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**Entrepreneurship education and entrepreneurial intention:
Do female students benefit?**

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Abstract

This article explores links between entrepreneurship education (EE) participation, alertness and risk-taking skills and the intensity of entrepreneurial intention relating to becoming an entrepreneur. Guided by insights from human capital and socially learned stereotypes theories, we conceptualize and test novel hypotheses that consider the potential moderating effect of gender and participation in EE. Business students participating in EE modules were compared with engineering students excluded from such programmes. Hierarchical regression analysis revealed that EE students reported high intensity of intention; however, EE did not generate equal benefits for all students. Women were significantly less likely to report high intensity of intention; however, those citing the alertness skill were more likely to report high intensity of intention than non-EE women students. Both male EE and non-EE students citing the risk perception skill reported higher intention whereas, women EE students citing the risk perception skill reported lower intention.

Keywords

Gender, education, alertness, risk-taking, entrepreneurial intention, Ukraine

Introduction

Policy-makers and practitioners view women as a reservoir of entrepreneurial talent (Organisation for Economic Co-operation and Development (OECD), 2003), an engine of growth (Ahl, 2006), and source of innovation, employment, and wealth creation (Brush and Cooper, 2012). Women are less likely to consider careers in entrepreneurship given

attitudinal, resource, skills, knowledge, institutional, regulatory, and societal barriers (Kariv, 2013). Contextual influences shape individual behaviour towards engaging in the entrepreneurial process (Welter, 2011). Thus, women face several challenges relating to careers in entrepreneurship. Ahl and Marlow (2012: 544) assert, "... despite the benign image of entrepreneurship as a meritocratic accessible field of economic opportunity seeking behaviour, closer analysis suggests that there are limitations upon the possibilities of who can claim the subject position of 'entrepreneur'...". Due to a dearth of high profile successful women role models (i.e. the 'invisibility' of women's involvement in and contribution to entrepreneurship (Marlow et al., 2008)) and a masculinised discourse bias, there is normative assumption that the ideal entrepreneur is male (Ahl and Marlow, 2012; Henry et al., 2015). In effect, woman entrepreneurs are positioned as 'other' which suggests a lack of belonging in relation to the entrepreneurial community (Stead, 2015) and in turn, assumes women lack entrepreneurial attributes and competencies (Marlow and Swail, 2014). Ahl and Marlow (2012: 543 and 545) warn, "...women are positioned as lacking and incomplete men", and there is a perpetuated "... hierarchical ordering where femininity is associated with deficit and a masculine discourse of entrepreneurship emerges as the unquestioned norm...".

Such assumptions are fuelled by gendered ascriptions whereby socially constructed and reproduced feminine and masculine characteristics are ascribed to men and women which effectively devalue the feminine and by default, women (Jones, 2014: 238). Gender-stereotypical beliefs regarding entrepreneurship are influential (Jennings and Brush, 2013; Giazitzoglu and Down, 2015). Gender stereotypes may encourage some women to have lower aspirations, and may deprive some women of the essential resources required to become businesses owners and retard the performance of their ventures (Steele et al., 2002). Also, gender stereotypes may encourage self-stereotyping whereby individuals conform to generic characterisations (Greene et al., 2013). This, in part, may explain why some women report

lower entrepreneurial intention (Gupta et al., 2008, 2014). This in turn, contributes to the global trend regarding the under-representation of women as business owners (Kelley et al., 2013) and relatedly, that men as a category have higher intentions to enter entrepreneurship (Wilson et al., 2004; Gupta et al., 2008; Kibler, 2013).

Policy-makers are encouraging more young people to consider pursuing careers in business ownership (OECD, 2012a). One pathway to addressing the sex imbalance evident within entrepreneurship lies in entrepreneurship education (EE); thus, alerting women to the possibilities of business venturing through formal learning should encourage higher rates of participation (Jones, 2014). Thus, policy-makers and entrepreneurship educators believe that EE can promote the accumulation of entrepreneurial skills and knowledge in students of both sexes (Kuratko, 2005; Jones, 2014). The Council of the European Union (2014) suggests that EE needs to be increased and under-represented groups, such as women, should receive special attention to increase engagement. EE is assumed to provide students with skills that can increase the pool of entrepreneurs (Gorman et al., 1997; OECD, 2011) and encourages students to accumulate relevant human capital skills (Gupta and York, 2008). EE students with self-confidence, enterprise skills and knowledge are assumed to be able to deal with uncertainty (Gibb et al., 2009), to address social and institutional factors (i.e. gender bias), and to make informed decisions (NESTA, 2008). Students are provided with theory, techniques, and tools to take risks, and new ways to collect and analyze information. Schøtt et al., (2015: 24) recently highlighted that "...young people of both genders show fairly positive rates of intention to start up a business in the next three years (29% for young women and 35% for young men)". However, Schøtt et al., (2015) found that young men reported more favourable self-perceptions relating to risk-awareness, self-efficacy, access to a role model and opportunity alertness compared to young women.

The qualitative discourse analysis conducted by Jones (2014: 246) found that policy and EE generally positions women as passive; they “... do not understand the opportunities that entrepreneurship might offer...”, and women require support “... in order to make them more entrepreneurial...”. EE is presented “... as an uncontested way of freeing individuals from structural constraint” whilst female students are “... positioned as needing extra help and support because they are ‘wrong kind of knower’ ...” (Jones, 2014: 246), and they need to be provided with EE that promotes confidence, skills and knowledge (i.e. generally associated with the entrepreneurial benchmark of the white, western, middle-class masculine-typified behaviour). Jones asserts that discourses of entrepreneurship are generally developed from a masculinised discursive space that “... effectively positions entrepreneurship as an activity linked to socially constructed masculinised norms...” (2014: 238). Further, Jones suggests that EE is “... thoroughly embedded within institutional constraints”, where “... individualistic notions of the entrepreneurial mindset are fixed firmly in the powerfully symbolic realm of the masculinise, fictive entrepreneur, against whom the fictive female student is found wanting” (2014: 250). Her discourse analysis questions the policy view of the fictive, homogeneous and gender-neutral student with male and female students equally benefiting from EE; it is argued that EE is underpinned by images of white, male successful entrepreneurs that reproduce masculinised normative templates. Notably, Jones in relation higher education EE states that “... collective notions about the similarity of women and entrepreneurs to each other have negative outcomes for female students” (2014: 240).

Three streams of gender and entrepreneurship studies have been identified (i.e. ‘gender as a variable’ feminist empiricism studies compared to studies that explore ‘gender as an influence’ (Marlow, 2002) relating to a feminist standpoint theory and post-structural feminism) (Neergaard et al., 2011; Henry et al, 2015). A shortcoming of many feminist empiricism studies is that gender is widely conceptualized as a social construction of

biological sex where social practices and representations that underpin notions of femininity and masculinity are ascribed to women and men (Ahl, 2006; Marlow et al., 2008; Marlow and McAdam, 2013). Ahl and Marlow (2012: 556) warn that this view "... creates, sustains and embeds as normal, female subordination". Scholars suggest that differences in entrepreneurial activity may not be limited to the effects of biological sex (Carter and Williams, 2003; Marlow and Patton, 2005), but may be related to issues relating to socially (and culturally) constructed gender (Gupta et al., 2009; Henry et al., 2015).

