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Determinants of Entrepreneurial Intention and Firm Performance:

Evidence from three Meta-Analyses

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Verfasser:	Michael König, M. Sc.
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Meiner geliebten Ehefrau Meike.

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List of abbreviations

ATB ..... attitude towards the behavior
CFI ..... confirmatory fit index
CI ..... conficence interval
EEM ..... entrepreneurial event model
EI ..... entrepreneurial intent
EMGB ..... extended model of goal-directed behavior
EO ..... entrepreneurial orientation
ESE ..... entrepreneurial self-efficacy
GEM ..... global entrepreneurship monitor
GUESSS ..... global university entrepreneurial spirit students' survey
MASEM ..... meta-analytical structural equation modelling
MGB ..... model of goal-directed behavior
PBC ..... perceived behavioral control
PSED ..... panel study of entrepreneurial dynamics
RIW ..... relativ importance weight
RMSEA ..... root mean square error of approximation
SRMR ..... standardized root mean square residual
TPB ..... theory of planned behavior
WLS ..... weighted least squares
χ^2 ..... chi-square

1. Determinants of entrepreneurial intention and firm performance: An introduction

The interest in examining entrepreneurial personality traits has strongly grown over the past decades. Business start-ups are of eminent importance to national economy with respect to employment, competition, structural change, innovation and stability. Such new venture creations need people that start, organize and manage the responsibilities, the entrepreneurs. According to Schumpeter (1934), entrepreneurial innovations are a key driver to economic growth, as competitors seek to outperform each other with improved technologies and advanced business practices, in an attempt to increase proft margins and raise the entrepreneurs' standard of living. Entreprenerus distinguish themselves according to Bird and Jelinek (1988) in their intentions to link and organize their own and others' resources to build a firm. Such intentions are necessary factors to manifest entrepreneurial ideas (Bird, 1988). Since this seminal article, research focused on entrepreneurial intention as the central factor in describing and predicting entrepreneurial behavior. Consequently, to foster entrepreneurial behavior and new venture creation it is necessary to understand the underlying processes that cause intentions to set up a business. On the other hand, the foundation of a firm can only be the first step. To be of advantage for economic growth businesses have to be also successful. Hence, an important point of interest in entrepreneurship research is the difference in the performance of successful and unsuccessful entrepreneurs.

Although a significant body of entrepreneurship literature investigates the process from starting a business to its final success, the field is fragmented, with a lack in theoretical clarity and inconclusive empirical findings. With the cumulative empirical and theoretical body of research, the number of inconclusive findings in the field is still growing. Shane and Venkataraman (2000) argue for a limited development of such a cumulative body of knowledge, because researchers fail to agree on many key issues of entrepreneurship. Furthermore, they

lack to build upon the results of other studies (Brown, Davidsson, & Wicklund, 2001), which further slows down the development in entrepreneurship research. We use meta-analysis in this thesis for several reasons. According to Rauch et al. (2009) meta-analysis can tell if a research area is saturated or if further work in this area is justifiable. Based on single meta-analyses, we are enabled to build meta-analytic correlation matrices and use meta-analytic structural equation modelling. Hence, we can test more complex models compared to primary studies, as the necessary surveys would extend an applicable scope. Furthermore, we are able to test underlying mechanisms of certain constructs with this procedure. Additionally, meta-analysis provides valuable insights on possible moderators, which allows a more precise explanation of certain relationships, if they are empirically supported. By using meta-analysis, we are able to clarify the extent to which study results replicate with respect to methodological and contextual moderators, which can help to establish boundary conditions of entrepreneurship specific theories. The quality of meta-analytical research depends highly on research design, operationalization, sampling and reporting of the primary studies. We therefore are able to identify potential shortcomings in earlier studies to provide methodological advice for future research.

Study I – Determinants of Entrepreneurial Intent

According to (Ajzen, 1991; Krueger & Carsrud, 1993) intention represents an individual's obligation to start a business in the near future. It is best suited as forecaster for such an action, as it serves as the best predictor for such planned behaviors (Bagozzi, Dholakia, & Basuroy, 2003; Kim & Hunter, 1993). The increasing interest in the development of entrepreneurial intentions has raised the necessity of theoretical approaches that enable to predict and explain individuals' propensity to start a firm. This led to the examination of a vast amount of determinants over the past years and consequently to a large amount of theoretical models with several extensions to enable to compare individuals due to their predisposition to

be an entrepreneur. Despite important contributions, these models led to sometimes inconclusive empirical findings of the impact of several determinants on entrepreneurial intentions (Krueger, 2009; Shook, Priem, & McGee, 2003). In their literature review on venture creation and the enterprising individual, Shook, Priem, and McGee (2003) stated a lack in empirical precision along with missing theoretical clarity in this field. To reduce the number in competing models they encouraged researchers to integrate existing models of entrepreneurial intention, which may enhance the explanatory power, consistency, and theoretical clarity.

The purpose of this study is to respond to calls in the entrepreneurship literature to systematically aggregate and evaluate existing cumulative evidence (Frese et al.,2012; Rauch & Frese, 2006; Shook, Priem, & McGee, 2003) and meta-analytically test the mostly used theories to explain entrepreneurial intention, the theory of planned behavior (Ajzen, 1991) and the entrepreneurial event model (Shapero & Sokol, 1982). Furthermore, recent studies (Carsrud & Brännback, 2011; Moriano et al., 2012; Shook, Priem, & McGee, 2003) call to examine potential moderating effects, which we respond to and thereby contribute to improve the understanding of how certain factors influence entrepreneurial intention. For this purpose, we address methodological and contextual moderators in the relation with its determinants. In addition, we respond to the call for a reduction of the number of alternative models on entrepreneurial intention (Shook, Priem, & McGee, 2003). Current research provides only little information on how attitudes, beliefs, and perceptions raise intentions of an individual to start a business. With the integration of the theory of planned behavior and the entrepreneurial event model and its comparison to the existing theories in terms of their predictive validity using meta-analytic structural equation modelling, we finally examine and identify the mechanism through which higher levels of entrepreneurial intention and positive perceptions develop, and contribute a more completed picture of the process.

Study II – The impact of personal background factors on entrepreneurial intention

Despite the theoretical framework and its competing theories, a significant body of literature not only investigates the direct influence of cognitive factors on entrepreneurial intention, but also the influence of personal background factors on an individual's entrepreneurial intention, which finally turn an individual into an entrepreneur. To be able to answer how individuals develop entrepreneurial intentions a large and still growing number of studies consequently focused on whether such factors (e.g., entrepreneurial role models, work experience, prior founding experience, general education and entrepreneurship education) build entrepreneurs (e.g., Bird, 1993; Shook, Priem, & McGee, 2003). Again, the findings in this area of research are inconclusive with respect to the direct impact of personal background factors on entrepreneurial intention (Chlosta et al., 2012; Davidsson & Honig, 2003). Furthermore, existing studies expect a direct influence of personal background factors on entrepreneurial intention, whereas personal factor are only weak predictors of an individuals' intention according to Krueger and Carsrud (1993). In line with the latter one, the entrepreneurial event model (Shapero & Sokol, 1982) and the theory of planned behavior (Ajzen, 1991) as main theories of the impact factors on entrepreneurial intention (Shook, Priem, & McGee, 2003; Solesvik et al., 2012) both propose that cognitive factors mediate the relationship, which contradicts the direct influence of personal background factors on entrepreneurial intention.

The aim of this study is to clarify the inconclusive findings in the relationships between personal background factors and entrepreneurial intention. We develop a path model of the relationship between personal background factors (i.e. prior founding experience, entrepreneurial role models, work experience, general education and entrepreneurship education) and entrepreneurial intention with the attitudinal variables of the theory of planned behavior (i.e. attitude, subjective norm, and perceived behavioral control) as mediators. These attitudinal variables can be altered by personal background factors (Eagly & Chaiken, 1993;

Robinson et al., 1991) as well as determine intention according to the theory of planned behavior. Therefore, we examine intention as being influenced by attitudes, which themselves derive from personal background factors. Furthermore, we respond to calls for a detailed examination of the process that leads to entrepreneurial intention (Fayolle & Liñán, 2014; Shook, Priem, & McGee, 2003) as well as for a more systematic aggregation and evaluation of cumulative evidence in entrepreneurship research (Frese, Rousseau, & Wiklund, 2014; Shook, Priem, & McGee, 2003).

Study III – Personality traits, active performance characteristics, and success

One further point of interest in entrepreneurship literature apart from the entrepreneurial intention, is the success that results from the subsequent action to set up a business. The literature in this area of research is twofold, with respect to impact factors on firm performance. According to Gartner (1988), research should focus on entrepreneurial activities and what the entrepreneur actually does. Contrary to this, several researchers assume the personality of an entrepreneur as an important impact factor on performance (Carland, Hoy, & Carland, 1988; Rauch & Frese, 2007a; Rauch, 2014), with a special focus on traits that are relevant in the entrepreneurship context (e.g., self-efficacy, need for achievement). The personality of an entrepreneur influences his strategic decisions, which consequently determine the economic success (Johnson, 1990; Shane, Locke, & Collins, 2003). In line with this position, a significant and still growing body of literature examined the relationships of several personality traits towards their outcomes (e.g., Brandstätter, 2011; Carland, Hoy, & Carland, 1988; Rauch & Frese 2007b; Rauch, 2014) against the background to fully understand the concept of entrepreneurship. The vast majority of studies have focused on the direct linkage between personality and success and only few studies examined potential mediators. Therefore, the research field still lacks an in-depth understanding of mechanisms that affect this relationship. Recent studies picked up the criticism on the personality approach on entrepreneurship (e.g.,

Brandstätter, 2011; Frese, 2009; Frese & Gielnik, 2014; Hisrich, Langan-Fox, & Grant, 2007; Rauch 2014), in an attempt to set up a coherent framework and to strengthen the existing theoretical framework.

The purpose of the third study is to respond to recent calls to identify the pathways how personality traits affect firm performance (Davidsson, 2007; Hisrich, Langan-Fox, & Grant, 2007; Rauch, 2014; Townsend et al., 2014). We use meta-analytic structural equation modelling to examine how entrepreneurial orientation and firm innovation mediate between specific entrepreneurial traits (need for achievement, locus of control, self-efficacy, and risk-taking) and firm success, to empirically test part of Frese's (2009) active performance characteristics and entrepreneurial success model. We extend existing meta-analytic research (e.g., Rauch & Frese, 2007a) through an in-depth examination of the relationship between personality traits and entrepreneurial orientation, as well as the personality traits-firm innovation relationship. Furthermore, we contribute to the entrepreneurship literature and identify as well as reconcile existing inconsistencies in the literature (Brandstätter, 2011).

Structure of the thesis

Chapter 1 introduces the topic and provides an overview of current research gaps on the determinants of entrepreneurial intention, as well as firm performance. Chapter 2 includes study I and deals with the determinants of entrepreneurial intention. We introduce existing theoretical models to derive hypotheses on an integrated model of entrepreneurial intent. We describe the process of literature research, the coding of variables and the meta-analytic procedure. We provide results of the analysis to test our hypotheses and to derive implications for theory and practice as well as avenues for future research. Chapter 3 includes study II of personal background factors as impact factors on entrepreneurial intention. We develop hypotheses of the effect of prior founding experience, entrepreneurial role models, work experience, general education, and entrepreneurship education on entrepreneurial intent. We

describe the meta-analytic procedure and provide the results of our analysis to discuss the outcome of the study with respect to theory, practice and further research possibilities. Chapter 4 includes study III of the relations between entrepreneurial personality traits, active performance characteristics, and entrepreneurial success. We derive hypotheses to test the mediational effect of entrepreneurial orientation and firm innovation in the relation of need for achievement, locus of control, self-efficacy, and risk-taking with firm performance. We describe the literature search and variable coding for the meta-analytic structural equation modelling and discuss the importance of our results with respect to theory, practice, limitations and directions for ongoing research. Chapter 5 concludes the thesis and provides a summary of the outcomes in consideration of existing limitations and avenues for future research.

2. Study I - Determinants of entrepreneurial intent: A meta-analytic test and integration of competing models

Since the seminal articles by Shapero (1975), Shapero and Sokol (1982), Bird (1988), as well as Katz and Gartner (1988), a large and still growing number of studies have focused on entrepreneurial intent (hereafter EI). In an effort to enhance our knowledge of EI, prior research has suggested and empirically examined the effects of a large number of determinants on EI, utilizing a variety of theoretical frameworks to explain why some individuals are more entrepreneurial than others. The emergence of these theoretically derived approaches has also led to a large number of alternative models and extensions. There has been growing concern about the sometimes inconclusive empirical findings of the relationship between EI and its determinants (Krueger, 2009; Shook, Priem, & McGee, 2003). Shook, Priem, and McGee (2003) have reviewed the literature and concluded that the field is fragmented and lacks theoretical clarity and empirical precision and they encouraged future research to integrate competing models of EI to reduce the number of alternative intention models. The theoretical integration of competing models by specifying their own contributions to the developmental process may enhance the explanatory power, consistency, and, in particular, theoretical clarity.

The objective of this study is threefold: First, we meta-analytically test and compare the theory of planned behavior (TPB, Ajzen, 1991) and the entrepreneurial event model (EEM, Shapero & Sokol, 1982), the two most extensively tested competing theories that have been used to explain EI (Shook, Priem, & McGee, 2003; Solesvik et al., 2012). Through a meta-analytic review of the determinants that have been identified to influence EI, we respond to calls for a more systematic aggregation and evaluation of the cumulative evidence in the entrepreneurship literature (Frese et al., 2012; Rauch & Frese, 2006; Shook, Priem, & McGee, 2003). Using this evidence-based approach we extend the pioneering work by Krueger, Reilly, and Carsud (2000), who have been the first to compare and theoretical integration the extant

theories of EI. Thus, the first contribution of our meta-analysis lies in the systematic overview of the empirical evidence on the determinants of EI, the identification and theoretical explanation of points of uncertainty in previous findings, and practical guidance for researchers regarding the usefulness of the competing theories and their respective constructs. Second, we explore contextual and methodological moderators of the relationships between EI and its determinants. Prior research has primarily focused on parallel predictors of EI and researchers have not comprehensively tested the boundary conditions for each of the competing theories. Recent calls (Carsrud & Brännback, 2011; Moriano et al., 2012; Shook, Priem, & McGee, 2003) suggest that to understand the direct effects of the identified determinants, studies should examine potential moderating effects of contextual factors. Prior literature also suggests that researchers methodological decision may moderator the relationship between EI and its antecedents (Heuer & Liñán, 2013). The meta-analytic procedure allows us to explore whether differences across studies are due to contextual or methodological moderators, while the test of these types of moderators is seldom possible in primary research studies. In this way, we contribute to the existing literature by improving our understanding of the factors that influence the development of EI, which is important to better understand the relationship between individuals' perceptions, attitudes, and intentions. Finally, the third purpose of this study is to examine the specific mechanism that underlies the formation of EI. The literature has primarily focused on direct relationships between EI and its determinants. Thus, currently little is known about how beliefs, attitudes, and perceptions influence each other and cause individuals to hold more positive intentions toward starting a business. Based on the model of goal-directed behavior (Perugini & Bagozzi, 2001) and the extended model of goal-directed behavior (Perugini & Conner, 2000), we integrate the TPB and the EEM, test this integrated model of entrepreneurial intent using meta-analytic structural equation modeling, and compare the results with the two competing theories in terms of their predictive validity. By examining the

mechanism through which specific determinants are associated with EI, we provide a more complete and more detailed picture of the process from whence positive perceptions and higher levels of EI arise. In doing so, we respond to Shook, Priem, and McGee's (2003) call for an integration of different theories in order to reduce the number of alternative EI models. Therefore, our third main contribution lies in the integration of the TPB and the EEM and identification of the mechanism through which perceptions and EI develop.

2.1 Theoretical background and hypotheses

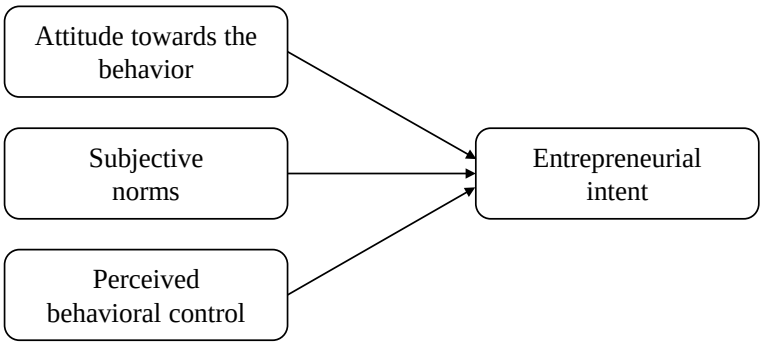
2.1.1 Theoretical models of entrepreneurial Intent

The entrepreneurship literature has made significant efforts to explain how and why new ventures originate and, as a result, made valuable theoretical and empirical contributions to our understanding of the early stage of the entrepreneurial process. The creation of an own venture involves careful planning and thinking on the part of the individual which makes entrepreneurship a deliberate and planned intentional behavior (Bird, 1988) and consequently applicable for intention models (Krueger, 1993). Across a wide range of different behaviors, behavioral intentions have been identified as the most immediate predictor of actual behavior (Ajzen, 1991). Entrepreneurial intentions are central to understanding entrepreneurship as they are the first step in the process of discovering, creating, and exploiting opportunities (Gartner et al., 1994). Entrepreneurial intent refers to the intention of an individual to start a new business (Krueger, 2009). In the past decades, several models have been proposed that explain the formation of EI (Krueger, 2009; Shook, Priem, & McGee, 2003). The EEM (in the literature also referred to as the entrepreneurial intention model or the Krueger-Shapero model) was one of the earliest models to predict EI (Shapero, 1975; Shapero & Sokol, 1982; Krueger, 1993). The TPB (Ajzen, 1991), a theory that has been widely applied as a frame of reference to explain and predict behavioral intentions in different research contexts, was introduced to the EI literature by Krueger & Carsrud (1993). Based on the EEM and the TPB, Krueger and Brazeal

(1994) developed the entrepreneurial potential model, suggesting that both theories overlap to a certain extent. In an empirical test of the two competing theories, Krueger, Reilly, and Carsrud (2000) have strongly emphasized the differences between the respective antecedents of the two models and included relationships between the more distal determinants of the TPB and the more proximal determinants of the EEM. Based on attitudes as well as on personal and situational characteristics, Davidsson (1995) proposed an additional model to examine EI. More recently, based on the model proposed by Krueger, Reilly, and Carsrud (2000), Elfving, Brännback, and Carsrud (2009) developed complex extensions of the EEM and the TPB. Prior reviews of the literature (Krueger, 2009; Shook, Priem, & McGee, 2003) have shown that the existing empirical literature on the determinants of EI has tended to focus on the TPB and the EEM. In this meta-analysis, we focus on these two theories as they provide well-articulated theoretical frameworks that demonstrate strong explanatory power.

