 9(1), 2022.002.
- Sahut, J.-M., Gharbi, S., & Mili, M. (2015): Identifying factors key to encouraging entrepreneurial intentions among seniors. *Canadian Journal of Administrative Sciences*, 32(4), pp. 252-264.
- Salavou, H. E., Chalkos, G., & Lioukas, S. (2021): Linkages between entrepreneurial intentions and entrepreneurship education: New evidence on the gender imbalance. *Education + Training*, 63(6), pp. 906-919.
- Sánchez-Queija, M. I., Sánchez-García, L., Rothwell, A. T., & Parra, Á. (2023): Differences in self-perceived employability between university and VET students: An analysis of emerging adults in Spain. *Education + Training*, 65(10), pp. 14-28.
- Sarfraz, L., Faghih, N., & Majd, A. A. (2014): The relationship between women entrepreneurship and gender equality. *Journal of Global Entrepreneurship Research*, 4, 6.
- Schoon, I., & Duckworth, K. (2012): Who becomes an entrepreneur? Early life experiences as predictors of entrepreneurship. *Developmental Psychology*, 48(6), pp. 1719-1726.
- Shahin, M., Ilic, O., Gonsalvez, C., & Whittle, J. (2021): The impact of a STEM-based entrepreneurship program on the entrepreneurial intention of secondary school female students. *International Entrepreneurship and Management Journal*, 17, pp. 1867-1898.
- Shinnar, R. S., Giacomini, O., & Janssen, F. (2012): Entrepreneurial perceptions and intentions: The role of gender and culture. *Entrepreneurship Theory and Practice*, 36(3), pp. 465-493.
- Shneor, R., Camgöz, S. M., & Karapinar, P. B. (2013): The interaction between culture and sex in the formation of entrepreneurial intentions. *Entrepreneurship and Regional Development*, 25(9-10), pp. 781-803.
- United Nations (2015): *The 17 goals*. New York: UNO.
- Urbano, D., Toledano, N., & Ribeiro-Soriano, D. (2011): Socio-cultural factors and transnational entrepreneurship: A multiple case study in Spain. *International Small Business Journal*, 29(2), pp. 119-134.
- Van Auken, H., Stephens, P., Fry, F. L., & Silva, J. (2006): Role model influences on entrepreneurial intentions: A comparison between USA and Mexico. *Entrepreneurship Management*, 2, pp. 325-336.

- van Ewijk, A. R., & Belghiti-Mahut, S. (2019): Context, gender and entrepreneurial intentions: How entrepreneurship education changes the equation. *International Journal of Gender and Entrepreneurship*, 11(1), pp. 75-98.
- Vankov, D., Kozma, D., Galanternik, M., Chiers, J., Vankov, B., & Wang, L. (2022): Understanding the predictors of entrepreneurial intentions of young people from Argentina, Belgium, Bulgaria, China, and Romania. *Entrepreneurship and Sustainability Issues*, 9(3), pp. 384-398.
- Wannamakok, W., & Chang, Y.-Y. (2020): Understanding nascent women entrepreneurs: An exploratory investigation into their entrepreneurial intentions. *Gender in Management: An International Journey*, 35(6), pp. 553-566.
- Welter, F., Smallbone, D., & Isakova, N. (2006): *Enterprising women in transition economies*. Farnham: Ashgate Publishing.
- Wieland, A. M., Kemmelmeier, M., Gupta, V. K., & McKelvey, W. (2019): Gendered cognitions: A socio-cognitive model of how gender affects entrepreneurial preferences. *Entrepreneurship and Regional Development*, 31(3-4), pp. 178-197.
- Yordanova, D. I., & Tarrazon, M.-A. (2010): Gender differences in entrepreneurial intentions: Evidence from Bulgaria. *Journal of Development Entrepreneurship*, 15(3), pp. 245-261.
- Zapkau, F. B., Schwens, C., & Kabst, R. (2017): The role of prior entrepreneurial exposure in the entrepreneurial process: A review and future research implications. *Journal of Small Business Management*, 55(1), pp. 56-86.
- Zhang, Y., Duysters, G., & Cloudt, M. (2014): The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. *International Entrepreneurship and Management Journal*, 10, pp. 623-641.

Appendix 1: Codebook

Role Model

Explanatory Variable (EV)

Question: Do you know any entrepreneurs personally?