Jones's (2014) qualitative study explored the relatively neglected view that EE is gender-biased towards masculinity and EE may generate negative outcomes for female students. The latter, in part, may be shaped by socially learned stereotypes associated with the devalued sphere of the feminine (Marlow and Patton, 2005), and the 'symbolically privileged sphere of the masculine' (Ahl, 2002). Recognizing 'gender as an influence' on resource accumulation and mobilization (Marlow, 2002), we follow the insights provided by Jones's (2014) qualitative study that explored the relatively neglected view that EE is gender-biased towards masculinity and EE may generate negative outcomes for female students. The latter, in part, may be shaped by socially learned stereotypes associated with the devalued sphere of the feminine (Marlow and Patton, 2005), and the 'symbolically privileged sphere of the masculine' (Ahl, 2002). Our quantitative gender and entrepreneurship study is guided by insights from human capital and socially learned stereotypes (SLS) theories. Here, we focus on the individual student and an objectivist epistemology is applied (Henry et al., 2005). Following Saridakis et al., (2014: 348), "we define gender as a binary categorisation of socially constructed masculine and feminine characteristics broadly mapped onto biological males and females (Bradley, 2007)". We recognize that the widely used binary definition ignores female (and male) diversity. Further, this binary definition may tend "... to reify female subordination.... and inadvertently blame women for any shortcomings in their

entrepreneurial endeavours” (Henry et al., 2015: 17). The selected empirical definition, however, is widely employed by educators, policy-makers and practitioners to target support.

This study explores the following research questions: Do female EE students report lower intensity of entrepreneurial intention than male EE students? Do female EE students reporting high intensity of entrepreneurial intention cite the same EE alertness and risk-taking skills as male EE students reporting high intensity of entrepreneurial intention? We conceptualize and test novel hypotheses that consider the potential moderating effect of gender and participation in EE.

To examine these issues, this paper is organized as follows. First, we discuss extant human capital theory and SLS theory. We suggest that the skills and knowledge accumulated by female EE students may not be the same as those accumulated by male EE students. Second, we present novel moderation hypotheses. Assuming that entrepreneurship is not a general-neutral phenomenon (Brush, 2006; Ahl and Marlow, 2012), we suggest that gender will moderate the role of EE, and lead to lower intensity of entrepreneurial intention reported by female EE students. Third, we discuss the research method. Fourth, we report the results from hierarchical multiple ordinary least squares (OLS) regression models and slope analysis. Fifth, we discuss our key findings and avenues for additional research attention. Practitioners generally assume that all students should benefit equally from EE participation (European Commission, 2008). Interestingly, we detect that EE does not generate equal benefits for students of both sexes. Implications for stakeholders are discussed. Finally, conclusions are presented.

Theory and hypotheses

EE human capital

General human capital acquired during education can be applied to other contexts (Becker, 1975); so for example, education is a key driver of entrepreneurial performance (Van der Sluis et al., 2001; Unger et al., 2011; Millán et al., 2014). Following a dynamic view of human capital (Martin et al., 2013), general human capital acquired through education is assumed to provide discipline, motivation, self-confidence, skills and knowledge that enables adaptation to new and changing situations (Cooper et al., 1994; Weick, 1996). A meta-analysis by Unger et al., (2011) found a positive relationship between entrepreneurial success and both general and specific human capital; notably, they found a positive relationship between education and success as an entrepreneur. Relating to youth entrepreneurship, Schøtt et al., (2015: 24) detected that after post-school business education "...males are 1.5 times and females 1.8 times more likely to be entrepreneurs". A meta-analysis of the outcomes of EE conducted by Martin et al., (2013) found a significant positive link between student participation EE and higher entrepreneurial intention. Further, Bae et al., (2014) detected a significant and positive link between EE and entrepreneurial intention, and this link was stronger than the link between general business education and entrepreneurial intention. There is, however, scant and conflicting evidence surrounding whether or not women benefit from EE in the same way as their male counterparts (Packham et al., 2010; O'Connor, 2013; Bae et al., 2014; Jones, 2014). Most EE studies have failed to monitor the skills associated with higher student entrepreneurial intention (Souitaris et al., 2007; Oosterbeek et al., 2010) and fail to consider that the skills accumulated by women EE students may not be the same as those reported by men (DeTienne and Chandler, 2007). This differential skill accumulation bias may explain the lower entrepreneurial intention of the women. Despite the importance of EE from a policy-maker perspective and the rapid growth of EE, relatively few evaluation studies have assessed the outcomes associated with EE courses – particularly for women (Bae

et al., 2014). Consequently, many evaluations of EE are considered to be analytically weak (Martin et al., 2013).

DeTienne and Chandler (2007), however, suggest that distinctive experiences lead to women and men possessing differentiated forms of human capital which they use to identify business opportunities. Social feminist theorists, for example, assume differences between female and male experiences from the outset of life that can lead to different ways of viewing the world due to unique socialization processes (Fischer et al., 1993; Carter and Williams, 2003). Building upon the insights from SLS theory, we argue that the human capital skills and knowledge accumulated by female EE students may not be the same as those accumulated by their male counterparts. Socially learned stereotypes may lead to some female EE students exhibiting a perceived incongruity between their prescribed gender role and the entrepreneur role if EE inadvertently reinforced the dominant stereotype of the ‘heroic male’ entrepreneur (Achtenhagen and Welter, 2011).

Derivation of hypotheses

Women’s human capital can be shaped by preferences relating to knowledge about gender-related characteristics associated with tasks (i.e. gender-role stereotypes), and identification with masculine or feminine characteristics (i.e. gender identification) (Gupta et al., 2009; Shinnar et al., 2012). The gendering of human capital accrual subsequently informs employment pathways and segregation (Bradley, 2007) and relatedly, entrepreneurial behaviours (Klyver et al., 2013). From early childhood, some women face issues relating to negative stereotyping (Ambady et al., 2001). To avoid performing badly in a stereotype-threatening domain, some women may avoid domains where the stereotype applies (Steele et al., 2002). Nevertheless, women, on average, are more likely to report attitudinal self-image

(Verheul et al., 2005), and self-confidence (Wilson et al., 2007) barriers to careers in entrepreneurship.