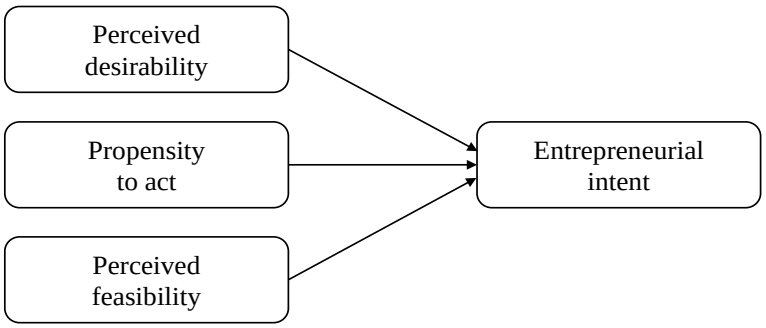
As presented in Figure 2.1, according to the TPB, individuals' intention is determined by attitude towards the behavior (hereafter ATB), subjective norms, and perceived behavioral control (hereafter PBC). ATB reflects an individual's awareness of the outcome of a behavior and the degree to which an individual has a favorable or unfavorable evaluation of performing the behavior (Ajzen, 1991). Subjective norms are the perceived normative beliefs about significant others, such as family, relatives, friends, as well as other important individuals and groups of individuals. The values and norms held by these individuals and the related social pressure to perform the behavior directly influence an individual's intent to perform the behavior (Ajzen, 1991). PBC refers to an individual's belief about being able to execute the planned behavior and the perception that the behavior is within the individual's control (Ajzen, 1991).

Figure 2.1 Theory of planned behavior



As presented in Figure 2.2, according to the EEM, EI depends on perceived desirability, the propensity to act, and perceived feasibility. Perceived desirability refers to the degree to which an individual feels attracted to become an entrepreneur and reflects individual preferences for entrepreneurial behavior (Shapero & Sokol, 1982). An individual's propensity to act upon opportunities refers to an individual's disposition to act on one's decision (Shapero & Sokol, 1982) and, in general, depends on an individual's perception of control as well as a preference to acquire control by taking appropriate actions (Krueger, Reilly, & Carsrud, 2000). Shapero (1975) suggested that individuals with a high locus of control show an orientation to control events in their lives, while Krueger, Reilly, and Carsrud (2000) propose learned optimism (Seligman, 1990) as an operationalization of the propensity to act. Perceived feasibility refers to the degree to which individuals are confident that they are personally able to start their own business and consider the possibility to become an entrepreneur as being feasible (Shapero & Sokol, 1982).

Figure 2.2 Entrepreneurial event model



We identified 98 studies, conducted in more than 30 countries (primary data studies) during the past 25 years, which have examined the development of EI in terms of either one of the two theories or of an extension or combination of the two theories. Table 2.1 provides an overview of these studies (the literature search as well as the study selection and coding procedure are described in detail in the methodology section).

Table 2.1 Characteristics of studies included in the meta-analysis in study I

Authors	*k*	*N*	Year	Publication	Respondent	Theory	Variables	Country
Abebe (2012)	1	186	2009	JA	S	TPB	SN	U.S.
Ali et al. (2012)	1	490	2011	JA	S	EEM	PD, PF	Mixed
Almobaireek & Manolova (2012)	1	950	2010	JA	S	TPB/EEM	SN, PD, PF	Arab nations
Altinay et al. (2012)	1	205	2009	JA	S	TPB/EEM*	ATB, PA	U.K.
Ang & Hong (2000)	1	205	1997	JA	S	EEM*	PA	Mixed
Autio et al. (2001)	2	3,542	1998	JA	S	TPB	ATB, SN, PBC	Mixed
Basu (2010)	1	231	2005	JA	S	TPB	ATB, SN, PBC	U.S.
Borchers & Park (2010)	1	191	2006	JA	NS	EEM*	ESE, PA	U.S.
Brännback et al. (2007)	1	421	2003	CP	NS	EEM	PD, PF	Finland
Byabashaija & Katono (2011)	1	167	2007	JA	NS	EEM	ESE, PD, PF	Uganda
Carr & Sequeira (2007)	1	308	2004	JA	S	TPB	ATB, SN, ESE	U.S.
Chen et al. (1998)	1	315	1995	JA	S/NS	EEM*	ESE, PA	U.S.
Chowdhury et al. (2012)	1	101	2009	JA	S	TPB	ATB, SN, PBC	Various
Chuluunbaatar et al. (2011)	1	361	2008	JA	S	EEM	PD, PF	Mixed
Criaco (2012)	1	16,783	2004	WP	NS	EEM	PD, PF	Mixed
De Clercq et al. (2013)	1	946	2008	JA	S	EEM	PD, PF	Canada
De Pillis & Reardon (2007)	2	206	2004	JA	S	TPB/EEM*	ATB, PA	Various
De Pillis & DeWitt (2008)	1	244	2005	JA	S	TPB/EEM*	ATB, PA	U.S.
Devonish et al. (2010)	1	376	2007	JA	S	EEM	PD, PF	Barbados
Dohse & Walter (2010)	1	1,949	2007	WP	NS	TPB	ATB, SN, PBC	Germany
Drennan & Saleh (2008)	1	378	2005	WP	NS	TPB/EEM	SN, PD, PF	Bangladesh
Emin (2004)	1	744	2002	JA	S	TPB/EEM	SN, PD, PF	France
Engle et al. (2010)	14	1,748	2008	JA	S	TPB	ATB, SN, ESE	Various
Espiritu-Olmos & Sastre-Castillo (2012)	1	1,210	2009	JA	NS	EEM*	PA	Spain
Ferreira et al. (2012)	1	74	2009	JA	S	EEM*	PA	Portugal
Fini et al. (2009)	1	200	2007	CP	NS	TPB	ATB, SN, PBC	Italy
Fitzsimmons & Douglas (2011)	1	414	2004	JA	S	EEM	PD, PF	Mixed
Frank et al. (2007)	1	1,249	2004	JA	S	EEM*	PA	Austria
Garg et al. (2011)	1	127	2007	JA	S/NS	EEM*	PA	Botswana
Gird & Bagraim (2008)	1	227	2005	JA	S	TPB	ATB, SN, PBC, PA	South Africa
Godsey & Sebora (2010)	1	84	2005	JA	S	EEM	PD, PF	U.S.
Goethner et al. (2009)	1	402	2006	WP	NS	TPB	ATB, SN, PBC	Germany
Göksel & Belgin (2011)	1	175	2008	JA	S	EEM*	PA	Turkey
Griffiths et al. (2009)	1	1,473	2007	JA	S	EEM	PD, PF	Mixed
Grundstén (2004)	1	271	2001	DI	NS	TPB/EEM	SN, PD, PF	Finland
Gurel et al. (2010)	2	409	2007	JA	S	EEM*	PA	Various
Hack et al. (2008)	1	111	2007	JA	S	TPB	SN, PBC	Germany
Hmieleski & Corbett (2006)	1	430	2003	JA	S	EEM*	ESE, PA	U.S.
Hulsink & Rauch (2010)	1	121	2007	CP	NS	TPB	ATB, SN, PBC	Netherlands
Iakovleva et al. (2011)	1	2,225	2008	JA	S	TPB	ATB, SN, PBC	Mixed
Iakovleva & Kolvereid (2009)	1	317	2004	JA	S	EEM/TPB	ATB, SN, PBC, PD/PF	Russia
Izquierdo & Buelens (2011)	1	236	2005	JA	NS	TPB	ATB, ESE	France
Katono et al. (2010)	1	217	2007	CP	NS	TPB	ATB, SN, PBC	Uganda
Kautonen et al. (2010a)	1	1,143	2009	JA	S	TPB	ATB, SN, PBC	Finland
Kennedy et al. (2003)	1	1,034	2002	CP	S	TPB/EEM	SN, PD, PF	Australia
Kolvereid (1996b)	1	128	1993	JA	S	TPB	ATB, SN, PBC	Norway
Kolvereid & Isaksen (2006)	1	297	2002	JA	S	TPB	ATB, SN, ESE	Norway
Kristiansen & Indarti (2004)	2	251	2002	JA	S	TPB/EEM*	ATB, ESE, PA	Various
Krueger (1993)	1	126	2003	CP	S	EEM	PD, PF, PA	U.S.
Krueger & Kickul (2006)	1	528	1990	JA	S	EEM	PD, PF	Mixed
Krueger et al. (2000)	1	97	1997	JA	S	TPB/EEM	ATB, SN, PD, PF	U.S.
Leffel & Darling (2009)	2	86	2006	JA	S	TPB	ATB, SN, PBC	U.S.
Lepoutre et al. (2011)	1	2,160	2007	JA	NS	TPB/EEM	ATB, PD, PF	Belgium
Leroy et al. (2009)	1	423	2006	BC	NS	TPB	ATB, SN, PBC	Belgium
Liñán & Chen (2006)	2	533	2003	WP	NS	TPB	ATB, SN, PBC	Various
Lucas & Cooper (2012)	1	311	2009	CP	NS	TPB/EEM	ESE, PD, PF	U.K.
Lüthje & Franke (2003)	1	512	2000	JA	S	TPB/EEM*	ATB, SN, PA	U.S.
Mokhtar & Zainuddin (2011)	1	138	2010	CP	NS	TPB/EEM*	ATB, SN, PBC, PA	Malaysia
Moriano et al. (2012)	6	1,074	2007	JA	S	TPB	ATB, SN, ESE	Various
Mueller (2011)	1	464	2005	JA	S	TPB	ATB, SN, PBC	Mixed

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper, S = student, NS = non-student. ATB = attitude towards the behavior, EI = entrepreneurial intent, ESE = entrepreneurial self-efficacy, SN = subjective norms, PBC = perceived behavioral control, PD = perceived desirability, PF = perceived feasibility, PA = propensity to act. Studies with various countries provided individual country data, while studies with mixed data sets used a pooled data set including several countries. In the theory category all EEM marked with an * indicate those studies that used locus of control, which is assumed to be a measure of the propensity to act.

Table 2.1 **Characteristics of studies included in the meta-analysis study I (cont.)**

Authors	*k*	*N*	Year	Publication	Respondent	Theory	Variables	Country
Mushtaq et al. (2011)	1	225	2008	JA	S	TPB/EEM	SN, PD, PF	Pakistan
Nistorescu & Ogarcă (2011)	1	62	2008	JA	S	TPB	ATB, ESE	Rumania
Nwankwo et al. (2012)	1	350	2009	JA	S	TPB	ESE	Nigeria
Oruoch (2006)	1	528	2004	JA	S/NS	TPB/EEM	SN, PD, PF	Kenya
Plant & Ren (2010)	1	181	2007	JA	S	TPB	SN, PBC	Mixed
Pruett et al. (2009)	1	1,056	2006	JA	S	TPB	SN, ESE	Mixed
Rasheed & Rasheed (2003)	1	224	1999	JA	NS	EEM*	PA	U.S.
Rittipant et al. (2011)	1	1,500	2008	CP	NS	TPB/EEM	ATB, SN, PBC, PD, PF	Thailand
Sánchez et al. (2007)	1	907	2004	WP	NS	TPB/EEM*	ATB, ESE, PA	Spain
Santos & Liñán (2010)	1	816	2007	WP	NS	TPB	ATB, SN, PBC	Mixed
Scherer et al. (1991)	1	337	1988	JA	S	TPB/EEM*	ATB, ESE, PA	U.S.
Schwarz et al. (2009)	1	2,124	2005	JA	S	TPB	ATB, SN	Austria
Segal et al. (2005)	1	115	2001	JA	S	TPB/EEM	ESE, PD, PA	U.S.
Shiri et al. (2012)	1	100	2009	JA	S	TPB/EEM	SN, PD	Iran
Shook & Bratianu (2010)	1	302	2005	JA	S	TPB/EEM	SN, ESE, PD, PF	Romania
Solesvik (2013)	1	321	2010	JA	S	TPB	ATB, SN, PBC	Ukraine
Solesvik et al. (2012)	1	192	2007	JA	S	TPB/EEM	ATB, SN, ESE, PBC, PD, PF	Ukraine
Souitaris et al. (2007)	1	250	2002	JA	S	TPB	ATB, SN, PBC	Mixed
Thompson (2009)	1	131	2006	JA	S	EEM*	PA	Various
Thun & Kelloway (2006)	1	238	2003	JA	NS	TPB	SN, ESE	Canada
Tkachev & Kolvereid (1999)	1	512	1997	JA	S	TPB	ATB, SN, PBC	Russia
Urbig et al. (2013)	1	111	2008	JA	NS	EEM	ESE	Netherlands
Van Gelderen et al. (2008)	1	1,235	2005	JA	S	TPB	ATB, SN, PBC	Netherlands
Van Praag (2011)	1	818	2007	BC	NS	EEM*	PA	Netherlands
Varamäki et al. (2011)	1	1,204	2010	CP	NS	TPB	ATB, SN, PBC	Finland
Vazquez et al. (2009)	1	1,156	2008	CP	S	EEM	ESE, PD, PF	Spain
Wagner (2011)	2	313	2008	JA	S	TPB	ATB	Various
Wagner (2012)	1	129	2009	JA	S	TPB	ATB	Germany
Wang et al. (2002)	1	7,844	2000	BC	NS	TPB/EEM	ATB, ESE, PD, PF	Singapore
Wang et al. (2011)	1	399	2009	JA	S	EEM	PD, PF	Mixed
Wilson et al. (2007)	1	933	2003	JA	S/NS	TPB	ESE	U.S.
Wurthmann (2013)	1	314	2010	JA	S	EEM	PD, PF	U.S.
Yan (2010)	1	207	2007	JA	S	EEM*	PA	U.S.
Yang et al. (2011)	1	270	2008	CP	NS	TPB	ATB, SN, ESE	Taiwan
Zali et al. (2011)	1	32,050	2008	WP	NS	TPB	ESE	Mixed
Zapkau et al. (2011)	1	372	2010	CP	NS	TPB	ATB, SN, PBC	Germany
Zellweger et al. (2011)	1	5,363	2006	JA	S	EEM*	ESE, PA	Mixed
Zhang et al. (2014)	1	494	2010	JA	S	EEM	PD, PF	China

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper, S = student, NS = non-student. ATB = attitude towards the behavior, EI = entrepreneurial intent, ESE = entrepreneurial self-efficacy, SN = subjective norms, PBC = perceived behavioral control, PD = perceived desirability, PF = perceived feasibility, PA = propensity to act. Studies with various countries provided individual country data, while studies with mixed data sets used a pooled data set including several countries. In the theory category all EEM marked with an * indicate those studies that used locus of control, which is assumed to be a measure of the propensity to act.

The majority of the studies is published in journals (72 percent) and based on student samples (65 percent). The first step in comparing the empirical evidence of different theories is the comparison of the extent to which these theories have been studied (Becker, 2009). With 30 studies using all three determinants and twelve studies using two of the three determinants, the TPB is the dominating model in the empirical literature on EI. To the best of our knowledge, only one study examined all three determinants of the EEM, while 12 studies focused on the two main determinants (perceived desirability and perceived feasibility) of the EEM. In total, 17 studies examined models that combined at least one of the main determinants of the EEM and at least one of the determinants of the TPB. Among these, ten studies focused on subjective norms and the main EEM determinants, six studies investigated entrepreneurial self-efficacy (hereafter ESE) together with the main EEM determinants, and three studies examined ATB and the main EEM determinants. Seven studies used the TPB and EEM variables as parallel predictors of EI and ten studies examined structural models. All of the structural models followed the conceptual model proposed by Krueger (2000) and Krueger, Reilly, and Carsrud (2000) and tested in particular the effect of subjective norms on perceived desirability and the effect of ESE on perceived feasibility. While four of the ten studies examined the significance of the mediation role of the EEM determinants based on the comparison of direct and indirect paths, only one of these studies used statistical procedures to more formally test the mediation. To our knowledge, there is currently no empirical study that examines all six determinants that have been proposed in the EEM and the TPB together. The primary advantage of theory-driven meta-analysis is the possibility to assess structural models that have not been studied in primary studies before (Landis, 2013). In the following, we propose an integrated model of EI and use meta-analytic structural equation modeling to test this model.

2.1.2 An integrated model of entrepreneurial intent

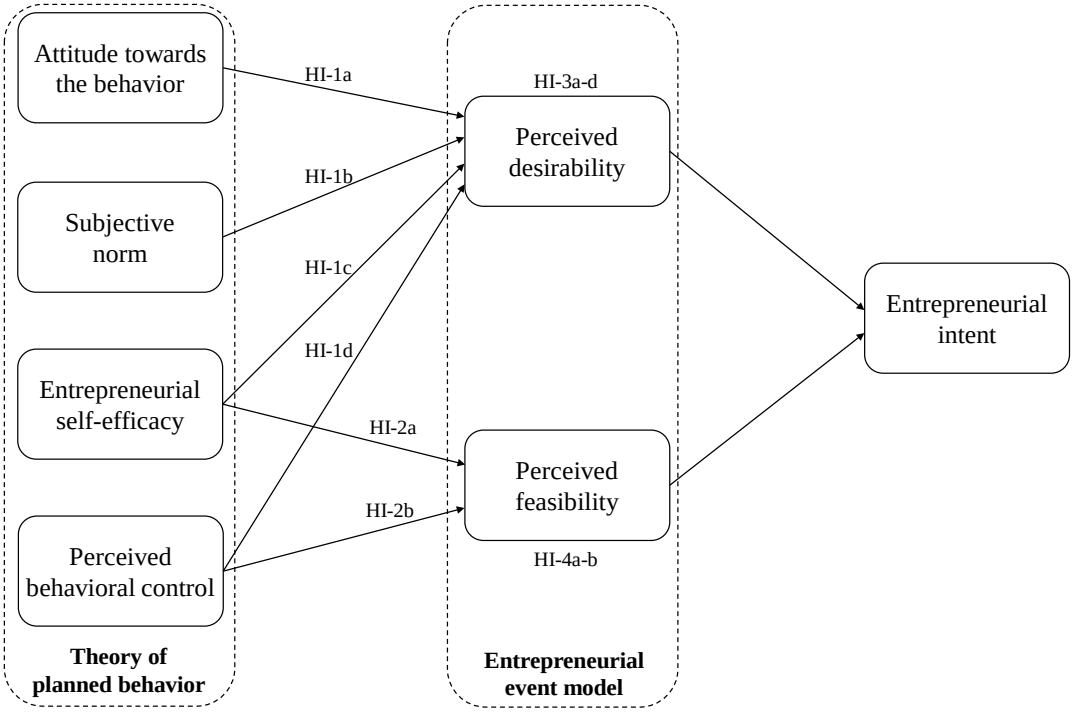
Prior research has argued that the TPB and the EEM overlap as in both models EI is explained by an individual's willingness and capability (Guerrero, Rialp, & Urbano, 2008; Krueger & Brazeal, 1994; Van Gelderen et al., 2008). In contrast, other researchers have emphasized that the TPB and EEM determinants are distinct constructs and proposed and empirically tested conceptual models that can be understood as partially integrated models (Krueger, Reilly, & Carsrud, 2000; Krueger & Kickul, 2006) and fully integrated models (Iakovleva & Kolvereid, 2009; Shook & Bratianu, 2010; Solesvik et al., 2012) of the EEM and the TPB. We build on this literature and the extended model of goal-directed behavior (Perugini & Conner, 2000) to develop and meta-analytically test an integrated model of EI.

In the TPB, it is assumed that ATB, subjective norms, and PBC determine the intention to perform a behavior and that each of these determinants provides the motivational foundation for forming an intention. Bagozzi (1992) argued that the TPB does not describe the motivational process and how these predictors act in the formation of intention, since the TPB does not incorporate an explicit motivational component. Furthermore, Bagozzi (1992) proposed that an individual's desire to perform a behavior might function as a factor that mediates the relationship between attitudes and intention. Prior EI research in particular used this argument to integrate the TPB and the EEM (Iakovleva & Kolvereid, 2009).