Scale: Multiple selections possible

RM Mother	My mother (RM_1)	Binary variable equal to 1 if selected
RM Father	My father (RM_2)	Binary variable equal to 1 if selected
RM Relatives	My siblings/other family members (RM_3)	Binary variable equal to 1 if selected
RM no Family	My friends, work colleagues, fellow students (RM_4)	Binary variable equal to 1 if selected
<i>Role Model</i>	Coded from above answers	Binary variable equal to 1 if at least one of the above have been selected

Intention

Adapted from

Liñán, F., & Chen, Y.-W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33(3), pp. 593-617.

Dependent Variable (DV)

Question: Please indicate on a scale from 1 (strongly disagree) to 5 (strongly agree) how much you agree with the following statements.

Scale: 1 (very little intention) to 5 (very strong intention)

EI 1	I am ready to do anything to be an entrepreneur. (EI_1)	1 (strongly disagree) to 5 (strongly agree)
EI2	I will make every effort to start and run my own firm. (EI_2)	1 (strongly disagree) to 5 (strongly agree)
EI3	I am determined to create a firm in the future. (EI_3)	1 (strongly disagree) to 5 (strongly agree)
EI4	I have the firm intention to start a firm someday. (EI_4)	1 (strongly disagree) to 5 (strongly agree)
Intention	Mean value of (EI_1 + EI_2 + EI_3 + EI_4)	1 (very little intention) to 5 (very strong intention)

Founder

DV

Question: Did you found a start-up or are you currently in the founding phase of your start-up?

Scale: Binary variable equal to 1 if founder (answer = yes to above question)

Female

EV

Question: Which gender do you feel you belong to?

Scale: Binary variable equal to 1 for female and 0 for male

Education

Control

Question: Have you participated in at least one of the following entrepreneurship programs or similar programs?

Scale: Binary variable equal to 1 if any entrepreneurial education had been taken

Age

Control

Question: How old are you?

Scale: Year

Field of Study

Control

Question: Please select the field of study that best describes your current study program:

Scale: Degree in the field of Business Administration, Economics or similar (1), degree in Information Technology, Computer Science or

Mathematics (2), degree in the field of Engineering (3), degree in the field of Natural Sciences (4), degree in Humanities, Cultural Studies, or Social Sciences (5)

Public HEI

Control

Question: Are you currently enrolled at a public or private university?

Scale: Binary variable equal to 1 if student attends a publicly funded and 0 a private higher education institution

Applied HEI

Control

Question: Are you currently enrolled at a university or university of applied sciences?

Scale: Binary variable equal to 1 if student attends a applied sciences higher education institution

German

Control

Question: Please state the name of the country you were born in?

Scale: Binary variable equal to 1 if student was born in Germany

Work Experience

Control

Item: Please indicate your previous work experience.

Scale: Binary variable equal to 1 if any kind of previous work experience exists

Appendix 2: Robustness Tests

Method

First, we briefly investigate our full sample using a linear regression with interaction term. To analyse the presumed gender differences and role model effects on them when looking at entrepreneurial intention and founder status, we follow the regression equation:

$$EntrepreneurX_i = \alpha + Female_i \# Role_Model_i + Controls_i + \varepsilon_i \quad (\text{Equ. 2})$$

We conduct two analyses. First, we investigate our dependent variable *EntrepreneurX* in its dimension of entrepreneurial *Intention* [Table A.1 Model (1) & (2)] and then the *Founder* status of individual *i* [Table A.1 Model (3) & (4)]. The interaction term consists of our gender variable *Female* and the variable *Role Model*, capturing the existence of at least one role model in entrepreneurship. The baseline of the interaction are male students with no entrepreneurial role model. The *Controls* vector contains our individual-level control variables. α displays the constant and ε the error term of our regression.