Following insights from SLS theory, gender stereotypes are descriptive (i.e. the characteristics relating to how men and women are), or prescriptive (i.e. how men and women should be) (Schein, 1973; 1975; Sczesny et al., 2004). These descriptive and prescriptive norms relate to gender-typical social roles (Eagly, 1987). We assume a similar stereotypical view prevalent in leadership is also found relating to entrepreneurship and indeed, is reinforced by the masculinised discourse which prevails (Ahl, 2006; Ahl and Marlow, 2012). This can manifest itself in a perceived incongruity between the female gender role and the entrepreneur leader role (i.e. similar to the ‘think-manager-think-male phenomenon’) (Schein, 1973, 1975), and the attribution of entrepreneurial abilities (Greene et al., 2013).

Gender roles act as a gate-keeping device that perpetuates an image, or set of characteristics that need to be demonstrated to engage in an entrepreneurial career (Marlow, 2012; Powell and Eddleston, 2013). This informs different rewards and punishments for individuals that cross gendered boundaries because “social responses reserve rewards for specific behaviour from specific populations” (Godwyn and Stoddard, 2011: 116). On the one hand, this can lead to women facing prejudice when they intend to become entrepreneurs (Iakovleva et al., 2013), in so far as stakeholders perceive an incongruity between the feminine gender role and the (entrepreneurial) leadership role (Eagly and Karau, 2002). On the other hand, women may self-stereotype in so far that a masculine construction of entrepreneurship can block female entrepreneurial intention and behaviour (Marlow and McAdam, 2013). This can lead to women perceiving a lack of fit between themselves and the masculine stereotype associated with entrepreneurship. Consequently, women may negatively evaluate their ability to engage in entrepreneurship and moreover, can experience a negative evaluation by potential resource providers (i.e. financiers, suppliers, etc) (Wu and Chua,

2012). These negative evaluations contribute to reducing the intensity of entrepreneurial intention.

EE potentially enhances the human capital skills of students encouraging them to discover, create and exploit opportunities (Grichnik et al., 2014). Further, EE can facilitate women to accumulate skills that can be mobilized to address barriers to enterprise. However, EE that does not specifically focus on the issues facing women may inadvertently reinforce the assumed dominant stereotype of the 'heroic male' entrepreneur (Achtenhagen and Welter, 2011), and lack of fit between women and the entrepreneur role.

There is conflicting evidence surrounding the link between EE and student intention to become self-employed and/or a business owner. Some find a positive link between EE and intention (DeTienne and Chandler, 2004; Ertuna and Gurel, 2011; Rauch and Hulsink 2015), whilst others have detected a negative link (Souitaris et al., 2007; Oosterbeek et al., 2010; von Graevenitz et al., 2010). Evidence relating to EE and gender is also mixed. Díaz García and Jiménez-Moreno (2010) found no significant difference in entrepreneurial intention reported by female and male students. Conversely, Oosterbeek et al., (2010) noted that both men and women reported lower entrepreneurial intention after EE, but the negative impact was more prominent for women. Whilst Walter et al., (2013) detected a positive and significant link between EE and student self-employment intention for male, but not female, students. As intimated above, this may be due to EE reinforcing rather than overcoming gender stereotypes. Following our theoretical argument relating to lack of fit, we suggest the following hypothesis:

H1: The relationship between participation in EE and intensity of entrepreneurial intention is moderated by gender such that there is a negative relationship for female students and a positive relationship for male students.

Debate surrounds whether the entrepreneurial alertness skill can be taught (McCaffrey, 2014). Following Kirzner (1979), Tang et al., (2012) suggest that alertness is a unique skill that can be learnt to discover opportunities in uncertain contexts (Kirzner, 1999). Alertness involves *scanning and searching* for information to acquire new information; making *evaluations* relating to the existence of profitable opportunities; and *evaluation* relating to the existence of profitable business. A positive link has been detected between the alertness of female students and the intention to start new firms (Langowitz and Minniti, 2007; Martin et al., 2013; Bae et al., 2014); as noted above, a potential issue for women is to identify opportunities that overcome any perceived lack of fit between their gender role and the entrepreneurial role. Following insights from SLS theory, due to female EE students perceiving a lack of fit between themselves and the masculine stereotype ‘alert entrepreneur’, the benefits of accumulating the alertness skill is assumed to be lower for female EE students compared to male EE students. Hence, we derive the following hypothesis:

H2: Gender will moderate the relationship between EE and (a) scan alertness, (b) connection alertness and (c) evaluation alertness skills and intensity of entrepreneurial intention, such that the relationships will be weaker for female than for male students participating in EE.

Women, on average, report lower tolerance of risk than men (Langowitz and Minniti, 2007). This is problematic in that risk aversion is a barrier to entrepreneurial propensity (Iakovleva et al., 2013; Noguera et al., 2013; Marlow and Swail, 2014). EE encourages students to enhance risk-taking perception (i.e. assessment of risk in a given situation), and propensity (i.e. ability to take or avoid risk) skills (Sitkin and Pablo, 1992) to evaluate

opportunities. A positive link between risk-taking and entrepreneurial intention has been detected (Lüthje and Franke, 2003). However, Walter et al., (2013) found a positive significant link between risk-taking propensity and self-employment intention for male, but not female, students. Given our argument above that women may perceive a lack of fit between themselves and the entrepreneurial role, and the view that potential external resource providers may perceive this lack of fit, female EE students may accumulate a heightened perception of the risk associated with becoming entrepreneurs compared to their male counterparts. Hence:

H3: Gender and participation in EE will moderate the relationship between accumulation of the risk-taking skill and intensity of entrepreneurial intention in so far that for female EE students a weaker relationship will emerge between (a) risk-taking perception and (b) risk propensity skills and intensity of entrepreneurial intention.

Method

Context

In recognition of the need to acknowledge context (Welter, 2011; Henry et al., 2015) as a key influence upon assumed normative environments, we focus upon EE in the Ukraine. Former Soviet republics are regarded as "... some of the most challenging environments for entrepreneurship in the world" (Welter and Smallbone, 2011: 120). Accordingly, in response to the call for more research on the influence of gender upon women's entrepreneurial intention (Henry et al., 2015) particularly, in novel contexts such as transition economies (Welter et al., 2006; Mickiewicz et al., 2014), plus, the need to evaluate the outcomes of EE (Pittaway and Cope, 2007; Neck and Greene, 2011; Walter et al., 2013), we posit new questions relating to women's entrepreneurial intention in the Ukraine. The Ukraine became

an independent state in 1991 with the Law on Entrepreneurship allowing entrepreneurship (Smallbone et al., 2010). Successive governments have promoted the move from a command to a market economy (Welter and Smallbone, 2011). Aidis et al., (2007) detected in the Ukraine that independence was the main motive leading to new firm formation (NFF), but women were more likely than men to report necessity-based ‘push’ to become entrepreneurs due to deficiencies in employment opportunities commensurate with their skills and knowledge.