In the context of EI, one potentially useful theory that extends the arguments by Bagozzi (1992) is the model of goal-directed behavior (MGB, Perugini & Bagozzi, 2001), which proposes that the intention to perform a specific behavior is mainly motivated by the desire to perform this behavior and to achieve a specific goal. In turn, the desire mediates the influence of ATB, subjective norms, PBC, and anticipated emotions on intentions. In other words, the MGB describes a mechanism through which the three TPB antecedents influence intention. The current study will focus on the role of desire as a mediating variable for the effect of the original

TPB determinants of EI. Desires are goal-related and can be defined as a mental state in which individuals' reasons to perform a behavior are transformed into their motivation to perform the behavior (Perugini & Bagozzi, 2004). In this way, desires provide the motivational basis for an intended goal-directed behavior (Perugini & Bagozzi, 2001) and are comparable to the perceived desirability construct in the EEM. Perugini and Conner (2000) extended the MGB (EMGB) by including goal desire as an antecedent of desire and goal perceived feasibility as an antecedent of PBC. A goal desire is positively related to the desire for a behavior as an individual desires a behavior because this behavior may ultimately result in the achievement of a goal that the individual desires (Perugini & Conner, 2000). To our knowledge, no empirical study directly examined the relationship between goal desires and EI. However, several studies (e.g., Engle et al., 2010) operationalized ATB in terms of variables, such as autonomy and wealth, which can be viewed as goal desires in the entrepreneurship context. Consequently, while we cannot include goal desires directly in an integrated model of EI, they are reflected to some extent in the ATB. Goal perceived feasibility refers to the perceived feasibility of achieving the goal (Perugini & Conner, 2000). In sum, the EMGB includes the TPB determinants, a construct that is conceptually close to perceived desirability in the EEM, and offers with goal perceived feasibility the potential to broaden the EMGB's scope by including perceived feasibility, the second main determinant in the EEM. Therefore, the EMGB provides a suitable conceptual framework to integrate the TPB and the EEM. Figure 2.3 presents the relationships in our integrated model of EI. In the following, we provide the theoretical arguments for this conceptual model.

Figure 2.3 An integrated model of entrepreneurial intent



Attitude, subjective norms, perceived behavioral control, and perceived desirability

The potential influence of ATB as well as subjective norms on the perceived desirability to found an own business have been explicitly or implicitly discussed in the literature since the pioneering work of Shapero & Sokol (1982) and the more formal conceptualization by Krueger (2000). As described above, in the entrepreneurship context, ATB reflects individuals' beliefs that starting an own business leads to certain outcomes and their evaluation of those outcomes. Perceived desirability is the degree to which individuals find the prospect of starting a business attractive and would be represented by the desire to perform a behavior to achieve a goal within the EMGB. Applying the arguments of the EMGB, an increase in an individual's ATB should have a positive influence on the individual's desire to perform those behaviors that are related to founding an own firm and achieve the goal to become an entrepreneur. Perceived desirability functions as the motivational factor that transforms a favorable attitude into EI. Positive attitudes toward entrepreneurship will positively affect the personal attractiveness of starting

an own business as more favorable attitudes justify more favorable perceptions of desirability of the behaviors related to the goal of becoming an entrepreneur. Therefore:

Hypothesis I-1a: Attitude towards the behavior is positively related to perceived desirability.
Hypothesis I-3a: The relationship between attitude towards the behavior and entrepreneurial intent is mediated by perceived desirability.

Along the same line of arguments, we propose that subjective norms affect perceived desirability. Subjective norms include the perceived expectations of relevant people or groups that influence the individual in carrying out the target behavior (i.e., social pressure, family wishes, and friends' wishes). The influence of relevant others operates by its influence on perceptions of desirability (Krueger, 2000). An individual's perception of relevant people's positive expectations about the start of an own venture by this individual will encourage this individual to form favorable perceptions of desirability with regard to the behaviors that are necessary to achieve the goal to become an entrepreneur. Negative expectations and, therefore, negative social pressure will create unfavorable perceptions of desirability of these behaviors. While subjective norms do not in, and of themselves, contain the motivation to act, more positive subjective norms increase the perceived desirability of the specific related behaviors. Thus:

Hypothesis I-1b: Subjective norms are positively related to perceived desirability.
Hypothesis I-3b: The relationship between subjective norms and entrepreneurial intent is mediated by perceived desirability.

One of the most discussed topics in the TPB literature is whether PBC and ESE are distinct constructs. While the earlier literature has argued that the two constructs are very similar (Ajzen, 1991), more recent research has emphasized that PBC and self-efficacy are related but distinct constructs (Ajzen, 2002; Conner & Armitage, 1998). Furthermore, Ajzen (2002) proposed that self-efficacy (internal control) and controllability (external control)

together form the higher order factor PBC. The ambiguity related to PBC and ESE resulted in the interchangeable use of the constructs in the EI literature. As presented above in Table 2.1, empirical studies that examined EI used both ESE and PBC. Therefore, we will examine the distinct effects of the two constructs on EI in the current study. Self-efficacy is the extent to which individuals believe in the ability to execute a behavior and what they believe is possible with the skills they possess (Bandura, 1997). ESE refers to individuals' beliefs in their ability to successfully start a company (McGee et al., 2009). PBC can be defined as the perceived control over the performance of a particular behavior (Ajzen, 2002). In the context of entrepreneurship, PBC reflects individuals' beliefs about their control of the potential outcomes of becoming an entrepreneur and the capability to overcome potential external constraints in this process. Within the conceptual framework of the EMGB, both ESE and PBC should have a positive effect on the desire to perform those behaviors that are useful to achieve the goal of starting an own venture. Individuals who have more confidence in their skills and abilities to start an own business and who perceive that the outcomes of their behavior are under their control should have more desire to perform the behaviors that are related to entrepreneurship than those individuals that lack the skills, abilities, and control. Thus:

Hypothesis I-1c: Entrepreneurial self-efficacy is positively related to perceived desirability.

Hypothesis I-3c: The relationship between entrepreneurial self-efficacy and entrepreneurial intent is mediated by perceived desirability.

Hypothesis I-1d: Perceived behavioral control is positively related to perceived desirability.

Hypothesis I-3d: The relationship between perceived behavioral control and entrepreneurial intent is mediated by perceived desirability.

Perceived behavioral control, entrepreneurial self-efficacy, and perceived feasibility

While some researchers have argued that PBC, ESE, and perceived feasibility are similar constructs (e.g., Guerrero, Rialp, & Urbano, 2008), other researchers have pointed out that they are distinct constructs and that in particular ESE has a positive influence on perceived feasibility (Elfving, Brännback, & Carsrud, 2009; Krueger, 2000; Krueger & Day, 2010; Shapero & Sokol, 1982). The lack of consistency in the operationalization of PBC and ESE also resulted in the use of the two constructs as measures of perceived feasibility. In the EI context, perceived feasibility has been defined as individuals' perception of feasible future states that are related to the creation of a new venture (Shapero & Sokol, 1982). Compared to PBC and ESE, perceived feasibility refers less to the degree to which individuals consider the internal and external factors to start their own business and more to the feasibility of the behaviors that are necessary to achieve the goal of becoming an entrepreneur. When understood in this way and applied in the conceptual framework of the EMGB, perceived feasibility forms a second motivational component alongside with perceived desirability that transforms perceptions of internal and external control into EI. It is important to note that perceived feasibility is distinct from goal perceived feasibility in the EMGB as the latter refers to the feasibility of the goal whereas perceived feasibility refers to the feasibility of the behaviors to achieve this goal. We extend the EMGB by a motivational component that affects behavioral intentions as a parallel predictor of desires (perceived desirability in our model). In the same way as goal desires affect desires in the EMGB, ESE and PBC affect perceived feasibility in our integrated model of EI. Individuals with higher ESE and higher PBC should have a higher perceived feasibility of the behaviors that are related to entrepreneurship. Higher perceptions of internal and external control broaden individuals' range of what they perceive as feasible and, as a result, increase the set of feasible alternatives (Krueger, 2000). Therefore:

Hypothesis I-2a: Entrepreneurial self-efficacy is positively related to perceived feasibility.

Hypothesis I-4a: The relationship between entrepreneurial self-efficacy and entrepreneurial intent is mediated by perceived feasibility.

Hypothesis I-2b: Perceived behavioral control is positively related to perceived feasibility.

Hypothesis I-4b: The relationship between perceived behavioral control and entrepreneurial intent is mediated by perceived feasibility.

2.2 Methodology

2.2.1 Literature search

Given the fragmented and interdisciplinary nature of EI research, meta-analysis has been suggested as a research tool for integrating research results as well as for testing, integrating, and developing theory in entrepreneurship research (Frese et al., 2012; Rauch & Frese, 2006).

To identify a sample of published and unpublished studies that empirically examined the relationships between EI and its antecedents, we used six complementary steps in our literature search. First, we consulted review articles (Krueger, 2009; Kuehn, 2008; Shook, Priem, & McGee, 2003) and previous meta-analyses (Haus et al., 2013; Martin, McNally, & Kay, 2013; Zhao, Seibert, & Lumpkin, 2010). Second, we examined several electronic databases (ABI/INFORM Global, EBSCO, Science Direct, ProQuest, and Business Source Premier) looking for entries published between 1985 and 2012. We used variations and combinations of keywords to identify EI as well as its determinants according to the TPB and according to the EEM. Third, we manually searched relevant journals issue-by-issue. In addition, a manual search of in-press articles in these journals was conducted. We also searched relevant conference programs and proceedings. Fourth, we conducted an unstructured search (Cooper, 1998) using Google, Google Scholar, and Microsoft Academic Search in an effort to identify unpublished studies. Fifth, requests were posted on electronic list servers to elicit in particular unpublished research to reduce publication bias (Rosenthal, 1995). Finally, we searched all

studies citing the articles revealed in the previous steps (Cooper, 1998) using Google Scholar and Scopus and explored the reference lists of all articles for additional studies of relevance. This process was re-applied to the newly found studies until no more relevant literature could be identified. The literature search included English-, German-, French-, and Spanish-literature in an effort to reduce a potential language bias (Rothstein, Sutton, & Borenstein, 2005).

2.2.2 Inclusion criteria and coding procedure

For inclusion in the meta-analysis articles needed to be empirical and report correlation coefficients or provide information so that correlation coefficients could be calculated (Geyskens et al., 2009; Lipsey & Wilson, 2001; Peterson & Brown, 2005). To maintain the assumption of independence among correlations (Hunter & Schmidt, 2004), we only included the articles that reported more information when several studies were based on the same data set. Moreover, we only included the results of the first point in time of longitudinal studies to ensure comparability with cross-sectional studies. Whenever studies reported results of different countries, we treated respective correlations as coming from different samples. The literature search and the use of the selection criteria resulted in a sample of 98 studies (123 independent samples, N = 114,007). A summary of all studies included in the meta-analyses is presented above in Table 2.1.

The studies were coded independently by the two authors and any discrepancies were discussed among the coders (Lipsey & Wilson, 2001). The inter-rater reliability analysis revealed an initial average agreement rate of 90 percent and a mean Cohen's kappa (Cohen, 1960) of .81, indicating a strong initial inter-rater reliability (Orwin & Vevea, 2009). Each study was coded for effect sizes, sample characteristics, contextual and methodological moderators, as well as the respective measurement construct reliability. At the measurement level, researchers have used different measures to operationalize EI and its determinants (Shook, Priem, & McGee, 2003; Thompson, 2009). Therefore, in coding the data, we used the definition

and measurement of variables rather than the names of the variables in the original studies and coded each variable accordingly.

In addition to the key constructs, we coded potential moderators of the various relationships. The proposed relationships for the TPB, the EEM, and the integrated model may be influenced by contextual and methodological moderators. According to the TPB (Ajzen, 1991) and the EEM (Shapero & Sokol, 1982), external factors, such as environmental characteristics, influence intentions only indirectly through their effect on the determinants of intentions and are not assumed to moderate the relationship between EI and its antecedents. Meta-analytic evidence (Cooke & Sheeran, 2004) suggests that moderation effects of external factors, such as certainty, add predictive validity beyond the direct and mediated effect for the TPB. The studies included in the current meta-analysis have been conducted in different time periods and in different countries with different social, institutional, and cultural contexts. The countries and time periods sampled in these studies differ in terms of various attributes and aspects of the respective environment, such as the availability of resources, support, and opportunities. In the development of EI, individuals perceive their environment as more or less munificent and, as a result, are more or less certain about the beliefs and attitudes that influence their intentions to found an own venture (Kibler, 2013). Prior research (Brännback et al., 2006; Elfving, Brännback, & Carsrud, 2009; Krueger & Day, 2010) argues that, while the general EI model is a robust one, the variations in the research results might be a result of differences in the national context. There is little theoretical clarity how moderators influence the effects of different determinants on EI, and moderators have not been examined systematically across studies (Liñán, Rodríguez-Cohard, & Rueda-Cantuche, 2011; Moriano et al., 2012; Terjesen, Hessels, & Li, 2013). The results of previous empirical studies suggest that cross-country differences in national culture and institutional settings may moderate the relationships between EI and its determinants (Engle et al., 2010; Iakovleva, Kolvereid, & Stephan, 2011; Moriano et

al., 2012). To address the moderating influence of differences in the national context on the relationship between EI and its determinants, we used a binary variable identifying studies which were conducted in Western countries (1) compared to non-Western countries (0). In an effort to explore potential time-dependence of the relationships between EI and its determinants, we coded the year of study. Following best-practice in the meta-analysis literature (Ellis, 2006), data collection was assumed to have taken place three years prior to the publication of each study unless otherwise stated. Previous research (Notani, 1998) has shown that in particular three methodological moderators may affect the relationships between variables: (1) construct operationalization, (2) respondent type, and (3) publication status. To better determine the impact of different construct operationalizations, we included whether EI or its determinants have been measured using different measures. There is an ongoing debate about the use of student samples in empirical studies (McGee et al., 2009; Shook, Priem, & McGee, 2003). The homogeneity and specific characteristics of student samples (i.e., age, education, and income) may affect the effect sizes. Consequently, we included respondent type (whether a study participant was a student or non-student) as a moderator variable. Finally, it has often been pointed out that published sources often report results that are statistically significant, resulting in a publication bias whereby reported studies differ from other studies (Rosenthal, 1979; Rothstein, Sutton, & Borenstein, 2005). Recent methodological studies disagree whether or not publication bias influences meta-analytic results (Dalton et al., 2012; Kepes et al., 2012). Therefore, we included publication status (whether a study has been published in a journal or not) as potential moderator.

2.2.3 Analytic procedures

Bivariate meta-analysis

We used Hunter and Schmidt's (2004) meta-analytic procedure which allows for correction of sampling error and measurement error. We followed the recommendations for meta-analytic procedures by Geyskens et al. (2009). We corrected for measurement error in the dependent and independent variables in each relationship. When available, the internal reliability estimates were used, otherwise, we calculated the average estimate for each variable across all studies reporting reliability information (Lipsey & Wilson, 2001). The heterogeneity of effect sizes was assessed using a combination of procedures. In particular, we used the *Q* statistic and the I^2 statistic as the I^2 is more appropriate for meta-analyses with fewer studies (Huedo-Medina et al., 2006).

Moderator analysis

Weighted least squares (WLS) regression analysis is used to test the influence of the proposed moderators (Steel & Kammeyer-Mueller, 2002). We use the inverse variance weights as analytic weights to correct for differences between samples sizes included in our meta-analysis (Hedges & Olkin, 1985). Given the heterogeneity of effect sizes in prior meta-analytic studies in the field of entrepreneurship (e.g., Rauch et al., 2009) and the recommendations in the literature (Geyskens et al., 2009), we use a mixed-effects model (Lipsey & Wilson, 2001). In the case of an insufficient number of studies to conduct the moderator analysis ($k < 10$), the respective effect size relationship was excluded from the moderator analysis (Card, 2012). If a relationship showed no or insufficient variation on a particular moderator ($k < 5$ for one category), that moderator was excluded from the respective regression analysis (Card, 2012).

Meta-analytic structural equation modeling

Meta-analytic structural equation modeling allows to investigate relationships between different constructs, although no individual study has included all constructs and, therefore,

presents the most appropriate statistical approach for testing competing theories (Becker, 2009; Viswesvaran & Ones, 1995) as well as for integrating competing theories (Leavitt, Mitchell, & Peterson, 2010). Following Viswesvaran and Ones's (1995) procedure and the recommendations by Landis (2013), we constructed meta-analytic correlation matrices and analyzed path models using the structural equation modeling. We used AMOS 21 (Arbuckle, 2012) and maximum likelihood estimation to test the path models. We used the respective harmonic mean sample size as the sample size for the analysis (Viswesvaran & Ones, 1995). Due to the restrictiveness of the chi-square (χ^2) approach, we used multiple additional indicators to assess model fit, namely, the confirmatory fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). To test the mediation in the integrated model, we use a structural equation modeling approach by comparing a series of nested models (James, Mulaik, & Brett, 2006) and the Sobel test (Sobel, 1982).

2.3 Analysis and results

2.3.1 Bivariate relationships, moderator analysis, and path analysis

Theory of planned behavior.

Summary findings of the meta-analyses for the TPB are reported in Table 2.2. The relationships between EI and ATB (r_c = .43, p < .05), subjective norms (r_c = .36, p < .05), ESE (r_c = .28, p < .05), and PBC (r_c = .56, p < .05) are all positive and statistically significant. The results are comparable with extant meta-analytic research in terms of the strength of the effect sizes (Armitage & Conner, 2001; ATB: r_c = .49; subjective norms: r_c = .34; PBC: r_c = .43). The results of the Q test as well as the I^2 test indicate that moderation is likely for the different relationships. The left side of Table 2.3 shows the meta-analytic regression results for the TPB.

Table 2.2 Overview of relationships for the theory of planned behavior

Relationship	Number of effects *k*	Total sample size *N*	Corrected mean r_c	Standard error *SE*	90% Confidence interval		*Q* test	I^2	Availability bias
ATB - EI	70	38,228	.43*	.03	.36	.49	2,303.98*	97	23,248
SN - EI	69	33,519	.36*	.03	.31	.41	1,290.73*	95	15,715
ESE - EI	33	15,961	.28*	.02	.23	.32	228.24*	86	1,002
PBC - EI	32	18,859	.56*	.02	.51	.61	504.24*	94	3,755

Note: The corrected mean correlation coefficients r_c are the sample size weighted, reliability corrected estimates of the correlation coefficients across studies. Mean effect sizes and *Q* values marked with * are statistically significant at $p < .05$. ATB = attitude towards the behavior, EI = entrepreneurial intent, ESE = entrepreneurial self-efficacy, SN = subjective norms, PBC = perceived behavioral control.