VARIABLES	(1) Intention	(2) Intention	(3) Founder	(4) Founder
Female	-0.467*** (0.053)		-0.053*** (0.012)	
Interaction (<i>Baseline: Male # No Role Model</i>)				
<i>Male # Role Model</i>		0.454*** (0.073)		0.105*** (0.017)
<i>Female # No Role Model</i>		-0.337*** (0.078)		-0.006 (0.018)
<i>Female # Role Model</i>		-0.066 (0.077)		0.031* (0.018)
Education	0.489*** (0.078)	0.417*** (0.078)	0.235*** (0.016)	0.218*** (0.016)
Age	-0.026*** (0.006)	-0.030*** (0.006)	0.005*** (0.001)	0.004*** (0.001)
Field of Study				
<i>Maths/Computer Sciences</i>	-0.210** (0.093)	-0.167* (0.092)	0.022 (0.021)	0.030 (0.021)
<i>Engineering</i>	-0.012 (0.073)	0.030 (0.073)	0.007 (0.017)	0.015 (0.016)
<i>Natural Sciences</i>	-0.400*** (0.079)	-0.355*** (0.079)	-0.017 (0.018)	-0.009 (0.018)
<i>Humanities</i>	-0.416*** (0.0823)	-0.361*** (0.082)	-0.010 (0.019)	-0.001 (0.019)
Public HEI	-0.448*** (0.088)	-0.404*** (0.087)	-0.039** (0.019)	-0.030 (0.019)
Applied HEI	0.150*** (0.058)	0.186*** (0.057)	0.011 (0.013)	0.017 (0.013)
German	-0.611*** (0.077)	-0.603*** (0.076)	-0.040** (0.017)	-0.037** (0.017)
Work Experience	-0.053 (0.077)	-0.120 (0.077)	0.033* (0.018)	0.020 (0.018)
Constant	4.390*** (0.194)	4.185*** (0.196)	-0.007 (0.043)	-0.059 (0.044)
Observations	2,041	2,041	2,237	2,237
R-squared	0.166	0.186	0.131	0.148

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

(1) & (2): students who have not founded a business, (3) & (4): students who founded a business, baseline of interaction term: male students without role models

Table A.1: Regression Results for Gender Differences in Entrepreneurial Intention and Founder Status

Diskussionspapiere des Instituts für Organisationsökonomik

Seit Institutsgründung im Oktober 2010 ist monatlich ein Diskussionspapier erschienen. Im Folgenden werden die letzten zwölf aufgeführt. Eine vollständige Liste mit Downloadmöglichkeit findet sich unter <http://www.wiwi.uni-muenster.de/io/forschen/diskussionspapiere.html>

- DP-IO 3/2024** The Influence of Role Models on Women's Entrepreneurial Intention and Behaviour
Lilo Seyberth/Anja Overwien
März 2024
- DP-IO 2/2024** Klausuren des Instituts für Organisationsökonomik
Alexander Dilger
Februar 2024
- DP-IO 1/2024** Management Tools
Alexander Dilger
Januar 2024
- DP-IO 12/2023** Rankings von Personen, Institutionen und Zeitschriften
Festvortrag zur Promotionsfeier der Wirtschaftswissenschaftlichen Fakultät am 24. April 2013 in der Aula des Schlosses
Alexander Dilger
Dezember 2023
- DP-IO 11/2023** Institutional Configurations in International Investment Research
Christopher Weber/Pascal Mayer
November 2023
- DP-IO 10/2023** 13. Jahresbericht des Instituts für Organisationsökonomik
Alexander Dilger/Lars Vischer
Oktober 2023
- DP-IO 9/2023** Bestimmung und Bewertung von Wachstumsfeldern im Sport
Alexander Dilger
September 2023
- DP-IO 8/2023** Zum Stiftungscharakter von Wohnungsgenossenschaften
Alexander Dilger
August 2023
- DP-IO 7/2023** Effects of the Rule Change from Three to Five Substitutions in the Bundesliga
Alexander Dilger/Lars Vischer
Juli 2023
- DP-IO 6/2023** Globalisation of Sports
Alexander Dilger
Juni 2023
- DP-IO 5/2023** Staatsinsolvenzen in der Finanzmarktkrise
Alexander Dilger
Mai 2023
- DP-IO 4/2023** Ein ganzes Land kann nicht komparativ überlegen sein
Alexander Dilger
April 2023



Herausgeber:
Prof. Dr. Alexander Dilger
Westfälische Wilhelms-Universität Münster
Institut für Organisationsökonomik
Scharnhorststr. 100
D-48151 Münster

Tel: +49-251/83-24303
Fax: +49-251/83-28429

www.wiwi.uni-muenster.de/io