The Ukraine can be viewed as a rent-seeking economy (i.e. a state that seeks to become a market economy but maintains a Soviet-style management (Aslund, 2002)), with a decentralized strategy of a rescue state (Ivy, 2013). Women are more likely to enter university so as a category, have higher levels of human capital (Oksamytna et al., 2010). Such higher levels of human capital do not translate in entrepreneurial activity as approximately only 23% of small and medium-sized enterprises are owned by women (IFC, 2011). This study was conducted in the city of Nikolaev, which is seeking to exploit business opportunities in Information Technology to compensate for the decline in the shipbuilding industry. Information was gathered from business students who followed EE courses provided by three universities that differ in ownership and age (Table 1). EE provided in each university is compulsory for business students and is consistent in terms of objectives, content, delivery modes, and assessment. In line with EE provision elsewhere, programmes focuses on the nature (i.e. opportunity-centred) and the dynamics of the entrepreneurial process (i.e. alertness, opportunity identification, and risk assessment relating to opportunity evaluation and exploitation) with the business plan used as a tool to consider and check off issues relating to the feasibility of the discovered or created business idea.

Business students take entrepreneurship theory and practically oriented courses in business planning in their second or third year. EE theoretical lectures and practical seminars

are solely provided to business students as a component of general business education (Parsyak et al., 2014). Unlike EE provision in many developed countries, teachers in the Ukraine draw upon entrepreneurship textbooks written in Russian and Ukrainian so they are not linked to emerging debates in entrepreneurship, or current western EE methods. However, alertness and risk-taking skills are drawn to the attention of students. Textbook content relates to the 'economic nature of entrepreneurship', 'entrepreneurs as key figures in market economies', 'small business development in the Ukraine', 'state support for entrepreneurship in the Ukraine', 'social and economic consequences of small business development in the Ukraine', 'technology and business start-up', 'risks in entrepreneurship', 'entrepreneurial ethics and social responsibility in business', 'development of the entrepreneurial idea', and 'business planning and management of entrepreneurial firms' (Varnaliy, 2008). Alertness and risk-taking skills are illustrated in business success histories and narratives of famous entrepreneurs in the Ukraine. Also, practitioners and entrepreneurs, during their guest lectures, illustrate the importance of alertness and risk-taking; Western case studies are generally not used. Business studies students sit formal examination relating to both EE courses and are encouraged to conduct feasibility analysis and risk assessments relating to where, when, and how the business opportunity discovered or created will be exploited in a specific location and industrial context. With regard to the business planning course, students have to write a business plan despite some concern surrounding the applicability of business plans to assess accumulated enterprise skills (Honig, 2004). Students are, in addition, assessed by oral examination. Risk-taking and alertness skills are viewed as being appropriate in this resource-constrained context.

Most teachers are not aware of EE simulations relating to experiential trial and error action learning that encourages students to prepare them for novelty and surprise, or contingency approaches (Honig, 2004). Courses do not specifically focus on Western ideas

relating to systematic search for business opportunities (Fiet, 2000), passive search skills emphasizing creativity (DeTienne and Chandler, 2004), bricolage (Baker and Nelson, 2005), or effectuation (Read et al., 2011).

Data collection

EE evaluations need to meet the following standards of methodological rigor (Westhead et al., 2001; Martin et al., 2013): (1) use a representative random sample of EE students; (2) include a control group containing a random sample of students who never participated in EE; (3) randomly assign participants to those groups; (4) consider potential moderators of the relationship between EE and both entrepreneurship-related human capital and entrepreneurship outcomes; and (5) conduct pre- and post-programme participant testing, at several points in time post-EE intervention. With the exception of theme (5), this study satisfies four out of the five standards of methodological rigor.

Gender biased questions have been employed in some previous quantitative studies (Henry et al., 2015). During the questionnaire design stage, we sought not to include any “gender-biased measures” (Henry et al., 2015: 2). Hand-collected cross-sectional survey data was gathered from bachelor and masters students who did and did not participate in business studies EE in the Ukraine. In a previous paper, we explored this dataset in relation to gender simplistically being considered as a control variable (Solesvik et al., 2013). Moreover, our previous analysis of the cross-sectional survey data failed to specifically test hypotheses relating to the potential moderating role of gender on female EE student outcomes. Since EE, particularly for women, has been suggested to promote economic development (OECD, 2012b), we analyse in the current study previously collected information from business studies students who had taken EE courses, and a control group of engineering students who did not study EE (Solesvik et al., 2013).

In relation to methodological standard (1), data was gathered from three random samples of business studies students who had taken two EE modules in their second or third year. With reference to each University context, the population of business studies EE students was identified (column 1 in Table 1). In relation to each University context, a quota of business studies EE students to be surveyed was selected (column 2). With regard to each sampling frame, each business studies EE student was allocated a random number; random number tables were used to identify three random samples of business studies EE students. A structured questionnaire was hand-administered between May and December 2012 to business studies EE students in the three random sampling frames. In total, 125 out of 175 business studies EE students responded (column 3). Overall, the response rate was 71% (column 4). The profiles of the 125 business studies EE student respondents and the 50 business student non-respondents were compared. Chi-square tests revealed no significant difference at the 0.05 level between the business studies EE respondents and non-respondents with regard to university origin, age, gender, and degree course. No response bias was detected. Thus, we can generalize from the random sample of business studies EE students to the population of business studies EE students in the three universities.

In relation to methodological standard (2), data was collected from a random sample control group of engineering students not allowed to take EE courses. In relation two of the three universities the populations of engineering students was identified (column 5). Quotas of engineering students for random sampling frames of engineering students were identified (column 6). With regard to each sampling frame, each engineering student was allocated a random number. Random number tables were used to identify two random samples of engineering students. A structured questionnaire was hand-administered between May and December 2012 to engineering students in two universities. In total, 64 out of 93 engineering students responded (column 7). Overall, the response rate was 69% (column 8). The profiles

of the 64 engineering student respondents and the 29 engineering student non-respondents were compared. Chi-square tests revealed no significant difference at the 0.05 level between the engineering respondents and non-respondents with regard to university origin, age, gender, and degree course. No response bias was detected. With regard to the two random samples of EE and engineering students, 83 were male and 106 were female. Further, 137 students were bachelor students and 52 students were masters students. Their mean age was 20.40 ($SD = 1.49$).

In relation to methodological standard (3), it was recognized that students are able to self-select on to business courses with EE and engineering courses with no EE. The issue of selection bias has generally been ignored in EE evaluations (Oosterbeek et al., 2010). However, reported intensity of entrepreneurial intention may be conditional on unobserved factors that are linked to the self-selection decision. The Heckman two-stage approach was used to check for potential selection bias (Djupdal and Westhead, 2015) (i.e. the skills variables and unobservable factors might influence reported intensity of entrepreneurial intention) between business studies EE students and control group engineering students. The Heckman two-stage approach (Robson et al., 2012) identifies both a method of testing for selection effects between business studies EE students and control group engineering students, and for consistent estimation if selection effects are shown to be statistically significant. A probit regression analysis was estimated during step 1 with regard to the total sample of 189 business studies EE students and control group engineering students relating to their propensity to be an EE student, or not. At least one independent variable (observable) has to be included in step 1 but not step 2, which is theoretically associated with the propensity to participate in EE, but not a higher intensity of entrepreneurial intention. Student work experience has been found not to be significantly associated with student entrepreneurial intention (Dohse and Walter, 2012). Students with work experience at university were

allocated a score of '1', otherwise a score of '0' (Work), and is the selection variable that was included in step 1. Variables included in the analysis are summarized in Appendix 1.