Table 2.3 Results of mixed effects wls regression (TPB and EEM)

Moderator	Theory of planned behavior					Entrepreneurial event model		
	ATB-EI	SN-EI	PBC-EI	ESE-EI	PBC/ESE-EI	PD-EI	PF-EI	PA-EI
Construct operationalization	.23*	.12	n/a	n/a	.43***	-.05	n/a	n/a
Year of study	-.02	.24†	.02	-.07	.00	.32†	.09	.00
Publication type (journal = 1)	-.42***	-.15	-.19	.04	-.13	-.14	.09	.26
National context (Western = 1)	-.11	.26*	.02	-.07	-.02	.39*	.35†	-.21
Respondent type (student = 1)	.08	-.03	.32†	.20	.25*	-.57***	.21	n/a
R^2	.27	.13	.14	.05	.26	.41	.16	.13
Q_{Model}	24.14***	9.35 †	4.80	1.53	20.37**	16.96***	5.47	3.94
$Q_{Residual}$	65.64	64.50	29.19	28.54	57.84	24.59	28.19	26.22
v	.06	.04	.02	.01	.02	.01	.02	.01
k	68	65	30	31	61	25	29	25

Note: Standardized regression coefficients are presented. ATB = attitude towards the behavior, EI = entrepreneurial intent, ESE = entrepreneurial self-efficacy, SN = subjective norms, PBC = perceived behavioral control, PD = perceived desirability, PF = perceived feasibility, PA = propensity to act, n/a = not applicable. *k* is the total number of effect sizes; *Q* is the homogeneity statistic; *v* is the random effects variance component.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

The regression model for the relationship between ATB and EI fits the data well (R^2 = .27). The homogeneity statistic is significant for the modeled variance in effect sizes (Q_{Model} = 24.14; $p < .001$), indicating that the moderators capture the heterogeneity in the effect sizes (Lipsey & Wilson, 2001). No significant effect was found for the year of data collection, the national context, and respondent type, implying that the results are stable across sample variations. The construct operationalization variable was significant and positive which means that studies that directly measured ATB showed higher relationships with EI as compared to studies that used indirect measures, such as achievement motivation and need for autonomy.

The publication type variable was strongly significant and negative, indicating that the effect size was smaller in studies published in journals compared to studies that were not published. This finding also suggests that our results are unlikely to be influenced by publication bias. The model for the relationship between subjective norms and EI fits the data to an acceptable degree (R^2 = .13; Q_{Model} = 9.35; p < .10). No significant effect was found for construct operationalization, publication type, and respondent type. The year of study variable showed a tendency towards significance, indicating that this relationship was stronger in more recent studies than in earlier studies. The national context variable was significant and positive which means that the relationship between subjective norms and EI was stronger in Western countries compared to non-Western countries. We examined three different regression models to disentangle the influence of PBC and ESE on EI. In the first model, we only included those studies that used PBC, in the second model, we only included those studies that used ESE, and in the third model, we used the pooled sample. While the models for the separate constructs show a poor model fit, the model for the pooled sample fits the data reasonably well (R^2 = .26; Q_{Model} = 20.37; p < .01). The construct operationalization variable was strongly significant and positive, indicating that studies that used PBC to predict EI showed higher effect sizes than studies that employed ESE. This result confirms prior research that conceptually and empirically distinguished the two variables (Ajzen, 2002; Conner & Armitage, 1998). While self-efficacy and PBC are related concepts, their effect on EI differs significantly. Furthermore, the respondent type variable was significant and positive, which means that studies that used a student sample showed a stronger relationship than those studies that used non-student samples.

Following the recommendations in the literature (Michel, Viswesvaran, & Thomas, 2011), the sample size adjusted mean effect sizes were used as input for the correlation matrix, which provided the basis for the path analysis. Sample descriptives and derived meta-analytic correlations are presented in Table 2.4.

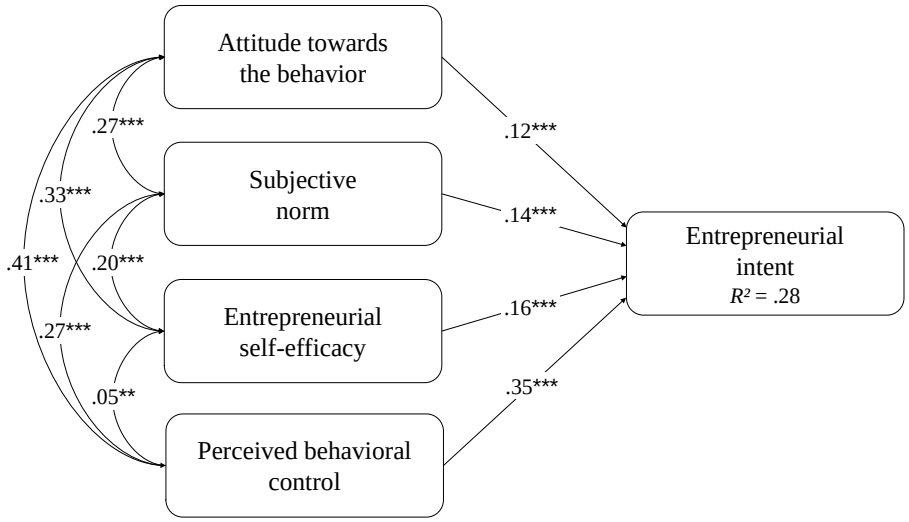
Table 2.4 Meta-analytic correlation matrix (theory of planned behavior)

Variable	1	2	3	4	5	6	7
1 Entrepreneurial intent	(.82)	46 / 70 38,228	48 / 69 33,519	30 / 32 18,859	14 / 33 15,961	11 / 12 12,512	19 / 21 21,967
2 Attitude towards the behavior	.35	(.80)	30 / 51 23,752	24 / 27 17,773	9 / 28 5,540	10 / 11 12,048	16 / 18 19,620
3 Subjective norms	.29	.27	(.79)	26 / 29 18,076	6 / 24 5,041	9 / 14 11,461	13 / 9 11,103
4 Perceived behavioral control	.44	.41	.27	(.77)	1 / 1 192	8 / 8 9,337	11 / 12 8,029
5 Entrepreneurial self-efficacy	.23	.32	.21	.05	(.84)	1 / 1 87	2 / 2 1,840
6 Age	.05	.01	-.05	.01	.06		9 / 10 8,603
7 Gender (female = 1)	-.06	-.04	.01	-.04	.05	-.02	

Note: Sample-weighted correlations are presented below the diagonal. The number of studies, number of effects, and the total sample sizes are given above the diagonal. Average construct reliabilities are depicted on the diagonal.

ATB, subjective norms, and PBC have a significant and positive effect on EI and explain 28 percent of the variance in EI (χ^2 = 1.01; *df* = 4; *p* < .91; CFI = 1.00; RMSEA = .00; SRMR = .00). The results of the path analysis are summarized in Figure 2.4. Overall, our results are in line with prior meta-analytic research on a variety of different behaviors showing that the determinants proposed by the TPB have significant effects in explaining intention towards performing a particular behavior (Armitage & Conner, 2001; Notani, 1998).

Figure 2.4 Path model results: Theory of planned behavior



Note: $\chi^2 = 1.01$; $df = 4$; $p < .91$; CFI = 1.00; RMSEA = .00; SRMR = .00. Harmonic mean sample size $N_{HM} = 2{,}167$. Standardized coefficients are provided for each path in the model. Age and gender (coded '1', female, and '0', male) had paths to independent and dependent variables. The significant standardized coefficients for the control variable are as follows: Age–ESE, .04†; age–subjective norm, -.05*; age–entrepreneurial intent, .08***; gender–ATB, -.04†; gender–ESE, .05*; gender–PBC, -.04*; gender–entrepreneurial intent, -.05**.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Entrepreneurial event model

Summary findings of the meta-analyses for the EEM are reported in Table 2.5.

Table 2.5 Overview of relationships for the entrepreneurial event model

Relationship	Number of effects *k*	Total sample size *N*	Corrected mean r_c	Standard error *SE*	90% Confidence interval		*Q* test	I^2	Availability bias
PD - EI	32	47,633	.51*	.04	.43	.58	1,647.10*	98	3,057
PF - EI	38	47,633	.41*	.03	.36	.47	1,245.06*	97	3,427
PA - EI	28	13,587	.18*	.03	.13	.23	192.81*	86	235

Note: The corrected mean correlation coefficients r_c are the sample size weighted, reliability corrected estimates of the correlation coefficients across studies. Mean effect sizes and *Q* values marked with * are statistically significant at $p < .05$. EI = entrepreneurial intent, PD = perceived desirability, PF = perceived feasibility, PA = propensity to act.

The relationships between EI and perceived desirability ($r_c = .51$, $p < .05$), the propensity to act ($r_c = .18$, $p < .05$), and perceived feasibility ($r_c = .41$, $p < .05$) are positive and statistically significant. The results of the *Q* test as well as the I^2 test indicate that moderation is likely for the three relationships. The right side of Table 2.3 shows the meta-analytic regression results for the EEM. The regression model for the relationship between perceived desirability and EI

fits the data well (R^2 = .41; Q_{Model} = 16.96; p < .001). No significant effect was found for construct operationalization and publication type. The year of study variable showed a tendency towards significance, indicating that the relationship was stronger in more recent studies as compared to earlier studies. The national context variable was significant and positive, indicating that the relationship between perceived desirability and EI is stronger in Western countries compared to non-Western countries. The respondent type variable was highly significant and negative, which means that the relationship was less strong for studies that used students samples compared to studies that used non-student samples. The regression models for the perceived feasibility-EI relationship (R^2 = .16; Q_{Model} = 5.47; p > .10) as well as the propensity to act-EI relationship (R^2 = .13; Q_{Model} = 3.94; p > .10) showed a poor fit, indicating that the moderators cannot explain the heterogeneity of effect sizes.

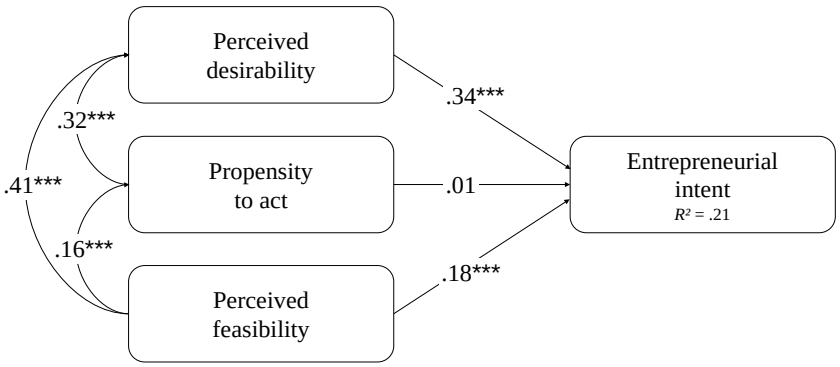
The sample size adjusted mean effect sizes were used as input for the correlation matrix, which provided the basis for the path analysis. Sample descriptives and derived meta-analytic correlations are presented in Table 2.6. While the propensity to act had no effect on EI, perceived desirability and perceived feasibility had a significant and positive effect and explained 21 percent of the variance in EI (χ^2 = .58; df = 2; p < .74; CFI = 1.00; RMSEA = .00; SRMR = .01). The results of the path analysis are summarized in Figure 2.5. Overall, our results show that perceived desirability and perceived feasibility are the significant determinants of EI within the EEM.

Table 2.6 Meta-analytic correlation matrix (entrepreneurial event model)

Variables	1	2	3	4	5	6
1 Entrepreneurial intent	(.85)	31 / 31 24,500	36 / 37 30,850	25 / 28 13,587	7 / 7 2,927	12 / 12 19,482
2 Perceived desirability	.42	(.77)	23 / 23 13,727	2 / 2 241	6 / 6 2,840	9 / 9 13,125
3 Perceived feasibility	.33	.43	(.74)	6 / 7 6,174	7 / 7 2,927	11 / 11 18,575
4 Propensity to act	.14	.33	.16	(.73)	1 / 1 207	2 / 2 6,270
5 Age	.08	.08	.09	-.02		6 / 6 2,616
6 Gender (female = 1)	-.10	-.11	-.13	-.05	-.01	

Note: Sample-weighted correlations are presented below the diagonal. The number of studies, number of effects, and the total sample sizes are given above the diagonal. Average construct reliabilities are depicted on the diagonal.

Figure 2.5 Path model results: Entrepreneurial event model



Note: χ^2 = .58; *df* = 2; p < .74; CFI = 1.00; RMSEA = .00; SRMR = .01. Harmonic mean sample size N_{HM} = 1,349. Standardized coefficients are provided for each path in the model. Age and gender (coded '1', female, and '0', male) had paths to independent and dependent variables. The significant standardized coefficients for the control variable are as follows: Age – perceived desirability, .11*; gender – perceived desirability, -.10*; age – entrepreneurial intent, .05†; gender – entrepreneurial intent, -.04†; gender – propensity to act, -.04†.
† p < .10; * p < .05; ** p < .01; *** p < .001.

The integrated model of entrepreneurial intent

To test Hypotheses I-1 and I-2, we conducted bivariate meta-analyses. The results for the main relationships of the proposed integrated model are reported in Table 2.7.

Table 2.7 Main relationships for the integrated model

Relationship	Number of effects *k*	Total sample size *N*	Corrected mean r_c	Standard error *SE*	90% Confidence interval		*Q* test	I^2	Availability bias
ATB - EI	70	38,228	.43*	.03	.36	.49	2,301.79*	97	23,185
ATB - PD	5	11,793	.26*	.11	.04	.48	514.63*	99	1
SN - EI	69	33,519	.36*	.03	.31	.41	1,289.72*	95	15,714
SN - PD	11	5,071	.29*	.06	.17	.41	130.93*	92	31
ESE - EI	45	56,453	.28*	.01	.25	.30	416.93*	89	2,516
ESE - PD	5	9,728	.37*	.10	.17	.58	965.20*	100	1
ESE - PF	5	10,141	.31*	.05	.21	.41	155,20*	97	1
PBC - EI	32	18,859	.56*	.02	.51	.61	504.24*	94	3,755
PBC - PD	2	1,800	.59*	.07	.46	.72	43.95*	98	1
PBC - PF	3	1,992	.82*	.09	.62	.99	117.00*	98	4
PD - EI	32	41,283	.51*	.04	.43	.59	1,692.95*	98	3,122
PF - EI	30	41,068	.45*	.03	.39	.51	1,099.51*	97	1,990
PA - EI	28	13,587	.18*	.02	.13	.24	192,81*	86	240

Note: The corrected mean correlation coefficients r_c are the sample size weighted, reliability corrected estimates of the correlation coefficients across studies. Mean effect sizes and Q values marked with * are statistically significant at $p < .05$. EI = entrepreneurial intent, ATB = attitude towards the behavior, SN = subjective norms, PBC = perceived behavioral control, PD = perceived desirability, PF = perceived feasibility, ESE = entrepreneurial self-efficacy, PA = propensity to act.

Hypothesis I-1 predicts that ATB (HI-1a), subjective norms (HI-1b), ESE (HI-1c), and PBC (HI-1d) have a positive effect on perceived desirability. Both, the ATB-perceived desirability relationship ($r_c = .26$, $p < .05$) and the subjective norms-perceived desirability relationship ($r_c = .29$, $p < .05$) are significant and positive. Also the relationships between ESE and perceived desirability ($r_c = .37$, $p < .05$) as well as between PBC and perceived desirability ($r_c = .59$, $p < .05$) are significant and positive. In sum, Hypotheses I-1a, I-1b, I-1c, and 1d were supported. Hypothesis I-2 predicts that both ESE (HI-2a) and PBC (HI-2b) have a positive effect on perceived feasibility. The relationship between ESE and perceived feasibility ($r_c = .31$, $p < .05$) as well as the relationship between PBC and perceived feasibility ($r_c = .82$, $p < .05$) were significant and positive. Therefore, Hypotheses I-2a and I-2b were supported. The results of the *Q* test as well as the I^2 test indicate that moderation is likely for the relationships between the distal TPB variables and the proximal EEM variables. Before examining the meta-analytic structural equation model, we explored the potential influence of the identified moderators on the different relationships and used moderator analysis to test the difference of

antecedents integrated in this model. In the literature, the differences and similarities of PBC, self-efficacy, and locus of control have been controversially discussed (Ajzen, 2002). Several researchers that empirically examined EI have utilized measures of ESE as opposed to PBC in the TPB and ESE or PBC as opposed to perceived feasibility in the EEM. Moreover, the majority of studies used locus of control as an operationalization of the propensity to act which might introduce additional ambiguity (Ajzen, 2002). As a result, several variables included in the integrated model potentially overlap in their effect on EI. Meta-analysis offers a unique opportunity to test differences in the effects of variables, what is also regarded as an important precondition for comparing and integrating theories in a meaningful way (Leavitt, Mitchell, & Peterson, 2010). To test the moderating role of the different measures, we merged the effect sizes for the different relationships and dummy coded the four variables. Table 2.8 presents the results of the meta-analytic regression analysis.

Table 2.8 Results of mixed effects wls regression (integrated model)

Moderator	**PBC/ESE/PF/PA-EI**			**ATB/SN/PD-EI**		**SN-PD**	**G-EI**	**Age-EI**
	Model 1	Model 2	Model 3	Model 1	Model 2			
Year of study	.01	.01	.01	.12	.12	-.42	.05	-.53**
Publication type (journal = 1)	.06	.06	.06	-.25***	-.25***	-.13	.08	-.10
National context (Western = 1)	.01	.01	.01	.08	.08	-.24	.05	-.58**
Respondent type (student = 1)	.17*	.17*	.17*	-.07	-.07	n/a	.11	.36*
Measurement moderators								
Perceived behavioral control	.73***	.16†	-					
Entrepreneurial self-efficacy	.53***	-.28**	-.20***					
Perceived feasibility	.36***	-	-.08†					
Propensity to act	-	-.55***	-.71***					
Attitude towards the behavior				-.32**	.02			
Subjective norms				-.34**				
Perceived desirability					.26*			
R^2	.36	.36	.36	.14	.14	.19	.02	.52
Q_{Model}	62.03***	62.03***	62.03***	26.19***	26.19***	2.33	.64	17.79**
$Q_{Residual}$	109.44	109.44	109.44	156.99	156.99	9.90	26.97	16.50
v	.02	.02	.02	.06	.06	.01	.03	.002
k	111	111	111	159	159	10	26	17

Note: Standardized regression coefficients are presented. K is the total number of effect sizes; Q is the homogeneity statistic; v is the random effects variance component.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Models 1 to 3 on the left side of Table 2.8 show that the four measure moderators are positive and significant or at least show a tendency towards significance, indicating that in terms of their effect on EI, the four variables are distinct from, though not necessarily unrelated to, each other. For PBC, ESE, and locus of control, this result confirms the findings of previous studies (for an overview see Ajzen, 2002) that showed the distinct effects of the different variables. We apply the same procedure for ATB, subjective norm, and perceived desirability as prior literature suggested that the two TPB antecedents are incorporated in the perceived desirability construct and researchers have empirically utilized measures of ATB and subjective norm as opposed to perceived desirability in the EEM. Models 1 and 2 in the middle of Table 2.8 show that the moderators for ATB and subjective norms are significant, indicating that they are distinct from perceived desirability in their effect on EI. Moreover, the results show that the effects of ATB and subjective norms on EI are comparable in their strength. Overall, our findings suggest that the examined constructs used in the TPB and EEM vary to a certain degree in their effect on EI and, as a result, the competing models can be compared and integrated (Gray & Cooper, 2010; Leavitt, Mitchell, & Peterson, 2010). Ten or more studies investigated the gender-EI, the age-EI, and the subjective norms-perceived desirability relationship, and, therefore, we conducted moderator analysis for these three relationships. The results are presented on the right side of Table 2.8. The model fit for the subjective norm-perceived desirability relationship as well as the gender-EI relationship show a poor model fit. The regression model for the age-EI relationship fits the data well ($R^2 = .52$; $Q_{Model} = 17.79$; $p < .01$). While no significant effect was found for publication type, the year of study variable and the national context variable were significant and negative, and the respondent type variable was significant and positive, indicating that the strength of this relationship depends on context and sample characteristics. Overall, given the small number of effect sizes ($k < 10$), we were unable

to conduct moderator analyses that investigated the other relationships proposed in the integrated model, which is a limitation of this study.