Model 1 in Table 2 is the step 1 Heckman model relating to the control variables, selection and independent variables focusing on EE participation or not. The inverse Mills ratio, which is a function of the correlation between the disturbances of the probit model, was considered during step 2 relating to the intensity of entrepreneurial intention. The OLS regression analysis relates to the control and independent variables, but not the Work selection variable. Standard errors were corrected for heteroscedasticity. The Inverse Mills ratio relating to step 2 Model 2 is not significant at the 0.1 significance level. No selection bias (i.e. randomly assigned participants to the business studies EE sample and the engineering no EE sample) was detected. There was, therefore, no need to run a two-stage Heckman procedure. OLS regression models relating to independent and interaction variables are presented to test the proposed hypotheses.

In relation to methodological standard (4), the issue of potential moderating relationships was considered. The interaction effects (Yip and Tsang, 2007) between gender and EE participation (i.e. two-way interaction), as well as between gender, EE participation and EE skills relating to scanning, connecting, evaluation, risk perception, and risk propensity (i.e. three-way interactions) were considered to test the novel moderating relationship hypotheses that have not, to our knowledge, been tested.

Data relates to a cross-sectional survey of students utilizing a hand-delivered questionnaire survey. Consequently, methodological standard (5) generally not considered in most EE studies was not satisfied.

Validity

The questionnaire was initially designed in English (Solesvik et al., 2013). It was then translated into Russian, which is the official language in the southern part of the Ukraine. Further, it was then back translated into English. To explore content and face validity issues, a pilot study was conducted with 10 native Russian speaking students studying at the University of Nordland in Norway. No problems with the questionnaire were detected at the pilot stage.

Multicollinearity and common method bias

A correlation matrix of the Pearson correlation coefficients relating to the control and independent variables is presented in Table 3. Summary statistics are also presented. Variance inflation factor (VIF) values suggest no evidence of multicollinearity, and the presented OLS models are not distorted by this problem. The following steps were taken to ensure that common method bias was minimized (Krishnan et al., 2006): protection of respondent anonymity (Podsakoff et al., 2003); reducing statement ambiguity by pre-testing the questionnaire on students; and ensuring all statements relating to the dependent variable were not located close to the independent variables on the questionnaire. In addition, a Harman one-factor test relating to all independent and control variables was conducted in order to test for common method variance. Five factors with eigenvalues greater than 1.0 were identified. They accounted for 73% of the variance. There is no evidence to suggest common method bias. Power analysis confirmed that the sample was large enough to test two-way interactions (Aiken and West, 1991).

Measures

Dependent variables. To improve measurement quality compared to studies that used a single question (Wilson et al., 2007; Díaz García and Jiménez-Moreno, 2010; Shinnar et al., 2012; Kibler, 2013) or two questions (Oosterbeek et al., 2010), Solesvik et al., (2013)

presented students with six questions (Liñan and Chen, 2009) relating to whether “Have you seriously considered becoming an entrepreneur” (Intention) (Appendix 1). Principal component analysis (PCA) confirmed that the Intention scale was valid. This scale has a Cronbach’s alpha of 0.92. The intensity of entrepreneurial intention dependent variable relates to the varimax rotated component scores.

Independent variables. Entrepreneurship education. Students who participated in EE were allocated a score of ‘1’, otherwise a score of ‘0’ (EE).

Gender. Female students were allocated a score of ‘1’, and male students were allocated a score of ‘0’ (Female).

Entrepreneurial alertness. Following Tang et al., (2012), students were presented with six statements focusing on the scanning and search entrepreneurial alertness skill (Scan) (Appendix 1). Students were also presented with three statements focusing upon the association and connection entrepreneurial alertness skill (Connect) (Appendix 1). Further, students were presented with four statements focusing upon the evaluation and judgement entrepreneurial alertness skill (Evaluation) (Appendix 1). A PCA detected that the six statements relating to Scan loaded on a single component. The three statements relating to Connect loaded on a single component. Further, the four statements relating to Evaluation loaded on a single component. Cronbach’s alpha scores of 0.85, 0.75 and 0.85 for Scan, Connect and Evaluation, respectively were detected. Varimax rotated component scores were computed for each Scan, Connect and Evaluation component.

Risk perception. The risk perception (Riskperc) scale developed by the Entrepreneurial Intentions Research Group (EIRG) at the University of Nordland was used. Students were presented with three statements (Appendix 1). A PCA detected that all three

statements loaded on a single component. Riskperc had a Cronbach's alpha of 0.81. Varimax rotated component scores were computed.

Risk propensity. The risk propensity (Riskprop) scale developed by the EIRG was used. Students were presented with three statements (Appendix 1). A PCA detected that all three statements loaded on a single component. Riskprop had a Cronbach's alpha of 0.84. Varimax rotated component scores were computed.

Control variables. An individual's socialization at home and school can shape whether they are inclined to entrepreneurship. Parents can act as initial role models, and they can have a profound influence on a child's self-image across the lifespan (Falck et al., 2012). Students drawn from business owner and/or self-employed parental backgrounds were coded '1', and otherwise they were coded '0' (Parents). To explore where university context shapes entrepreneurial mindsets, two university dummy were computed. Students drawn from the National University of Shipbuilding were allocated a score of '1', otherwise a score of '0' (NUS). Further, students drawn from the European University were allocated a score of '1', otherwise a score of '0' (EU).

Results

Hierarchical multiple OLS regression analysis was conducted. To improve interpretation of the interaction coefficients the independent and control variables were centred with regard to their means. Table 2 shows the results. Model 3 is the baseline control variable model. Students from self-employment and/or business ownership backgrounds (Parents) ($p < 0.05$) reported significantly higher entrepreneurial intention. The gender variable and the university dummy location variables were not significant.

Building from this baseline model, we included the EE participation variable in Model 4. EE is positively and significantly associated with high intensity of intention.

Model 5 includes the interaction term exploring whether female students are less likely to benefit from EE participation. The interaction between EE participation and gender (EE*F) ($p < 0.001$) is significantly negatively associated with high intensity of intention. Simple slope analysis (t-value = -2.06) shows that there are negative relations between EE and intention for female EE students, and positive relations between EE and intention for male EE students. H1 is supported.

Model 6 includes the three-way interaction variables and explores whether female EE students accumulated scan, connect, and evaluation alertness skills, and risk-taking perception and propensity skills. Out of the five interactions, only two were significant. For female EE students, the connection alertness skill is significantly positively associated with high intensity of intention (EE*F*C) ($p < 0.05$). The interaction between female EE students and risk perception skill (EE*F*RC) ($p < 0.05$) is significantly negatively associated with high intensity of intention.

Table 4 shows the significance values of the slope differences for connection alertness. For female EE students, a positive relationship emerges between connection alertness and intention. The relationship is significantly different for non-EE female students. The latter relationship is slightly negative. Non-EE female students and non-EE male students also differ significantly with regard to the relationships between connection alertness and intention. The relationship between connection alertness and intention are positive for all groups except non-EE female students. H2a, H2b and H2c are not supported.

Table 5 shows the significance values of the slope differences for risk perception. Male EE students differ significantly with respect to the relationship between risk perception and intention from non-EE female students. For non-EE female students, the relationship between risk perception and intention differ significantly from non-EE male students. For both male groups, the relationship between risk perception and intention is positive. This

means that both male groups are more oriented towards higher intention when they perceive more risk. For both female groups, the relationship is low and slightly negative. Women tend to be lower on intention when they perceive risk. H3a is supported whilst H3b is not supported.

Discussion

Key findings

This study responds to the call by Martin et al., (2013: 211) "... to investigate the links between entrepreneurship education and both the human capital assets it creates and the entrepreneurial outcomes to which it purportedly leads". We explored new questions and moderation hypotheses with regard to the links between gender, EE participation, EE honing of alertness and risk-taking skills and entrepreneurial intention. We provide fresh insights relating to a relatively under-researched context for female entrepreneurship in the Ukraine, where there is high entry to university business courses, but low levels of female business ownership. Relating to evidence from three universities and samples of students who did, and did not, participate in EE courses, we satisfied four of five criteria relating to methodological with reference to EE evaluation. Notably, we considered sample selection bias and EE moderating relationships generally ignored in previous EE studies.

Practitioners are concerned that the impact of EE is unclear (O'Connor, 2013), or that EE does little to enhance entrepreneurship skills (Oosterbeek et al., 2010); we provide insights into these concerns. EE students reported higher intensity of entrepreneurial intention than students than those who did not participate. However, EE did not unequivocally benefit all participants; women reported significantly lower intention intensity than their male counterparts. Contrary to expectation, the three-way interaction analysis detected that gender did not moderate the relationship between EE and scan, connection, or evaluation alertness

skills and intensity of entrepreneurial intention. The relationship between the connection alertness skill and intention was positive for all groups apart from non-EE female students. Interestingly, we detected that men and women benefit from EE in that they showed higher intention at high connection alertness skill than those who did not participate. This emphasizes the positive nature of EE - at least when it comes to the connection skill.

Results from the three-way interaction analyses showed that for female EE students, the relationship between the risk propensity skill and intensity of entrepreneurial intention was slightly negative, similar to that of non-EE female students. For men it was positive, and overall intention was higher for male EE students at high risk perception skill. It seems that women are more risk averse, or more realistic, when it comes to entrepreneurship, in so far, that when their risk perception increases, intention decreases. Men appear to have a higher intention at high risk perception than women, and this is even more pronounced for men taking part in EE. This, however, is not necessarily beneficial as it may lead to men taking undue risks, and it may, in part, explain the high new firm failure rates. EE did not increase the risk-taking propensity skills of female EE students and indeed, may encourage those with higher risk perception skills to become more realistic regarding a career in entrepreneurship (Oosterbeek et al., 2010).

We expand research on women's entrepreneurship by challenging the view that EE generates equal benefits for all students (DeTienne and Chandler, 2007), and that increasing EE student skills and knowledge universally raises female EE student entrepreneurial intention. We assumed that gender stereotypes would manifest themselves in a perceived incongruity between the feminine and the entrepreneur role and the attribution of entrepreneurial abilities (Orser et al., 2011). Further, we assumed that some women perceive that they would attain fewer rewards for some behaviour (Dreher and Cox, 2000). Contrary to expectation relating to the assumption of gender stereotypes, we provide evidence that

suggests raising the connection alertness skill was associated with high intensity of entrepreneurial intention for female EE students (Martin et al., 2013; Bae et al., 2014). However, supporting gender stereotypical behaviour, we noted that raising the risk perception skill reduced the intensity of entrepreneurial intention reported by female EE students. This is an important contribution to our understanding of human capital theory and the appropriateness of teaching these skills in EE. Future studies should not regard students as a homogeneous group; rather, future studies need to conceptualize and consider the particular issues facing women.

Implications for practitioners

Government and EE teachers need to clearly state the goals of EE which should be monitored to ascertain whether they are achieved (O'Connor, 2013; Bullough et al., 2015). Government and universities in the Ukraine have yet to clearly specify the purpose of EE or monitor EE. In that respect, our results are an important contribution; from an educational perspective it is essential to understand which skills related to EE are associated with students reporting higher intensity of entrepreneurial intention. This validates (or not) EE provision. Courses that focus on the accumulation of the connection alertness skill can increase the pool of students, particularly women, with a higher intensity of entrepreneurial intention. Conversely, EE focused on risk propensity can reduce the reported intensity of entrepreneurial intention by female students. It encourages women to become more realistic about entrepreneurship and could potentially reduce female owned firm failure rates. Additional research is warranted to explore whether men (as well as women) in other locational and cultural contexts who accumulate and mobilize the risk propensity skill become realistic with regard to the business opportunities they pursue. The skill learning requirements of women may not be same as those required by men. Practitioners need to recognize that women can be subject to a

(perceived) lack of fit between their gender stereotype and the stereotype of a Western ‘heroic male’ entrepreneur, which may limit their ability to accumulate the same skills that men can generally accumulate (Ahl and Marlow, 2012). Also, women facing prejudice may believe that investing in their human capital will not be beneficial so deterring careers in entrepreneurship.

The ‘one size fits all’ EE approach may not be appropriate; our findings suggest that additional research is warranted surrounding the potential delivery of ‘gender-sensitive EE’ (Wilson et al., 2007). EE course design in the Ukraine (and elsewhere) may unintentionally focus on a male-oriented notion of entrepreneurship (Gupta et al., 2009; Ahl and Marlow, 2012). To raise the entrepreneurial intention of female students, EE may need to be tailored to different types of women (and men). Further, the content and delivery of EE may need to focus on the accumulation of skills (or ‘defensive strategies’) (Steele et al., 2002) that can be employed by women to address female subordination and gender stereotyping. Practitioners can encourage more universities to provide EE courses that teach the alertness skill, which according to the results of our study appears to be a mechanism to increase the stock of future female entrepreneurs. Although not empirically tested in this study, there may be the case for female only EE classes that are taught by female entrepreneurs and female practitioner guest speakers who can promote female entrepreneurship by overcoming a perceived lack of fit (i.e. feminine gender identification) in relation to the entrepreneurial process (Gupta et al., 2009). However, ‘women only’ teaching to ‘women only’ students could potentially further emphasize the ‘otherness’ of women, and their perceived lack of fit with being entrepreneurs. Additional research is warranted surrounding the benefits of ‘women only’ teachers and EE students. Irrespective of teaching delivery and class composition, there is the need for entrepreneurship educators to ensure that all EE is gender sensitive, and it relates to a diverse range of guest speakers, case studies, industry sectors and it focuses upon critical engagement

with entrepreneurship theories that do not solely focus on the personality traits and behaviour of the dominant stereotype of the ‘heroic male’ entrepreneur.