We used meta-analytic structural equation modeling to examine the fit and the predictive power of the integrated model and to test Hypotheses I-3 and I-4. Sample descriptives and derived meta-analytic correlations are presented in Table 2.9.

Table 2.9 Meta-analytic correlation matrix (integrated model)

Variable	1	2	3	4	5	6	7	8	9	10
1 Entrepreneurial intent	(.83)	46 / 70 38,228	48 / 69 33,519	29 / 32 18,859	25 / 44 24,403	31 / 31 24,500	29 / 29 24,285	27 / 28 13,587	18 / 19 15,439	25 / 29 30,248
2 Attitude towards the behavior	.35	(.80)	30 / 51 23,752	24 / 27 17,773	10 / 29 5,732	5 / 5 11,793	4 / 4 11,601	7 / 9 4,172	10 / 11 12,048	16 / 18 19,620
3 Subjective norms	.29	.27	(.79)	26 / 29 18,076	8 / 26 5,535	11 / 11 5,071	8 / 8 4,172	2 / 2 365	9 / 9 11,461	14 / 15 11,405
4 Perceived behavioral control	.44	.41	.27	(.77)	1 / 1 192	2 / 2 1,800	3 / 3 1,992	2 / 2 8,029	8 / 8 9,337	11 / 12 8,029
5 Entrepreneurial self-efficacy	.23	.32	.21	.05	(.84)	5 / 5 9,728	5 / 5 10,141	7 / 8 7,292	2 / 2 398	6 / 6 8,120
6 Perceived desirability	.42	.20	.22	.46	.29	(.77)	22 / 22 13,612	2 / 2 241	6 / 6 2,840	9 / 9 13,125
7 Perceived feasibility	.37	.31	.28	.61	.25	.41	(.73)	1 / 1 126	6 / 6 2,840	9 / 9 13,125
8 Propensity to act	.14	-.09	.21	.22	.18	.33	.19	(.73)	1 / 1 207	2 / 2 6,270
9Age	.06	.01	-.05	.01	.06	.08	.09	-.02		15 / 16 11,219
10 Gender (female = 1)	-.07	-.04	.00	-.04	-.10	-.11	-.10	-.05	-.02	

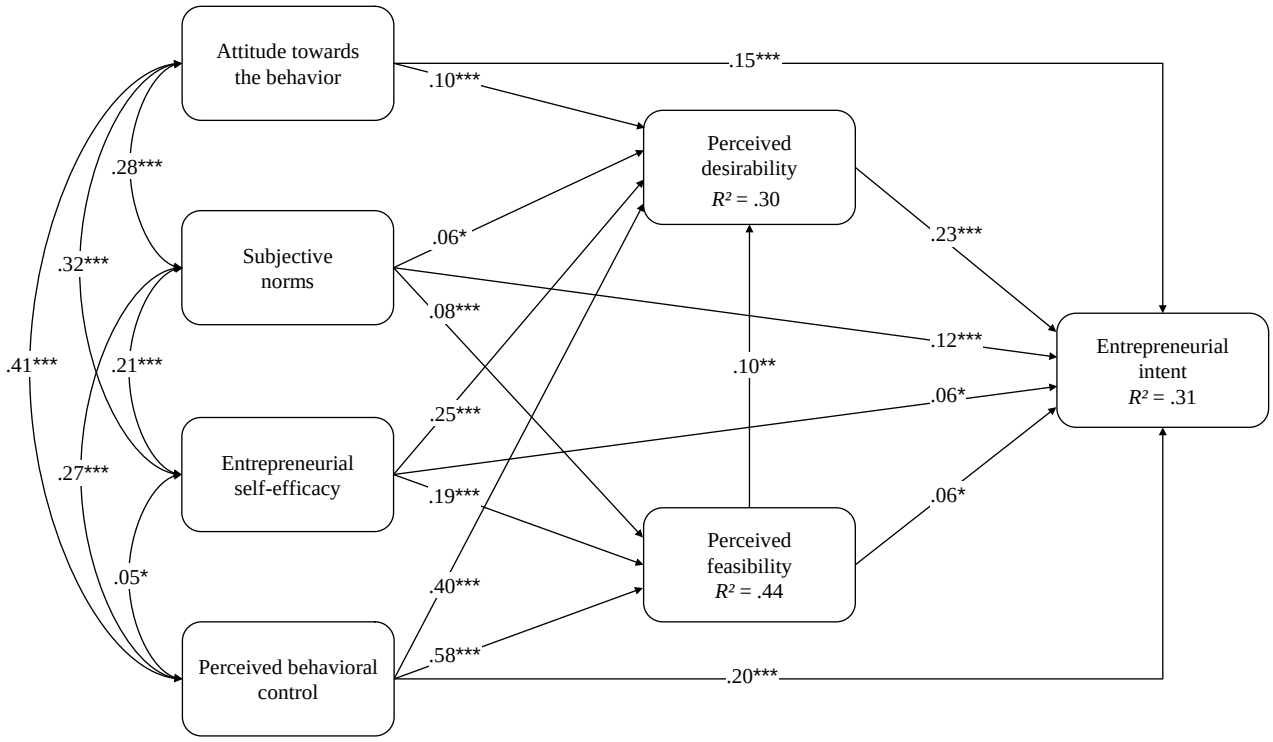
Note: Sample-weighted correlations are presented below the diagonal. The number of studies, number of effects, and the total sample sizes are given above the diagonal. Average construct reliabilities are depicted on the diagonal.

Shapero and Sokol (1982) suggest that more distal factors indirectly influence EI through their effect on perceived desirability and perceived feasibility. In the MGB (Perugini & Bagozzi, 2001) as well as in the EMGB (Perugini & Conner, 2000), it has been suggested that the TPB determinants influence intentions indirectly through their effect on desires. Consequently, we tested a full mediation model as the baseline model. Mediation is indicated when the paths between the independent variables (ATB, subjective norms, ESE, and PBC) and the respective mediator variables (perceived desirability and perceived feasibility), as well as the paths between the mediator variables and the dependent variable (EI) are significant, and

the overall model shows acceptable goodness of fit (James, Mulaik, & Brett, 2006). The proposed integrated model did not fit the data well, with several indexes failing to meet the requirements (χ^2 = 188.45; *df* = 9; $p < .000$; CFI = .93; RMSEA = .12; SRMR = .05). We followed the recommendations by Anderson and Gerbing (1988) and examined an alternative model that was plausible on theoretical arguments. Specifically, we added direct relationships between subjective norms and perceived feasibility as well as between perceived feasibility and perceived desirability. More favorable subjective norms should result in a more favorable perception of feasibility with regard to the behaviors that are related to the start of a business. Individuals perceive behaviors as more desirable when they perceive these behaviors also as being more feasible, in particular, when the feasibility is related to the start of an own venture. Estimation of the revised integrated model (χ^2 = 162.33; *df* = 7; $p < .000$; CFI = .94; RMSEA = .13; SRMR = .05) resulted in a significantly better fit ($\Delta\chi^2$ = 26.12; Δdf = 2; $p < .000$). To test whether partial or full mediation is present, we compared the revised integrated model with a partial mediation model as well as a nonmediated model (James, Mulaik, & Brett, 2006). In the partial mediation model, we specified direct paths from the four TPB determinants to EI and included all other specifications that were also included in the revised integrated model. The partial mediation model had an excellent fit (χ^2 = 3.79; *df* = 3; $p < .29$; CFI = 1.00; RMSEA = .01; SRMR = .01). The change in the value of chi-square between the revised full mediation model and the partial mediation model was highly significant ($\Delta\chi^2$ = 158.44; *df* = 4; $p = .000$). The added direct paths from ATB, subjective norm, ESE, and PBC to EI were all significant and positive. In the nonmediated model, we specified direct paths from the four TPB determinants to EI and excluded all other direct paths to EI. The nonmediated model did not fit the data well (χ^2 = 84.82; *df* = 5; $p < .000$; CFI = .97; RMSEA = .11; SRMR = .03) and showed a worse fit than the partial mediation model ($\Delta\chi^2$ = 81.03; *df* = 2; $p = .000$). The tests and

comparisons of the path models suggested that the revised integrated model with partial mediation depicted in Figure 2.6 provided the best fit for the data.

Figure 2.6 Path model results: Revised integrated model



Note: χ^2 = 3.79; *df* = 3; p < .29; CFI = 1.00; RMSEA = .01; SRMR = .01. Harmonic mean sample size N_{HM} = 1,385. Standardized coefficients are provided for each path in the model. For the attitude-perceived desirability path the multicollinearity adjusted coefficient is reported. Age and gender (coded '1', female, and '0', male) had paths to independent and dependent variables with the same result as reported above for the TPB and EEM path models.
† p < .10; * p < .05; ** p < .01; *** p < .001.

In partial support of Hypothesis I-3, which predicted that the effect of ATB (HI-3a), subjective norms (HI-3b), ESE (HI-3c), and PBC (HI-3d) on EI is mediated by perceived desirability, the effect of all four determinants is partially mediated by perceived desirability. In partial support of Hypothesis I-4, which predicts that ESE (HI-4a) and PBC (HI-4b) have an indirect effect on EI through perceived feasibility, the influence of both variables on EI was partially mediated by perceived feasibility. In addition to the MASEM procedure, Sobel tests (Sobel, 1982) confirmed the indirect effects of the TPB variables on EI. A comparison of the direct, indirect, and total effects revealed that the direct effects of the four TPB antecedents on

EI are stronger than their indirect effects. Moreover, the results show that only for subjective norms the total effect on EI is stronger than the effect on the two mediating EEM variables, compared to ATB, ESE, and PBC which show stronger total effects on the EEM variables than EI. Overall, the findings suggest that the effect of the TPB variables on EI is complementary mediated by the EEM variables (Zhao, Lynch, & Chen, 2010), suggesting that other mediators are involved in this mechanism.

2.3.2 Comparison of the competing models

As a next step, we compared the correlations of the different determinants in the two competing models. All determinants are predictors of the same dependent variable (EI) and, consequently, the comparison of correlations has to take account of the relationship between the different determinants. We followed the recommendations in the literature for comparing nonindependent correlations (Meng, Rosenthal, & Rubin, 1992) and applied Steiger's *z* test (Steiger, 1980) as well as the procedure suggested by Zou (2007), which takes into account the confidence limits around overlapping effect sizes. The sample size for the comparisons was determined by following a conservative approach and so we used the harmonic mean samples size across the primary studies included in the TPB (N = 188) and the EEM (N = 264) for the correlations between the respective determinant and EI. For the correlations between the different determinants, we used the harmonic mean samples size across the primary studies included in the integrated model (N = 215). The two tests provide an indication of whether the differences in the correlations are statistically significant. The larger the difference in two correlations, the more likely is a difference in predictive power of one determinant over the other, indicating whether the TPB or the EEM determinants are better predictors of EI. The results of the comparisons for all seven determinants are presented in Table 2.10.

Table 2.10 Differences in correlations

Variable	(*i*)	ATB	SN	PBC	ESE	PD	PF
SN	r_{ci} /r_{cSN}	.43/.36					
	Δr	.07					
	CI	-.05/.19					
PBC	r_{ci} /r_{cPBC}	.43/.56	.36/.56				
	Δr	-.13*	-.20**				
	CI	-.25/-.01	-.38/-.02				
ESE	r_{ci}/r_{cESE}	.43/.28	.36/.28	.56/.28			
	Δr	-.15*	.08	.28**			
	CI	-.30/-.01	-.06/.21	.06/.50			
PD	r_{ci} /r_{cPD}	.43/.51	.36/.51	.56/.51	.28/.51		
	Δr	-.08	-.15*	.05	-.23**		
	CI	-.20/.03	-.29/-.01	-.03/.13	-.41/-.06		
PF	r_{ci} /r_{cPF}	.43/.45	.36/.45	.56/.45	.28/.45	.51/.45	
	Δr	-.02	-.09	.11†	-.17*	.06	
	CI	-.13/.08	-.20/.02	.02/.20	-.31/-.03	-.02/.14	
PA	r_{ci} /r_{cPA}	.43/.18	.36/.18	.56/.18	.28/.18	.51/.18	.45/.18
	Δr	.25**	.18*	.38***	.10	.33***	.27***
	CI	.01/.48	.03/.33	.16/.59	-.03/.23	.14/.52	.03/.50

Note: The sample-weighted and reliability corrected correlation coefficients (r_c) are compared. The confidence interval (CI) is presented for the respective probability level. For all nonsignificant comparisons the 90 percent confidence interval is presented. ATB = attitude towards the behavior, ESE = entrepreneurial self-efficacy, SN = subjective norms, PA = propensity to act, PBC = perceived behavioral control, PD = perceived desirability, PF = perceived feasibility.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

The results show that within the TPB the effect size for the PBC-EI relationship is significantly larger compared to those of ATB, subjective norms, as well as ESE (Steiger's *z* test is significant and the confidence interval does not include zero). The difference in the effect sizes for ATB and subjective norm is not significant (Steiger's *z* test is not significant and the confidence interval does include zero), while it is significant for the difference in the effect sizes for ATB and ESE. For the EEM, the results show that the effect size for perceived desirability and perceived feasibility do not differ significantly, while both show significantly larger effect sizes than the propensity to act. When comparing all seven determinants included in the two theories, the TPB determinants show significantly higher correlation coefficients than the EEM in four out of the eight comparisons, while the EEM determinants show significantly higher effect sizes in three comparisons. The majority of studies operationalized the propensity to act in terms of the locus of control, which might fail to capture the specific features of the propensity to act construct. When we excluded propensity to act from the

comparisons, the EEM determinants still showed significantly higher effect sizes in three out of eight comparisons, while only the PBC-EI effect size was larger than the perceived feasibility-EI effect size at $p < .10$ for the TPB determinants. When the effect sizes for PBC and ESE are pooled, this effect disappears completely. In sum, the findings of the correlations comparison suggest that the EEM determinants show stronger effect sizes than the TPB determinants. In meta-analytic structural equation analyses, all three models achieve comparable fit to the data. Therefore, it is reasonable to examine the models in terms of their explanatory power. The results show that the TPB determinants ($R^2 = .28$) together explain a larger variance in EI than the EEM determinants ($R^2 = .21$). The integrated model of EI provides a better predictive power with a slight increase in the explained variance ($R^2 = .31$) relative to both the TPB and the EEM. This result indicates that the integrated model provides additional insights into EI. In the integrated model, perceived desirability exhibited the strongest direct effect. PBC appeared to have a weaker direct effect on EI than perceived desirability, but exhibited a stronger influence on intention than ATB and subjective norms. Overall, these results confirm the prediction of the MGB and the EMGB that individuals' desire is the most immediate predictor of behavioral intention.

2.4 Discussion

Despite the high number of studies on the determinants of EI, little conclusive evidence has been obtained about the theoretical coherence of the two most widely utilized theories, namely the TPB and the EEM. Using meta-analytic data from 114,007 individuals across 123 independent samples reported in 98 studies, our study presents a systematic review of the literature and meta-analytically compares and integrates the two conceptual frameworks to achieve more theoretical clarity and robustness.

2.4.1 Limitations

Before we elaborate on the implications of our results, several limitations need to be addressed. First, the cross-sectional research design of the majority of EI studies limits our ability to make causal references between study variables. Meta-analysis is insensitive to causal directions (Aguinis et al., 2011) and, therefore, longitudinal data or experimental and quasi-experimental research designs are necessary to establish causal linkages (Wood & Eagly, 2009). Second, the conclusions drawn from the results of moderator analyses are based on relatively small numbers of effect sizes and, therefore, should be interpreted with caution. The existence of moderators and in particular the interaction between moderators is difficult to confirm in meta-analysis due to a lack of statistical power and dichotomization before moderator analysis (Aguinis, Gottfredson, & Wright, 2011; Aguinis et al., 2011; Aguinis & Pierce, 1998; Dalton & Dalton, 2008). Our meta-analysis was also limited to the information reported among the retrieved primary studies and further research is warranted to substantiate the proposed structural model and make more confident generalizations about the strength of these relationships (Cooper & Hedges, 2009).

2.4.2 Implications for theory

The results of the bivariate meta-analyses show that the different determinants included in the two theories have a positive effect on EI. While prior research has in particular questioned the role of subjective norms in explaining EI, our findings indicate that subjective norms are more predictive of EI than ESE. Compared to the meta-analytic findings of prior studies, the effect sizes for the determinants of the two theories are substantially greater than the direct effects of entrepreneurship education (Martin, McNally, & Kay, 2013) and personality traits on EI (Zhao, Seibert, & Lumpkin, 2010) and comparable to the direct influence of risk propensity on EI (Zhao, Seibert, & Lumpkin, 2010). For the TPB, our results are comparable to those obtained by Armitage & Conner (2001). Comparison of the effect sizes and path analysis

revealed that, while the EEM determinants show larger effect sizes compared to the TPB determinants, the latter theory explains a larger amount of variance in EI. Thereby, we advance and challenge the findings by Krueger, Reilly, and Carsrud (2000), who found that the EEM has higher predictive power.

Using meta-analytic structural equation modeling, we tested an integrated model of EI based on the MGB and the EMGB and identified the mechanism through which the different determinants are related and together affect EI. The results show that the TPB determinants as well as perceived feasibility particularly influence EI through perceived desirability. This important finding confirms the MGB and suggests that it is an individual's desire through which the other determinants are transformed into EI. Moreover, we expand the findings of prior research by providing evidence in favor of a partial mediation model, as opposed to a full mediation model. This finding, in particular, suggests that if an individual has more perceived control over starting a business, PBC becomes an important predictor of EI next to the desire to start a business venture. We show that, in particular, PBC affects individual intentions directly and hereby extend the MGB. The integration of the EEM and the TPB helped to identify and understand the interrelationships between their constructs, which is important for advancing theory in the EI domain.

In the moderator analysis, we identified significant contextual and methodological moderators that help to explain the mixed results across studies and cast light on the boundary conditions of the competing theories. One major contribution of this meta-analysis is that the results of the moderator analysis suggest differential effects of the TPB and EEM determinants on EI. Theoretically, this finding challenges prior research in which the assumption has been that perceived desirability includes attitudes and subjective norms and that perceived feasibility includes ESE and PBC. Our results show that the different variables operate through different

pathways (ATB and subjective norms) or vary in the strength of the paths when they operate through the same pathways (ESE and PBC).

The findings of the current study also suggest the need for a more contextual perspective and approach to conceptualizing the development of EI. We found that the subjective norms-EI relationship and the perceived desirability-EI relationship had a stronger positive association in Western countries. Compared to non-Western countries, Western societies are characterized by different cultural norms and values, such as higher levels of independence and individualism, emphasizing the uniqueness of individuals' goals and achievements (Brandl & Bullinger, 2009). Individuals in Western societies define themselves in terms of their actions and, at the same time, are bound to societal norms. As a result, subjective norms and perceived desirability may have a stronger effect on EI in Western societies. Furthermore, our meta-analysis exposed that subjective norms and perceived desirability had a stronger positive relationship with EI for more recent studies. This finding suggests that there is no significant decline effect (Lehrer, 2010; Schooler, 2011) and, instead, the relationships are getting stronger for two of the main relationships what might have different reasons. While several explanations for a decline or incline in effect sizes have been offered (Bosco et al., 2013) future research should seek to identify the specific sources for variations over time in the EI field. Economic and institutional conditions impact entrepreneurship change over time and affect the entrepreneurial process (Tolbert, David, & Sine, 2011). Prior research has shown that EI is influenced by economic conditions and institutional settings (Griffiths, Kickul, & Carsrud, 2009; Shinnar, Giacomin, & Janssen, 2012). The improved institutional conditions for entrepreneurs combined with an unstable economic situation might have created the environment in which becoming an entrepreneur is more desirable and is perceived as being more attractive by important others. In particular, the finding that the subjective norm-EI relationship is affected by contextual

moderators clarifies the nature of this relationship and partially explains the inconclusive findings of previous studies.