By discussing theoretical and practical issues relating to the entrepreneurial process (Fiet, 2000), EE can highlight that a career in entrepreneurship is not valuable to all students. Diverse approaches are required to teach entrepreneurship (Neck and Greene, 2011; Bullough et al., 2015). Although not empirically tested, there may be a need to shift from ‘learning about’ transmission models of teaching to ‘learning for’ experimental learning, EE curriculums that are more focused on hands-on experience (Neck et al., 2014) and discussions with entrepreneurs from diverse backgrounds (NESTA, 2008). The latter changes may raise student entrepreneurial intention; the EE curriculum needs to encourage students to experience the entrepreneurial process by thinking, behaving, and acting as actual entrepreneurs (Edelman et al., 2008), although debate surrounds the best way to go about becoming and being an entrepreneur (Honig, 2004; Neck and Greene, 2011). Future EE for women (and men), for example, could encourage practice-based learning (Neck et al., 2014) relating to the accumulation of bricolage and effectuation skills, particularly in resource-constrained transition contexts such as the Ukraine.

Implications for research

This study addresses several technical problems with previous studies, but it is inevitably associated with limitations that provide opportunities for additional research attention. Our study is limited by its focus on three universities in the Ukraine and university students who followed business or engineering courses, where EE was compulsory for business students but not provided to engineering students. We recognize that the control group is not perfect. Future research can strengthen the generalizability of our findings by conducting cross-sectional and longitudinal evaluations of EE in different national contexts, at different

universities, and for different types of EE courses relating to entrepreneurial intention and the likelihood of NFF post-university education over several points in time. Studies are warranted exploring whether the teaching of bricolage, effectuation, imagination, creativity, and innovation skills, particularly appropriate in a resource-constrained context, are more likely to raise female entrepreneurial intention than teaching solely focusing upon alertness and risk-taking skills. Like similar studies, we did not seek to assess the quality of the EE, and whether teaching delivered by women teachers is associated with superior learning outcomes for female and male students. The latter topics warrant additional research attention.

Stereotypical female and male roles and/or prevailing attitudes to entrepreneurship may relate to the national or cultural context being explored. Presented results are generalizable to the Ukraine context. Western EE approaches may not guarantee a significantly higher likelihood of students report the intention to become entrepreneurs and/or propensity to become entrepreneurs in all national contexts, but there is tentative evidence the EE benefits women in some national contexts (Packham et al., 2010). To explore whether presented results are applicable to other national and cultural contexts additional longitudinal multivariate statistical quantitative and qualitative EE studies are warranted.

Entrepreneurship is a regional event (Brixy et al., 2012; Kibler, 2013), and local supply and demand factors can shape regional variations in enterprise. An individual's personal and local regional knowledge context can impact on entrepreneurial intention (Dohse and Walter, 2012). Information relating to the postcode of each students home address could not be obtained to identify information relating to access to strategically relevant knowledge resources (i.e. culture of enterprise as reflected in the local NFF rate and local resource munificence relating regional research and development investment or employment) embedded in the potential entrepreneur's region of residence. Additional studies need to

explore whether EE skill accumulation by students has higher conversion rates (i.e. ability to report entrepreneurial behaviour) in particular regional contexts.

Holmquist (1997: 181) insightfully warned that, “Women entrepreneurs should not be treated as a homogeneous group. There are differences within the group that make all generalizations dangerous”. Additional insights may be provided by future studies that identify ‘types’ of women (de Bruin et al., 2006) EE respondents with regard to conceptual typologies or empirical taxonomies of EE participants in relation to key elements raised by gender identification theorists (Gupta et al., 2009). Studies also need to move beyond a focus on ‘average students’, and there is a need to explore the heterogeneity (Jennings and Brush, 2013) amongst women (Ahl, 2006).

Conclusion

This study explored whether universities providing compulsory EE for business students raises entrepreneurial intention. Several technical problems with previous EE evaluation studies were addressed. Guided by insights from human capital theory and SLS theory, we present insights surrounding the links between EE and specifically, alertness and risk-taking skills and the outcome of intensity of entrepreneurial intention. EE students reported high intention, but EE did not unequivocally benefit all participants. Indeed, female EE students were significantly less likely to report high intention. The benefits of EE were not the same for female and male EE students. Female EE students who accumulated the connection alertness skill reported higher intensity of intention than female non-EE students. Non-EE female students and non-EE male students also differed significantly with regard to the relationships between connection alertness skill and intention. The relationship between the connection alertness skill and intention was positive for all groups apart from female non-EE students. Both male EE and non-EE students citing risk perception skills reported higher

intention, whilst female EE students citing risk perception skills reported lower intention. The case for customized EE for women is made.

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Table 1. Business EE students and control group engineering students with no EE survey respondents by university context.

University context	Population of business EE students April 2012 (column 1)	Random sampling frame of business EE student hand-delivered questionnaire May to December 2012 (column 2)	Business EE student survey respondents (column 3)	Response rate (%) (column 4)	Population of engineering students with no EE (column 5)	Random sampling frame of engineering students hand-delivered questionnaire May to December 2012 (column 6)	Engineering student survey respondents (column 7)	Response rate (%) (column 8)
European University; private; opened in 1997 (a)	280	45	29	64	110	25	17	68
National University of Shipbuilding; state-owned; opened in 1920 (b)	536	100	75	75	678	68	47	69
Petro Mohyla Humanitarian University; state-owned; opened in 1996 (b)	320	30	21	70	(d)	0	0	0
Total	1,136	175	125	71	788	93	64	69

Notes: (a) EE course finished April 2012, (b) EE course finished February 2012, (c) Survey data collected between May and December 2012, (d) Access to the list of the population of engineering students could not be obtained.

Table 2. Entrepreneurship education and skills associated with intensity of intention: Heckman two-step estimation and ordinary least squares (OLS) hierarchical regression models estimating the direct and interaction effects (n = 189)^(a).

Dependent variable: intention	Model 1: step 1	Model 2: step 2	Model 3 control variables	Model 4 direct effects	Model 5 interaction	Model 6 interaction
Control variables						
Female	-0.04	-0.04	0.05	-0.09	0.31*	-0.04
Parents	0.02	0.05	0.15*	0.12	0.06	0.04
EU	0.05	0.01	0.01	0.05	0.01	0.04
NUS			0.08	0.13	0.06	0.10
Work	0.09					
Direct effects						
EE	0.05	0.04		0.28**	0.20*	0.05
Scan (S)	0.25**	0.27**			0.26**	0.26*
Connect (C)	-0.10	-0.10			-0.13**	-0.28*
Evaluation (E)	0.17*	0.18*			0.21**	0.26*
Riskperc (RC)	0.07	0.07			0.09	0.19*
Riskprop (RP)	0.33** *	0.32** *			0.29***	0.34**
Inverse Mill's ratio		0.01				
Observations		189				
Censored observations		49				
Uncensored observations		140				
Interaction terms						
EE*F					-0.49***	
EE*F*S						-0.02
EE*F*C						0.23*
EE*F*E						-0.06
EE*F*RC						-0.17*
EE*F*RP						-0.02
R ²			0.03	0.08	0.40	0.39
Adjusted R ²			0.01	0.05	0.36	0.34
Δ R ²			0.03	0.05	0.32	0.31
F value			1.29	2.99	10.17	7.08
Sig. F change			0.01	0.000	0.000	0.000

Notes: a) Standardized beta regression coefficients.

* p<0.05; ** p<0.01; *** p<0.001.

Table 3. Descriptive statistics and correlation matrix (n = 189)^{(a)(b)}.

Variables	Mean	SD	VIF	1	2	3	4	5	6	7	8	9	10	11
1. Female	0.56	0.49	1.49	1.00										
2. Parents	0.42	0.50	1.08	.04	1.00									
3. NUS	0.65	0.50	1.15	-.20**	-.11	1.00								
4. EU	0.24	0.48	1.10	.07	-.02	-.67**	1.00							
5. EE	0.66	0.47	1.72	.58**	.16*	-.16*	-.05	1.00						
6. Scan	31.77	7.28	1.76	.09	.07	-.10	.03	.23**	1.00					
7. Connect	14.60	3.58	2.06	-.05	.07	.01	.01	.08	.56**	1.00				
8. Evaluation	20.12	4.97	1.96	.01	.05	.04	-.08	.18*	.46**	.51**	1.00			
9. Riskperc	14.92	3.93	1.08	.01	-.04	-.04	-.04	.02	.16*	.20**	.07	1.00		
10. Riskprop	14.77	4.23	1.57	.12	.16*	-.02	.01	.32**	.43**	.40**	.44**	.06	1.00	
11. Intention	27.87	9.17		.04	.16*	.05	.01	.21	.45**	.33**	.43**	.09	.52**	1.00

Notes: (a) Means and standard deviations (SD) for Scan, Connect, Evaluation, Riskperc, Riskprop and Intention relate to summative scales for this table.

(b) * p<0.05 (two-tailed), ** p<0.01 (two-tailed).

Source: Solesvik et al., (2013: 756).

Table 4. Slope difference test for three-way interactions between gender, EE and connect alertness on intention.

Pair of slopes	t-value for slope difference	p-value for slope difference
EE-female and EE male	-0.02	0.984
EE-female and Non-EE female	2.11	0.036
EE-female and Non-EE male	0.61	0.545
EE male and Non-EE female	1.57	0.118
EE male and Non-EE male	0.42	0.673
Non-EE female and Non-EE male	-2.03	0.044

Table 5. Slope difference test for three-way interactions between gender, EE and risk perception on intention.

Pair of slopes	t-value for slope difference	p-value for slope difference
EE female and EE male	-1.55	0.124
EE female and Non-EE female	0.51	0.611
EE female and Non-EE male	-1.83	0.069
EE male and Non-EE female	2.66	0.009
EE male and Non-EE male	-0.46	0.647
Non-EE female and Non-EE male	-3.02	0.003

Appendix 1. Dependent, independent and control variable operationalization.

Dependent variable		Cronbach's Alpha
Intention	Students were asked: Have you seriously considered starting your own business? (Liñan and Chen, 2009). I am ready to do anything to be an entrepreneur (a). My professional goal is to become an entrepreneur (a). I am determined to create a business venture in the future (a). I have very seriously thought about starting a firm (a). I have got the intention to start a firm one day (a). I intend to start a firm within five years of graduation (a).	0.92(b)
Independent variables		
EE	Students participating in entrepreneurship education (EE) =1, and students not participating in EE = 0.	
Female	Female students = 1, and male students = 0. Scanning and search entrepreneurial alertness skill (Tang et al., 2012): I have frequent interactions with others to acquire new information (a). I always keep an eye out for new business ideas when looking for information (a). I read news, magazines, or trade publications regularly to acquire new information (a). I browse the Internet everyday (a). I am an avid information seeker (a).	0.85(c)
Scan	I am always actively looking for new information (a). Association and connection entrepreneurial alertness skill (Tang et al., 2012): I see links between seemingly unrelated pieces of information (a). I am good at 'connecting dots' (a).	0.75(d)
Connect	I often see connections between unconnected domains of information (a). Evaluation and judgement entrepreneurial alertness skill (Tang et al., 2012): I have a gut feeling for potential opportunities (a). I can distinguish between profitable opportunities and not-so-profitable opportunities (a). I have a knack for telling high-value opportunities apart from low-value opportunities (a).	0.85(e)
Evaluation	When facing multiple opportunities, I am able to select the good ones (a).	
Riskperc	Risk perception skill (Entrepreneurial Intentions Research Group (EIRG) at the University of Nordland):	0.81(g)

	Starting a new business is very risky (f).	
	I see the possibility of starting a business as a potential loss (f).	
	The probability of a new venture doing poorly is very high (f).	
	Risk propensity skill (EIRG):	0.84(g)
	I see the possibility of starting a business as a potential opportunity to pursue (f).	
	If I do not start my own business, I may be missing a great opportunity (f).	
Riskprop	Overall I would label the option of starting a business as something positive (f).	
Control variables		
Parents	Students drawn from business owner and/or self-employed parental backgrounds = 1, and otherwise = 0.	
NUS	Students drawn from the National University of Shipbuilding = 1, and otherwise = 0.	
EU	Students drawn from the European University = 1, and otherwise = 0.	

Notes: a) With regard to each statement, a seven point scoring system was employed, where a score of 1 suggested ‘absolutely disagree’, 4 suggested ‘neither agree nor disagree’, and a score of 7 suggested ‘absolutely agree’. b) A principal component analysis (PCA) found that all six statements loaded on a single component. c) A PCA detected that the six statements relating to Scan loaded on a single component. d) A PCA detected that the three statements relating to Connect loaded on a single component. e) A PCA detected that the four statements relating to Evaluation loaded on a single component. f) With regard to each statement, a seven point scoring system was employed, where a score of 1 suggested ‘absolutely disagree’, 4 suggested ‘neither agree nor disagree’, and a score of 7 suggested ‘absolutely agree’. g) A PCA detected that all three statements loaded on a single component.