2.4.3 Implications for researchers and educators

While researchers should be careful to use mean effect sizes based on cross-sectional studies to decide which variable has the strongest effect on EI, or to decide which theory offers the best explanation of EI, the presented meta-analytic results can help researchers to set priorities for future studies. Variables that predict EI well, such as perceived behavioral control and perceived desirability, should have a higher priority for future research than variables that predict EI poorly, such as propensity to act (locus of control). Theories that predict EI well should be given a higher priority for future research to explore their potential compared to theories that predict EI poorly. Our results showed that the integrated model accounted for .31 of the variance in EI compared to .28 and .21 for the TPB and the EEM. While the TPB and the EEM are more parsimonious, the more complex integrated model provides a more complete understanding of the determinants of EI and their interrelationships. Therefore, to make a choice between the competing theories, it is important to consider the trade-off between more explanatory power and a deeper understanding of the specific contribution of each theoretical construct. Our meta-analytic evidence suggests that a combination of the TPB with perceived desirability is most powerful in explaining and understanding EI. Consequently, utilizing more complex theories, such as the MGB, that provide a better understanding and explanation of EI than the TPB and the EEM alone should be given a higher priority in future research.

Our results also offer implications for researchers how to best capture and measure the determinants of EI. If an operationalization of a variable predicts EI better than another operationalization, the former should deserve higher priority for future research attention. Our moderator analyses revealed that studies that operationalized ATB in line with Ajzen (1991) yielded stronger effect sizes than studies that used other constructs, such as achievement

motivation and the need for autonomy. Our results revealed that propensity to act, which was in nearly all studies operationalized using locus of control, neither had a significant effect in the EEM nor in the integrated model on EI. Moreover, while prior research has pointed out that perceived desirability is similar to or includes ATB and subjective norms, we found different strengths of effect sizes for ATB and subjective norms compared to perceived desirability. Our analysis also indicated that ESE, PBC, and perceived feasibility produced different effect sizes and are distinct constructs in their effect on EI. This finding supports recent research (Crook et al., 2010; Shook, Priem, & McGee, 2003) that calls for greater attention to measurement properties and more empirical precision. One implication is that future research should not use the TPB and EEM constructs interchangeably as the constructs seem to be distinct from each other.

The analysis of the methodological moderators provides insights on how methodological choices of researchers affect effect sizes and results. Our results showed that for the PBC-EI relationship the effect size was stronger for student samples compared to non-student samples. In contrast, our results showed that the relationship between perceived desirability and EI is stronger for non-student samples compared to student samples. These findings have important implications for researchers as the two determinants are the strongest predictors of EI and, in particular, perceived desirability is a mediator for all other determinants in the integrated model. Given their education and training, students might perceive a higher degree of external control but at the same time are not willing to invest as much time and effort in the respective actions necessary to start an own business, resulting in lower levels of perceived desirability. Since we have found no clear pattern for the influence of using student sample, future research is necessary to examine how EI develops in different phases of life.

We encourage authors, journal reviewers, and editors to apply publications standards that facilitate evidence-based research in the field of entrepreneurship. Only 52 to 78 percent of the

studies that investigated the TPB and EEM reported reliability information. While the percentages are higher for some of the relationships than those reported in reviews on entrepreneurship methodology (Crook et al., 2010; Heuer & Liñán, 2013; Mullen, Budeva, & Doney, 2009), the numbers for the majority of relationships are below these percentages. Overall, 78 of the primary studies (82 percent) report data outside of the United States. The majority of these studies do not describe whether and how the research instrument has been translated, which is an important methodological weakness (Harzing, 2005; Liñán & Chen, 2009). Only 77 percent of the articles reported correlation coefficients for all variables included in the respective study. Given these findings and the results of the moderator analysis, reviewers and editors should require and support authors to report the information (i.e., variable measures, reliabilities, correlation coefficients, year of study etc.) that allows to compare studies. Close consideration of these issues enables researchers to replicate or synthesize the results of prior empirical studies.

Entrepreneurship educators may use the findings of the present study to foster EI and to choose an instrument to evaluate components of their entrepreneurship education curriculum. Our results emphasize the importance of perceived desirability and its direct antecedents in the development of EI. To increase EI, educators should actively seek to strengthen students' entrepreneurship related skills and capabilities to increase ESE and PBC and to positively affect students' perceived desirability to become an entrepreneur. Educators should highlight the advantages of starting an own firm, i.e. by enabling students to gain own experiences in (successful) start-ups or inviting (successful) entrepreneurs to share their experiences with the students.

2.4.4 Avenues for future research

We provide a systematic theory-driven overview of the research on EI as a direction to those embarking on future research and developing and deepening theoretical explanations.

First, this meta-analysis focused on the prevolitional process in entrepreneurial behavior. Only a limited number of studies examined the effect of EI on entrepreneurial behavior (Kolvereid & Isaksen, 2006; Hulsink & Rauch, 2010; Kautonen, Van Gelderen, & Fink, 2013; Kautonen, Van Gelderen, & Tornikoski, 2013). While for these studies the variance explained by EI in actual entrepreneurial behavior (37 percent) is comparable to meta-analytic evidence in other research domains (Armitage & Conner, 2001), the predictive power of intention on behavior has been questioned (Katz, 1990), in example, due to the time-lag between EI and behavior (Bird, 1992; Katz, 1992). To gain further understanding of the entrepreneurial process future research should include actual behavior to further test the intent-behavior link. Second, meta-analysis cannot replace focused empirical research as well as it cannot embrace the full complexity of inter-relationships between variables (Cooper & Hedges, 2009). These inter-relationships (e.g., the direct influence of the national context on subjective norms) need to be addressed in future primary studies. The findings of our study and previous research (Busenitz & Lau, 1996) suggest that it is meaningful for future research to further explore the contingent role of the formal institutional context (laws, regulations, and policies) as well as the informal institutional context (cultural norms and values). Data sets such as the Global Entrepreneurship Monitor (GEM), the Panel Study of Entrepreneurial Dynamics (PSED), and the Global University Entrepreneurial Spirit Students' Survey (GUESSS) could offer great insights into the context-specific development of EI.

Future research should also identify other determinants that explain variance in EI beyond that accounted for by the TPB and EEM antecedents. The variables included in this meta-analysis are constrained to variables for which sufficient data are available. Thus, the meta-analysis should be considered a summary of the most commonly studied determinants of EI. Future research may examine alternative theories, such as the MGB and the EMGB, and the effects of those variables not included in this study (i.e., positive and negative anticipated

emotions). Moreover, while this study focuses on a single stage EI, intentions are more complex psychological states. Prior research (Carsrud et al., 2009; Carsrud & Brännback, 2011) suggests that the extent to which initial entrepreneurial intentions are realized and are transformed into behavior might depend a more complex process, which includes goal intentions and implementation intentions (Bagozzi, Dholakia, & Basuroy, 2003; Gollwitzer & Brandstätter, 1997). This study was also restricted to examine those moderators that were available for coding in existing studies. Previous research (Barbosa, Gerhardt, & Kickul, 2007; Krueger & Kickul, 2006) suggests that other moderators may moderate some of the relationships. Another direction for future research is the possibility of reverse causality. Prior research (Brännback et al., 2007; Krueger, 2009) suggests that an increase in EI may affect desirability and feasibility. Future research should utilize more dynamic models and examine reverse causality and simultaneity in EI models. Finally, our study offers insights into the promises and challenges of theory-driven meta-analysis and meta-analytic structural equation modeling in the area of EI. An important area for further meta-analytic research is the potential mediating role of TPB and EEM variables in the relationship between EI and more distal variables, such as entrepreneurial traits (i.e., achievement motivation, risk propensity, and innovativeness), personality traits (i.e., openness, conscientiousness, and extraversion), entrepreneurial exposure (i.e., entrepreneurship experience), and entrepreneurship education. While prior meta-analytic studies investigated the direct effect, i.e. of personality traits (Zhao, Seibert, & Lumpkin, 2010) and entrepreneurship education (Martin, McNally, & Kay, 2013) on EI, both the TPB (Ajzen, 1991) and the EEM (Shapero, 1982) predict that these and other distal variables only have an indirect effect on EI through their impact on the underlying beliefs related to the respective EI determinants (i.e., Haus et al., 2013). Theory driven meta-analysis provides a method to address unresolved research questions and reach "*a sense of theoretical clarity*" (Gartner, 2001, p. 28) of the relationships that entrepreneurship researchers strive to understand.

3. Study II - The impact of personal background factors on entrepreneurial intention: A meta-analytic path model

Entrepreneurial intention (EI) is an important construct in entrepreneurship research as it represents the commitment of individuals to start a business in the near future (Ajzen, 1991; Krueger & Carsrud, 1993). Intentions serve as the best predictor for planned behaviors, such as starting a business (Bagozzi, Baumgartner, & Yi, 1989; Kim & Hunter, 1993). Hence, a fundamental question in entrepreneurship research is how individuals develop EI (Fayolle & Liñán, 2014; Liñán & Fayolle, 2015). Consequently, entrepreneurship research has a longstanding history of analyzing whether personal background factors (e.g., prior founding experience, entrepreneurial role models, work experience as well as general and entrepreneurship education) eventually turn individuals into entrepreneurs (e.g., Bird, 1993; Shook, Priem, & McGee, 2003).

Two deficits in this literature motivate the present study: First, previous findings on the direct impact of personal background factors on EI are largely inconclusive (Chlosta et al., 2012; Davidsson & Honig, 2003). Specifically, prior studies investigating the impact of prior founding experience find positive (e.g., Fitzsimmons & Douglas, 2011) as well as non-significant (e.g., Degeorge & Fayolle, 2008) influences. Likewise, prior researches on the influence of entrepreneurial role models on EI suggest a beneficial (e.g., Crant, 1996), a non-significant (e.g., Kolvereid & Isaksen, 2006), or even a negative (e.g., Schmitt-Rodermund & Vondracek, 2002) effect. Furthermore, work experience is found to stimulate (e.g., Wang, Lu, & Millington, 2011), decrease (e.g., Taormina & Lao, 2007), or not affect (e.g., Kautonen, Luoto, & Tornikoski, 2010b) individuals' EI. Regarding education, prior research finds positive effects for general (e.g., Lee et al., 2011) and entrepreneurship education (e.g., De Clercq, Honig, & Martin, 2013), while other studies suggest neither general (e.g., Kautonen, Luoto, & Tornikoski, 2010b) nor entrepreneurship education (e.g., Abebe, 2012) to have an effect or even

find entrepreneurship education to reduce individuals' EI (e.g., Oosterbeek, van Praag, & Ijsselstein, 2010). In addition, the vast majority of the existing studies have not included a comprehensive set of personal background factors. Therefore, most studies have tested the influence of these factors on EI in isolation without assessing potential collinearity between and the relative importance of different factors. Thus, relatively little is known about the unique and shared effects of different personal background factors and their importance in affecting EI.

As a second research deficit, prior studies largely assume a direct influence of personal background factors on EI (Zapkau et al., 2015). This is problematic as personal background factors are only weak direct predictors of individuals' intentions (Krueger & Carsrud, 1993; Krueger, Reilly, & Carsrud, 2000). Moreover, direct effect models provide only descriptive information and do not facilitate theoretical or empirical insights into the underlying mechanism explaining why respective factors affect EI (or not). Such studies give no answer to the question *how* individuals develop EI and, hence, offer only little guidance on how to influence EI (e.g., through entrepreneurship support programs) (Elliott, Armitage, & Baughan, 2003). The two theories that are most often utilized to explain EI (Lortie & Castogiovanni, 2015; Schlaegel & Koenig, 2014) – the theory of planned behavior (TPB) (Ajzen, 1991) and the entrepreneurial event model (Shapero & Sokol, 1982) – both propose that cognitive factors mediate the relationship between personal background factors and EI. However, of the 160 empirical studies that examined personal background factors (Table 3.1 provides detailed study characteristics) only 27 studies have used a mediation framework and only 15 of these studies have applied statistical procedures to test the significance of the mediation. Thus, the field still lacks a comprehensive understanding of the specific pathways connecting personal background factors with EI.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Abebe (2012)	1	186	JA	Student	U.S.	-	ERM, WE, EE	na
Ahmed et al. (2010)	1	276	JA	Student	Pakistan	-	ERM, WE, EE	na
Ali, Lu, & Wang (2012)	1	490	JA	Student	Mixed	-	ERM, WE	na
Almobaireek & Manolova (2012)	1	950	JA	Student	Saudi Arabia	SN, PBC	PFE, EE	no
Alsos & Isaksen (2012)	1	215	CP	Student	Norway	ATB, SN, PBC	PFE, ERM	no
Altinay et al. (2012)	1	279	JA	Student	UK	-	ERM	na
Aslam, Awan, & Kahn (2012)	1	197	JA	Student	Pakistan	ATB, SN, PBC	EE	no
Athayde (2009)	1	249	JA	Student	U.S.	-	ERM, EE	na
Autio et al. (2001)	2	3,542	JA	Student	Various	ATB, SN, PBC	WE	no
Azhar, Javaid, Rehman, & Hyder (2011)	1	320	JA	Student	Pakistan	-	ERM, EE	na
BarNir, Watson, & Hutchins (2011)	1	393	JA	Student	U.S.	ESE	ERM	yes
Basu (2010)	1	231	JA	Student	U.S.	ATB, SN, PBC	PFE, ERM, EE	no
Basu & Virick (2008)	1	122	CP	Student	U.S.	ATB, SN, PBC	PFE, ERM, EE	no
Baughn et al. (2006)	3	782	JA	Student	Mixed	SN, ESE	ERM	no
Boissin et al. (2009)	2	612	JA	Student	US, France	ATB, SN, SE	EE	no
Boissin, Chollet, & Emin (2009)	1	655	JA	Student	France	ATB, SN, PBC	ERM	no
Bosma et al. (2011)	1	292	WP	Non-student	Netherlands	-	PFE, ERM, GE	na
Brown, Bowlus, & Seibert (2011)	1	454	WP	Student	U.S.	ATB, SE	EE	na
Byabashaija & Katono (2011)	1	167	JA	Student	Uganda	SN, SE	EE	yes
Carr & Sequiera (2007)	1	304	JA	Non-student	U.S.	ATB, SN, ESE	ERM*, WE, GE	yes
Cox, Mueller, & Moss (2002)	1	713	JA	Student	U.S.	ESE	EE	na
Crant (1996)	1	181	JA	Student	U.S.	-	GE, ERM	na
D'Orazio, Monaco, & Palumbo (2012)	1	85	WP	Non-student	Italy	ATB, SE	WE	no

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
De Clercq, Honig, & Martin (2013)	1	946	JA	Student	Canada	-	ERM, GE, EE	na
Degeorge & Fayolle (2008)	1	58	JA	Student	France	ATB, SN, PBC	ERM, WE, EE	no
Delgado Pina et al. (2008)	1	52	JA	Student	Argentina	SE	PFE, ERM	no
Devonish et al. (2010)	1	376	JA	Student	Barbados	-	PFE	na
Dohse & Walter (2012)	1	1,949	JA	Student	Germany	ATB, SN, PBC	ERM, WE, EE	yes
Drennan & Saleh (2008)	1	378	WP	Student	Bangladesh	SN	ERM	no
Drost & McGuire (2011)	1	168	JA	Student	Finland	ESE	PFE, EE	yes
Ekpe & Mat (2012)	1	120	JA	Student	Nigeria	SE	ERM, EE	no
Engle et al. (2010)	14	1,748	JA	Student	Various	SN	ERM	no
Engle, Schlaegel, & Dimitriadi (2011)	3	477	JA	Student	Various	SN	ERM	no
Ertuna & Gurel (2011)	1	767	JA	Student	Turkey	-	ERM	na
Evans (2010)	1	111	DI	Student	U.S.	ESE	ERM, EE	no
Fayolle, Gailly, & Lassas-Clerc (2006)	1	144	JA	Student	France	ATB, SN, PBC	PFE, ERM, EE	no
Fitzsimmons & Douglas (2011)	1	414	JA	Student	Mixed	-	PFE, WE, GE	na
Fretschner & Weber (2013)	1	49	JA	Student	Germany	ATB, SN, PBC	EE	no
Galloway & Kelly (2009)	1	292	JA	Student	UK	-	ERM	na
Gerba (2012)	1	156	JA	Student	Ethiopia	SN, SE	ERM, EE	no
Gerry, Marques, & Nogueira (2008)	1	640	JA	Student	Portugal	-	EE	na
Gird & Bagraim (2008)	1	227	JA	Student	South Africa	ATB, SN, PBC	PFE, ERM	no
Goethner et al. (2012)	1	496	JA	Non-student	Germany	ATB, SN, PBC	PFE, GE	yes
Grundstén (2004)	1	271	DI	Student	Finland	SN	ERM	no

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Gurbuz and Aykol (2008)	1	324	JA	Student	Turkey	SN, PBC	ERM	no
Guerrero, Rialp, & Urbano (2008)	1	719	JA	Student	Spain	-	EE	na
Gurel, Altinay, & Daniele (2010)	2	409	JA	Student	Mixed	-	ERM	na
Hack, Rettberg, & Witt (2008)	1	111	JA	Student	Germany	ATB, SN, PBC	PFE, ERM, EE	yes
Hadjimanolis & Poutziouris (2011)	1	167	JA	Student	Cyprus	-	ERM	na
Hattab (2014)	1	182	JA	Student	Egypt	-	EE	na
Heuer & Kolvereid (2014)	2	968	JA	Student	various	ATB, SN, PBC	PFE, RM, GE, EE	yes
Huber, Sloof, & Van Praag (2014)	1	2,360	JA	Student	Netherlands	SE	ERM, EE	no
Iakovleva & Kolvereid (2009)	1	317	JA	Student	Russia	ATB, SN, PBC	ERM	no
Iakovleva, Kolvereid, & Stephan (2011)	13	2,225	JA	Student	Mixed	ATB, SN, PBC	PFE	yes
Iakovleva & Solesvik (2014)	1	427	JA	Student	Mixed	ATB, SN, PBC	RM	no
Ismail et al. (2009)	1	123	JA	Student	Malaysia	-	PFE, ERM, EE	na
Jaén, Moriano, & Liñán (2010)	1	1,405	BC	Student	Spain	-	PFE, ERM, WE	na
Jeger, Sušanj, & Mijoč (2014)	1	333	JA	Student	Croatia	ATB, SN, PBC	PFE, ERM, EE	no
Karimi et al. (2013)	1	331	JA	Student	Iran	ATB, SN, PBC	ERM	yes
Karimi et al. (2014)	1	205	JA	Student	Iran	ATB, SN, PBC	EE	yes
Katono, Heintze, & Byabashaija (2010)	1	217	CP	Student	Uganda	ATB, SN, PBC	ERM	yes
Kautonen et al. (2010a)	1	1,143	JA	Non-student	Finland	ATB, SN, PBC	PFE, ERM, GE	no
Kautonen et al. (2010b)	1	785	JA	Non-student	Finland	ATB, SN, PBC	PFE, WE, GE	yes
Kibler (2013)	1	834	JA	Non-student	Finland	ATB, SN, PBC	PFE, GE	no
Keat, Selvarajah, & Meyer (2011)	1	417	JA	Student	Malaysia	-	ERM, WE, EE	na
Kolvereid (1996a)	1	128	JA	Student	Norway	ATB, SN, PBC	PFE, ERM	yes
Kolvereid & Isaksen (2006)	1	297	JA	Non-student	Norway	ATB, SN	ERM, GE	no
Kolvereid & Moen (1997)	1	278	JA	Student	Norway	-	PFE, WE, EE	na
Kristiansen & Indarti (2004)	2	251	JA	Student	Various	SE	WE	no
Kuckertz & Wagner (2010)	2	712	JA	Student	Mixed	ATB	ERM, WE	no

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Lans, Gulikers, & Batterink (2010)	1	102	JA	Student	Netherlands	ESE	PFE, ERM, WE	no
Laspita al. (2012)	1	43,764	JA	Student	mixed	-	ERM, EE	na
Lee, Chang, & Lim (2005)	2	377	JA	Student	U.S., Korea	-	EE	na
Lee et al. (2011)	1	4,364	JA	Non-student	mixed	SE, ESE	WE	no
Lee & Wong (2004)	1	959	JA	Non-student	Singapore	-	WE	na
Leffel & Darling (2009)	1	86	JA	Student	U.S.	ATB, SN, PBC	PFE, WE	no
León et al. (2007)	1	601	JA	Student	Spain	-	PFE, ERM, WE, EE	na
Lepoutre et al. (2010)	1	2,160	BC	Student	Belgium	ATB	EE	no
Leroy et al. (2009)	1	423	CP	Student	Belgium	ATB, SN, PBC	GE	no
Liñán (2004)	1	166	JA	Student	Spain	ATB, SN	ERM, WE, GE, EE	yes
Liñán & Chen (2009)	1	519	JA	Student	mixed	ATB, SN, PBC	WE, PFE, ERM	yes
Lorz (2011)	1	272	DI	Student	Germany	ATB, SN, PBC	EE	no
Lucas & Cooper (2012)	1	311	CP	Non-student	UK	SE	ERM, GE	no
Malebana (2014)	1	329	JA	Student	South Africa	ATB, SN, PBC	PFE, ERM	no
Marques et al. (2012)	1	202	JA	Student	Portugal	ATB, SN, PBC	ERM, EE	no
Matthews & Moser (1995)	1	89	CP	Student	U.S.	-	ERM, WE	na
Mauer, Eckerle, & Brettel (2013)	1	211	BC	Student	Germany	ESE	PFE, ERM	yes
McStay (2008)	1	429	DI	Student	Australia	-	PFE, EE	na
Meeks (2004)	1	331	DI	Non-student	U.S.	-	ERM	na
Miller et al. (2009)	1	232	JA	Student	U.S.	ATB	EE	no
Mo (2011)	1	110	JA	Student	China	ATB, SN, PBC	EE	no
Moberg (2012)	1	220	DI	Student	Denmark	ESE	PFE, ERM, EE	na
Moi, Adeline, & Dyana (2011)	1	787	JA	Student	Malaysia	ATB	EE, ERM	no
Mohamed et al. (2012)	1	410	JA	Student	Malaysia	-	ERM, EE	na
Morello, Deschoolmeester, & Garcia (2004)	2	1,071	WP	Student	various	-	ERM, WE	na

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Moy, Luk, & Wright (2008)	2	256	WP	Student	Mixed	ESE	ERM	no
Müller (2011)	1	465	JA	Student	Mixed	ATB, SN, PBC	PFE, ERM*	yes
Muofhe & Du Toit (2011)	1	269	JA	Student	South Africa	ATB, PBC, SE	ERM, EE	no
Nistorescu & Ogarcă (2011)	1	62	JA	Student	Romania	ATB, SE	ERM, WE, GE	no
Olomi & Sinyamule (2009)	1	508	JA	Student	Tanzania	-	ERM, EE	na
Oruoch (2006)	1	528	DI	Student	Kenya	SN	PFE	no
Osterbeek, van Praag, & Ijsselstein (2010)	1	250	JA	Student	Netherlands	SE	ERM, EE	no
Packham et al. (2010)	3	237	JA	Student	UK	ATB	EE	na
Pawan & Ahmad (2012)	1	166	WP	Non-student	Malaysia	ATB, SN, PBC	EE	no
Peterman & Kenedy (2003)	1	224	JA	Students	Australia	-	ERM, WE	na
Plant & Ren (2010)	2	181	JA	Student	Mixed	SN, PBC	PFE, ERM	no
Prodan & Drnovsek (2010)	2	547	JA	Non-student	Various	ESE	ERM	yes
Pruett (2012)	1	105	JA	Student	U.S.	-	ERM, EE	na
Pruett et al. (2009)	3	1,056	JA	Student	Mixed	SE	PFE, ERM	no
Radu & Loué (2008)	1	44	JA	Student	France	ESE	ERM, EE	no
Raposo et al. (2008)	1	316	JA	Student	Portugal	-	ERM, EE	no
Rashid et al. (2012)	1	129	JA	Student	Malaysia	-	PFE	na
Rauch & Hulsink (2014)	1	142	JA	Student	Netherlands	ATB, SN, PBC	EE	yes
Rittipant et al. (2011)	1	1,500	CP	Student	Thailand	ATB, SN, PBC	ERM	no
Ruhle et al. (2010)	1	335	WP	Student	Germany	ATB, SN, PBC	PFE, ERM, EE	no
Rodrigues et al. (2012)	1	48	BC	Student	Portugal	ATB, SN, PBC	EE	no
Saeed, Muffatto, & Yousafzai (2014)	1	805	JA	Student	Pakistan	-	ERM	na
Sanchez (2011)	1	863	JA	Student	Spain	SE	EE	no
Sandhu, Jain, & Yusof (2010)	1	234	JA	Student	Malaysia	-	ERM, EE	na
Schaper & Casimir (2007)	1	138	BC	Student	Australia	SE	EE	no

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Scherer, Brodzinski, & Wiebe (1991)	1	337	JA	Student	U.S.	SE	ERM	no
Scholten, Kemp, & Omta (2004)	1	211	CP	Non-students	Netherlands	ATB, SN, PBC	ERM, GE	no
Schwarz et al. (2009)	1	2,124	JA	Student	Austria	ATB	EE	no
Shneor & Jenssen (2014)	1	1,782	BC	Student	Norway	SN, SE	PFE, ERM, EE,	yes
Shinnar et al. (2009)	2	404	JA	Student/ Non-student	U.S.	-	ERM	na
Shiri, Mohammadi, & Hosseini (2012)	1	100	JA	Student	Iran	SN	ERM	no
Siu & Lo (2013)	1	204	JA	Student	China	ATB, SN, ESE	PFE, EE	yes
Siyanbola et al. (2012)	1	7,560	JA	Student	Nigeria	-	PFE, ERM, EE	na
Solesvik (2013)	1	321	JA	Student	Ukraine	ATB, SN, PBC	ERM	no
Solesvik et al. (2012)	1	192	JA	Student	Ukraine	ATB, SN, PBC	ERM	no
Solesvik, Westhead, & Matlay (2014)	1	321	JA	Student	Ukraine	-	PFE, EE	na
Souitaris, Zerbinati, & Al-Laham (2007)	1	250	JA	Student	Mixed	ATB, SN, PBC	EE	no
Swail, Down, & Kautonen (2014)	1	960	JA	Student	Mixed	-	ERM, EE	na
Taormina & Kin-Mei Lao (2007)	1	337	JA	Non-student	China	-	WE, GE	na
Teixeira & Davey (2008)	1	4,413	WP	Student	Portugal	-	PFE, ERM, WE, GE, EE	na
Teixeira & Forte (2009)	1	2,430	WP	Student	Portugal	-	ERM, WE	na
Thun & Kelloway (2006)	1	238	CP	Student	Canada	SN, SE	PFE, ERM	no
Tkachev & Kolvereid (1999)	1	512	JA	Student	Russia	ATB, SN, PBC	PFE	no
Tong, Tong, & Loy (2011)	1	194	JA	Student	Malaysia	SN	ERM	no
Tung (2011)	1	411	DI	Student	Hong Kong	ATB, SN, PBC	ERM, WE, EE	no
Turker & Selcuk (2009)	1	300	JA	Student	Turkey	-	WE, EE	na

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Table 3.1 Characteristics of the articles included in the meta-analysis in study II (continued)

Authors	*k*	*N*	Publication	Sample	Country	TPB variables	Personal background variables	Mediation
Uddin & Bose (2012)	1	520	JA	Student	Bangladesh	-	EE	na
Varamäki et al. (2011)	1	1,204	CP	Student	Finland	ATB, SN, PBC	ERM, EE	no
Varamäki et al. (2012)	1	92	CP	Student	Finland	ATB, SN, PBC	ERM, EE	no
Veciana, Aponte, & Urbano (2005)	2	1,272	JA	Student	Various	-	ERM	na
von Graevenitz, Harhoff, & Weber (2010)	1	196	JA	Student	Germany	SN, ESE	ERM, EE	no
Wagner (2011)	2	313	JA	Student	Germany	ATB	ERM	no
Wang, Lu, & Millington (2011)	2	399	JA	Student	Mixed	-	ERM, WE	na
Wang, Prieto, & Hinrichs (2010)	1	532	JA	Student	U.S.	ESE	ERM	yes
Wang, Wong, & Lu (2001)	1	7,844	WP	Student	Singapore	SE	ERM	no
Weber (2012)	1	403	BC	Student	Germany	PD, SN, PBC	PFE, ERM, WE, EE	no
Wilson, Kickul, & Marlino (2007)	1	399	JA	Student	U.S.	SE	EE	no
Wu & Wu (2008)	1	150	JA	Student	China	ATB, SN, PBC	GE, EE	yes
Yar Hamidi, Wennberg, & Berglund (2008)	1	78	JA	Student	Sweden	-	PFE, ERM, EE	na
Zampetakis et al. (2009)	1	280	JA	Student	Greece	ATB	ERM	no
Zapkau et al. (2015)	1	372	JA	Student	Germany	ATB, SN, PBC	PFE, ERM, WE	yes
Zhang et al. (2012)	1	52	JA	Student	China	SE	EE	yes
Zhang, Duysters, & Cloodt (2014)	1	494	JA	Student		-	PFE, EE	na
Zhao, Seibert, & Hills (2005)	1	267	JA	Student	U.S.	ESE	PFE, EE	yes

Note: *k* = number of independent samples per study, *N* = total sample size per study, year = year of data collection, publication = publication type, BC = book chapter, CP = conference proceedings or conference presentation, DI = dissertation, JA = journal article, WP = working paper. Studies with various countries reported individual country data, while studies with mixed data sets utilized a pooled data set consisting of several countries. "na" denotes not applicable. ATB = attitude, EE = entrepreneurship education, ERM = entrepreneurial role models, ESE = entrepreneurial self-efficacy, GE = general education, PBC = perceived behavioral control, PFE = prior founding experience, SE = self-efficacy, SN = subjective norm, TPB = theory of planned behavior, WE = work experience. A variable that is marked with * is the only variable that has been included in the respective mediation analysis.

Based on the TPB, the present study develops a path model for the impact of personal background factors (i.e., prior founding experience, entrepreneurial role models, work experience as well as general and entrepreneurship education) on individuals' EI mediated through attitude, subjective norm, and perceived behavioral control. The TPB claims that these attitudinal variables determine intention. However, attitudinal variables can be altered by personal background factors (Eagly & Chaiken, 1993; Robinson et al., 1991). Thus, intention derives from attitudes, which, in turn, are influenced by exogenous influences such as personal background factors (Ajzen, 1987; von Graevenitz, Harrhoff, & Weber, 2010), suggesting a more complex pathway leading to EI. We validate our research model by integrating existing empirical evidence (160 studies and 145,705 individuals) and applying meta-analytical structural equation modeling (MASEM).

Our study offers two contributions: first, we contribute to resolving the previously inconclusive relationships between individuals' personal background factors and EI based on broad empirical evidence. Integrating prior empirical findings by means of meta-analysis allows to identify overall directions and effect sizes when previous research yielded ambiguous findings (Rauch & Frese, 2006). We take a comprehensive approach and test the impact of five personal background factors providing insights into the unique and shared influence of the different factors in explaining EI.

Second, we clarify the underlying path leading to EI. Prior meta-analyses contributed to a better understanding of competing EI models (Schlaegel & Koenig, 2014) as well as the effect of more distal antecedents on attitudes and EI (Haus et al., 2013; Martin, McNally, & Kay, 2013). Building on and extending these studies, we begin to answer recent calls to more closely examine the underlying pathways behind the formation of EI (Fayolle & Liñán, 2014; Shook, Priem, & McGee, 2003). Based on the obtained knowledge, we are able to provide practical implications for initiatives promoting entrepreneurship and entrepreneurs themselves. By this,

we answer calls (Frese, Rousseau, & Wiklund, 2014; Shook, Priem, & McGee, 2003) for a more systematic aggregation and evaluation of the cumulative evidence in entrepreneurship research which ultimately leads to the formation of action principles that bridge the gap between entrepreneurship research and practice (Frese et al., 2012; Rauch & Frese, 2006).

3.1 Development of the research model and hypotheses

Starting a business is a prime example of a non-affective behavior, as its execution requires extensive planning (e.g., writing a business plan) beforehand (Bird, 1988; Katz & Gartner, 1988). The most accurate way to predict which individuals will conduct a planned behavior is to analyze which individuals display a high level of intention towards the focal behavior (Bagozzi, Baumgartner, & Yi, 1989; Kim & Hunter, 1993). More specifically, EI – an individual's commitment to start a new business – is the immediate precursor of actual start-up behavior (Kautonen, Van Gelderen, & Tornikoski, 2013; Krueger & Carsrud, 1993). Hence, studying EI contributes to better understand the formation of new ventures (Krueger, Reilly, & Carsrud, 2000; Schlaegel & Koenig, 2014). Moreover, focusing on EI instead of entrepreneurial behavior helps avoiding methodological pitfalls. This includes selection bias (stemming from sampling only existent and hence successful founders) as well as hindsight and retrospective bias (resulting from analyzing new venture formation ex post) (Davidsson & Honig, 2003; Krueger & Carsrud, 1993).

The TPB (Ajzen, 1991) is the dominant theoretical framework for explaining intentions and is widely established in predicting planned behaviors across a wide area of research fields (Ajzen, 1991; Armitage & Conner, 2001; Manstead, 2011). The TPB claims that intention has three attitudinal determinants. In the entrepreneurship context, the more favorable individuals' outcome expectations of starting a business (attitude), the higher the perceived social pressure to start a business (subjective norm), and the greater the perceived ease of and control over starting a business (perceived behavioral control), the stronger individuals' EI will be (Ajzen,

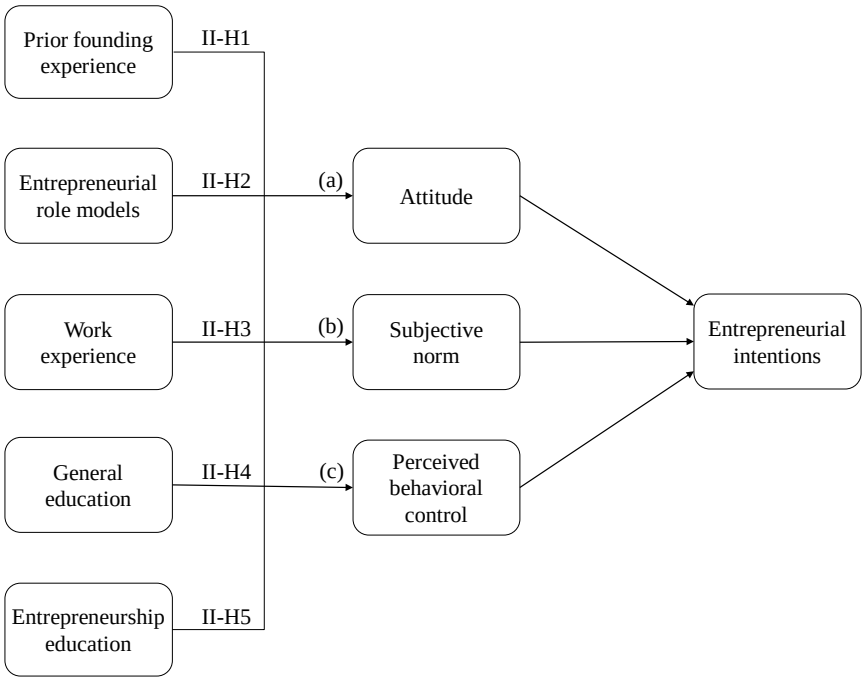
1991, 2002; Krueger & Carsrud, 1993). Recent meta-analyses (Haus et al., 2013; Schlaegel & Koenig, 2014) confirm that TPB's attitudinal determinants display ample predictive validity in entrepreneurship research and also have a higher explanatory power compared to Shapero's conceptually related entrepreneurial event model. Following TPB rationale, an individual's EI is not constant but rather depends on her/his attitude, subjective norm, and behavioral control in regard to starting a business. However, these attitudinal determinants may be altered by different personal background factors (Ajzen, 1987; von Graevenitz, Harhoff, & Weber, 2010).

Prior literature reveals five particularly salient personal background factors whose influence on EI has been analyzed and discussed in literature reviews (e.g., Gorman, Hanlon, & King, 1997; Liñán & Fayolle, 2015; Pittaway & Cope, 2007; Shook, Priem, & McGee., 2003; Van der Sluis, Van Praag, & Vijverberg, 2008; Zapkau, Schwens, & Kabst, forthcoming) or bivariate (direct-effects) meta-analyses (e.g., Bae et al., 2014; Martin, McNally, & Kay, 2013; Van der Sluis, Van Praag, & Vijverberg, 2004, 2005). Consistent with prior research, suggesting that personality traits matched to task characteristics of entrepreneurs are particularly influential on individuals' decision to start a business (Frese & Gielnik, 2014; Rauch & Frese, 2007a), we distinguish between personal background factors with high and low task-relevance for entrepreneurship. Prior founding experience, entrepreneurial role models, and entrepreneurship education constitute personal background factors with high task-relevance for entrepreneurship, whereas work experience and general education have low task-relevance. *Prior founding experience* attributes to individuals who have previously started a business (Delmar & Shane, 2006; Krueger, 1993). *Entrepreneurial role models* include close attachment figures such as parents, relatives, or friends who have previously started a business (e.g., Scherer, Adams, & Wiebe, 1989). *Work experience* encapsulates all events experienced by individuals that relate to the performance of a job (Quinones, Ford, & Teachout, 1995). *General education* refers to individuals' total years of formal education (Dickson, Soloman, & Weaver,

2008). *Entrepreneurship education* refers to "any pedagogical program or process of education for entrepreneurial attitudes and skills" (Fayolle, Gailly, & Lassas-Clerc, 2006, p. 702).

According to TPB rationale, the effect of exogenous influences such as personal background factors on EI is assumed to be fully mediated by attitude, subjective norm, and perceived behavioral control (Ajzen, 1991; Manstead & Parker, 1995). While the majority of prior research investigates direct influences of personal background factors on EI (Zapkau et al., 2015), some studies develop and empirically test path models, which are more consistent with the theoretical thrust of the TPB (i.e., personal background factors change TPB's attitudinal determinants (Ajzen, 1987; von Graevenitz, Harrhoff, & Weber, 2010)). For example, prior research suggests that the influence of prior founding experience and entrepreneurial role models on EI is mediated through TPB's attitudinal variables (Liñán & Chen, 2009; Mueller, Zapkau, & Schwens, 2014). Moreover, other studies suggest that the attitudinal variables of the TPB also mediate the effect of work experience (Zapkau et al., 2015), and general education (Kolvereid & Isaksen, 2006), as well as entrepreneurship education (Siu & Lo, 2013; Souitaris, Zerbinati, & Al-Laham, 2007) on EI. Although existing studies using mediation analysis have methodological shortcomings (e.g., only four studies tested the significance of the specific indirect effects for different mediators) limiting conclusions regarding mediation, they provide valuable insights into the potential pathways connecting personal background factors with EI. Consistent with and in an effort to expand this existing knowledge, we develop a path model for the impact of a comprehensive set of personal background factors on EI mediated by attitude, subjective norm, and perceived behavioral control. Figure 3.1 displays our research model. Next, we develop the research model's underlying hypotheses in greater detail.

Figure 3.1 Conceptual model



3.1.1 Prior founding experience

Prior founders realize an experience curve through prior founding attempts (Alsos & Kolvereid, 1998; MacMillan, 1986). Through this, individuals obtain more realistic outcome expectations (Westhead & Wright, 1998) as well as human, social, and financial capital, which may be utilized in subsequent founding attempts (Kim, Aldrich, & Keister, 2006). Hence, we expect prior founding experience to positively affect individuals' attitudes in regard to starting a business and, in turn, their EI.

Experience gained in the course of a prior founding attempt is assumed to alter individual's attitude towards future founding attempts and, in turn, individuals' EI (Westhead & Wright, 1998). By preferring self-employment over a career in paid employment, prior founders have already indicated to have a positive attitude towards starting a business. This attitude depends on the expected personal consequences from starting a business (Krueger & Carsrud, 1993). Prior research has identified a multitude of consequences individuals expect from starting a business, which in turn affect their attitude towards this behavior. These outcome

expectations include being innovative (e.g., new accomplishments, learning), being independent (e.g., autonomy, control, flexibility), recognition (e.g., approval, status), achieving financial success (e.g., increase of personal wealth, realization of economic opportunities), or pursuing self-realization (e.g., pursuit of self-directed goals, challenging work environment) (Birley & Westhead, 1994; Carter et al., 2003; Kolvereid, 1996a). In addition, prior entrepreneurs are on average more optimistic in evaluating the outcomes of new business opportunities than non-entrepreneurs (Busenitz & Barney, 1997; Hmieleski & Baron, 2009) enhancing their attitude towards starting a business resulting in a stronger EI.

Prior founding experience may also affect individuals' subjective norm in regard to starting a business resulting in turn in a higher level of EI. From an ecological perspective (Hannan & Freeman, 1993), prior founding experience may signal the legitimacy of a new founding project to outsiders (Shane & Khurana, 2003). Particularly, reference people may encourage prior founders to repeat vocational activities in which they already have accumulated human and social capital. In contrast to other vocational opportunities, starting another business gives prior founders the opportunity to realize greater utility from previously accumulated capital (Douglas & Shepherd, 2000, 2002). Moreover, reference people may even perceive individuals with prior founding experience as competent to successfully implement joint business opportunities (MacMillan, 1986). This argumentation is bolstered by meta-analytical evidence finding individuals with human capital with high task-relation to entrepreneurship such as prior founding experience to be more successful than novice founders without such experience (Unger et al., 2011).

Prior founding experience may also influence individuals' perceived behavioral control, as prior founding attempts enables them to accumulate knowledge and skills relevant for starting subsequent ventures (Kim, Alderich, & Keister, 2006; MacMillan, 1986). The benefits of prior founding experience in this regard may be threefold (Campbell, 1992; Delmar & Shane,

2006): first, prior founding experience provides tacit knowledge of organizational routines and skills, which novice founders usually lack. This knowledge includes managerial and technical skills such as the ability to identify profitable market niches, promising opportunities as well as required resources (Kim, Alderich, & Keister, 2006). Second, prior founding experience provides individuals with role familiarity making it easier to fulfill necessary roles and responsibilities in a new venture. That is, experienced founders know which firm organization activities to prioritize (Duchesneau & Gartner, 1990; Ericsson & Smith, 1991) and how to identify relevant information channels for identifying and exploiting promising opportunities (Delmar & Shane, 2006). Third, prior founding experience provides individuals with a network of potential employees, suppliers, customers, and investors (Campbell, 1992). Individuals can build upon such social ties in subsequent start-up attempts. In sum, experienced entrepreneurs are likely to have a higher perceived behavioral control over founding-related tasks and skills compared to novice founders (Starr & Bygrave, 1991; Wright, Westhead, & Sohl, 1998) ultimately enhancing individuals' EI. These arguments lead to the following hypothesis:

Hypothesis II-1: Prior founding experience has a positive impact on entrepreneurial intention. The relationship is mediated by a) attitude, b) subjective norm, and c) perceived behavioral control.

3.1.2 Entrepreneurial role models

Social learning theory (Bandura, 1977, 1986) emphasizes the role of behavior acquisition through observational learning from important others (i.e., role models). Observing such role models affects individuals' attitudes towards specific vocational opportunities such as an entrepreneurial career (Bandura, 1977; Lent, Brown, & Hackett, 1994). Hence, we expect individuals with entrepreneurial role models to have more positive attitudes in regard to starting a business and, in turn, higher levels of EI.

Prior research suggests that individuals adopt a positive attitude towards starting a business from entrepreneurial role models (Liñán & Santos, 2007). Observing vocational behaviors of entrepreneurial role models enables individuals to build cognitive evaluations of their own actual or future capabilities and interests. Specifically, exposure to entrepreneurial role models facilitates individuals to evaluate outcome expectations regarding an entrepreneurial career (Krumboltz, Mitchell, & Jones, 1976; Scherer, Adams, & Wiebe, 1989). In turn, this exposure shapes an individual's attitude in regard to starting a business (Carr & Sequeira, 2007) as role models may encourage and reinforce an individual's preferences and interests toward an entrepreneurial career (Schoon & Duckworth, 2012). Consistent with TPB rationale, an enhanced attitude towards starting a business leads to stronger EI.

Individuals with contacts to entrepreneurial role models may also perceive social pressure to follow their career path (Nishimura & Tristán, 2011), as social norms need to be shared and mainly evolve through interactions with others (Cialdini & Trost, 1998). Through discussions with entrepreneurial role models, individuals may attain insights into different career opportunities. Entrepreneurial role models may use this influence to motivate individuals' towards an entrepreneurial career (van Auken, Fry, & Stephens, 2006) ultimately leading to a stronger EI. Moreover, individuals have a high likelihood of being integrated into their role models' social networks applying additional social pressure on them to pursue an entrepreneurial career (Kim, Aldrich, & Keister, 2006). The influence of entrepreneurial role models on individuals' subjective norms is enhanced in uncertain situations (entrepreneurship is regularly perceived as involving a high degree of uncertainty) where individuals particularly stick to the norms of important others (Cialdini & Trost, 1998; Engle et al., 2010).

The observation of entrepreneurial role models may also enable individuals to acquire specific know-how and skills necessary for starting a business (Scherer, Adams, & Wiebe, 1989). Individuals may receive business knowledge and methods from their entrepreneurial role

models. This human capital may raise an individual's perceived feasibility of starting a business (Dunn & Holtz-Eakin, 2000; Scherer, Brodzinski, & Wiebe, 1991) and, in turn, increase an individual's EI. Moreover, individuals may also receive social (e.g., network contacts) or financial capital from their entrepreneurial role models further enhancing their perceived behavioral control in regard to starting a business (Kim, Aldrich, & Keister, 2006; Liñán & Santos, 2007) ultimately leading to higher EI. These arguments lead to the following hypothesis:

Hypothesis II-2: Entrepreneurial role models have a positive impact on entrepreneurial intention. The relationship is mediated by a) attitude, b) subjective norm, and c) perceived behavioral control.

3.1.3 Work experience

Work experience equips individuals with general and potentially also specific human capital (Brüderl, Preisendörfer, & Ziegler, 1992; Kim, Aldrich, & Keister, 2006), which influences individuals' attitudes towards an entrepreneurial career (Dyer, 1994; Unger et al., 2011). Additionally, work experience provides individuals with more realistic evaluations of different career opportunities (Krumboltz, Mitchell, & Jones, 1976; Mitchell & Krumboltz, 1984). We argue that work experience positively affects individuals' attitudes, ultimately leading to a stronger EI.

Prior research suggests that individuals with certain characteristics such as tolerance toward work effort, affinity to risk, or need for independence will develop a positive attitude toward an entrepreneurial career once their outcome expectations of such a career are more positive than working in paid employment (Douglas & Shepherd, 2002). Particularly work experience perceived as negative may lead individuals' to perceive an entrepreneurial career as more rewarding (Dyer, 1992) ultimately enhancing their EI. Moreover, work experience – in particular the one experienced in small or newly founded firms – may also foster an individual's

development of entrepreneurial work attitudes (Kautonen, Luoto, & Tornikoski 2010b; Parker, 2004). In the same vein, Dyer (1994) suggests that individuals who previously worked for an entrepreneur develop a preference for an entrepreneurial lifestyle.

Additionally, prior work experience may also influence individuals' subjective norms. Attachment figures may more likely perceive it as a reasonable career alternative for an individual to start a business if the individual gained human capital through prior work experience in particular in a small or newly founded firm (Douglas & Shepherd, 2000, 2002). Moreover, existing customers may encourage individuals to start their own business as work experience in a particular industry gives individuals a better understanding of how to meet demand conditions in this particular industry (Johnson, 1986). This rationale is supported by prior research suggesting that individuals often start new businesses in industries close to their last employment (Aldrich, 1999; Cooper, Dunkelberg, & Woo, 1988).

By providing different types of learning experiences, general work experience may particularly influence individuals' perceived behavioral control, resulting in turn in a higher EI. Besides general business-related skills, such experience may provide individuals with industry-specific knowledge allowing them to identify profitable business opportunities (Shepherd & DeTienne, 2005) or other industry-related specifics (Shane, 2003). Moreover, individuals may enter business networks and develop relationships to customers and suppliers, which prove beneficial in an own startup attempt (Kim, Aldrich, & Keister, 2006). Together, this leads us to put forth the following hypothesis:

Hypothesis II-3: Work experience has a positive impact on entrepreneurial intention. The relationship is mediated by a) attitude, b) subjective norm, and c) perceived behavioral control.

3.1.4 General education

Educational measures may also influence individuals' attitudes towards starting a business (von Graevenitz, Harhoff, & Weber, 2010; Wu & Wu, 2008). Human capital theory (Becker, 1962, 1964) and signaling theory (Van der Sluis, Van Praag, & Vijverberg, 2008) suggest a positive influence of general education on individual's propensity to pursue an entrepreneurial career. Education enhances individuals' outcome expectations regarding an entrepreneurial career and provides individuals with skills and knowledge (albeit with low task-relatedness) (Unger et al., 2011), which may be signaled to potential stakeholders (Van der Sluis, Van Praag, & Vijverberg, 2008). Hence, we contend that general education positively affects individuals' attitudes in regard to starting a business and ultimately leads to a stronger EI.

We argue that higher levels of general education lead to a more positive attitude towards starting a business ultimately resulting in a higher level of EI. Human capital theory (Becker, 1962, 1964) assumes general education to positively influence individuals' outcome expectations regarding an entrepreneurial career, as human capital increases individuals' options and capabilities making such a career more valuable (Dickson, Solomon, & Weaver, 2008). Supporting this rationale, meta-analytic evidence suggests a positive relation between human capital and entrepreneurial success elevating individuals' outcome expectations in regard to an entrepreneurial career (Unger et al., 2011; Van der Sluis, Van Praag, & Vijverberg, 2005, 2008).

General education may also increase individual's subjective norm in regard to starting a business, which may influence the individual to have a higher EI. Attachment figures are more likely to regard individuals to have profound capabilities to start a business when the individuals have a high education level. Moreover, general education signals entrepreneur's ability to

outsiders, which is particularly useful in markets with incomplete information (Van der Sluis, Van Praag, & Vijverberg, 2008).

Through general education individuals attain codified knowledge, elevating their perceived behavioral control in regard to starting a business (Van der Sluis, Van Praag, & Vijverberg, 2008). That is, the codified knowledge acquired through education gives individuals a better understanding of the general rules their environment consists of. Moreover, education raises an individual's ability to obtain and exploit more codified information regarding working and non-working related conditions (Ferrante & Sabatini, 2007; Wu & Wu, 2008). Examples include managerial and learning abilities (Calvo & Wellisz, 1980; Le, 1999). Moreover, individuals with higher education perceive more business opportunities compared to individuals with lower education (Arenius & De Clercq, 2005). We therefore derive the following hypothesis:

Hypothesis II-4: General education has a positive impact on entrepreneurial intention. The relationship is mediated by a) attitude, b) subjective norm, and c) perceived behavioral control.

3.1.5 Entrepreneurship education

Entrepreneurship education programs usually incorporate theoretical and active elements such as interactive learning, experience-based learning, or entrepreneurial role models and provide access to business networks (Peterman & Kennedy, 2003). Building on human capital theory (Becker, 1962, 1964) as well as social learning theory (Bandura, 1977, 1986) and on the basic assumption that entrepreneurship can be taught (Gorman, Hanlon, & King, 1997), such education specifically aims at enhancing individuals' entrepreneurial attitudes and ultimately their EI (Dickson, Solomon, & Weaver, 2008).

Entrepreneurship education programs specifically aim at elevating individuals' perceived desirability of starting a business by demonstrating students that this behavior is highly regarded and personally rewarding (Souitaris, Zerbinati, & Al-Laham, 2007). To this end, entrepreneurship education programs provide participants with social experiences such as observing entrepreneurial role models (Peterman & Kennedy, 2003). Moreover, program participants acquire specific human capital in regard to an entrepreneurial career elevating the outcome expectations resulting from such an occupational choice (Douglas & Shepherd, 2002; Galloway et al., 2005) resulting in a more favorable attitude and, in turn, stronger EI.

Entrepreneurship education may also affect a participant's subjective norm in regard to starting a business and, in turn, his/her EI. An entrepreneurial career is perceived as reasonable by attachment figures if the individual possesses the necessary human capital (Douglas & Shepherd, 2000, 2002). Entrepreneurship education signals the legitimacy of a founding project to attachment figures (Shane & Khurana, 2003), who may even approach individuals with business ideas (MacMillan, 1986). Besides, entrepreneurship education programs may also exert social pressure to further motivate participants to become entrepreneurs (Bae et al., 2014; Zhao, Seibert, & Hills, 2005).

Targeting individuals' perceived behavioral control over the process of starting a business, entrepreneurship education programs also include active elements to give participants opportunities to vicariously learn (e.g., trainee programs in entrepreneurial firms) or attain mastery experience (e.g., writing a business plan) (Bae et al., 2014; Peterman & Kennedy, 2003). Participants of entrepreneurship education programs may also profit from access to business incubator resources helping them to evaluate and develop business opportunities and providing them with financial capital or network contacts (Souitaris, Zerbinati, & Al-Laham, 2007). In sum, we hypothesize:

Hypothesis II-5: Entrepreneurship education has a positive impact on entrepreneurial intention. The relationship is mediated by a) attitude, b) subjective norm, and c) perceived behavioral control.

3.2 Methodology

3.2.1 Literature search

We conducted a comprehensive search of published and unpublished empirical studies, covering a time period of 23 years (1991 to December 2014). As our model is based on the TPB we decided to use 1991 (the year in which Ajzen's TPB article was published) as the starting point for our literature search. We used several procedures to identify relevant studies that have examined the relationships between personal background factors, the attitudinal variables included in the TPB, and EI. First, we examined qualitative (e.g., Gorman, Hanlon, & King, 1997; Krueger, 2009; Kuehn, 2008; Pittaway & Cope, 2007; Shook, Priem, & McGee, 2003) and quantitative literature reviews (e.g., Haus et al., 2013; Martin, McNally, & Kay, 2013; Zhao, Seibert, & Lumpkin, 2010) to obtain articles. Second, using various keywords and combinations of keywords (e.g., *entrepreneurial intention, theory of planned behavior, attitude, subjective norm(s), perceived behavioral control, entrepreneurial exposure, entrepreneurship/entrepreneurial education, entrepreneurial experience, role model(s) etc.*), we examined several electronic databases (ABI/INFORM Global, EBSCO, and Scopus). Third, we manually searched relevant journals issue-by-issue and in-press articles (e.g., *Journal of Business Venturing, Entrepreneurship Theory and Practice, Journal of Small Business Management, and International Small Business Journal)* as well as various conference programs and proceedings (e.g., Babson College Entrepreneurship Research Conference, Annual Meeting of the Academy of Management) to obtain unpublished articles. In addition, we conducted an unstructured search using Google as well as Google Scholar in an effort to identify additional unpublished studies (Rosenthal, 1995) and posted requests on electronic list

servers. Finally, we explored the reference lists of all articles and searched all studies citing the identified articles using Google Scholar and Scopus. We repeated this process until no more relevant empirical studies could be identified. In an effort to reduce a potential language bias (Rothstein, Sutton, & Borenstein, 2005), the literature search included various languages (i.e., English, German, French, and Spanish).

3.2.2 Inclusion criteria and coding procedure

For inclusion in the meta-analysis, we selected studies on the basis of two criteria. First, articles needed to be quantitative empirical studies (e.g., reporting numerical relations between personal background factors, TPB's attitudinal variables, and EI). Second, we included only studies that reported the *r*-family of effect sizes. Following the recommendations of Geyskens et al. (2009), we used *t* statistics and beta-coefficients when correlation coefficients were not available. When only *t* statistics were available, we calculated effect sizes based on the degrees of freedom and *p* values (Lipsey & Wilson, 2001). When only beta coefficients were available, we calculated effect sizes based upon the procedure described by Peterson and Brown (2005). In the case that several studies were based on the same data set, we only included the article that reported the highest amount of information so that the effect sizes included in our study are based on independent observations (Hunter & Schmidt, 2004). The literature search resulted in a final sample of 160 studies (208 independent samples, n = 145,705) containing comprehensive information for analysis.

Table 3.1 presents a summary of all studies included in the meta-analysis. Two of the authors independently coded the studies drawing on a coding protocol. Following the recommendation in the literature (Orwin & Vevea, 2009), we applied Cohen's kappa statistic (Cohen, 1960) to examine inter-coder reliability. The overall agreement prior to correcting discrepancies was .77, which is considered to be a substantial agreement (Landis & Koch, 1977). All inconsistencies were resolved through discussion.

3.2.3 Analytic procedures

Bivariate meta-analysis.

In order to correct for sampling error and measurement error, we employed the meta-analytic procedures proposed by Hunter and Schmidt (2004). Following the recommendations in the literature (Geyskens et al., 2009), we corrected for measurement error in the dependent and independent variables for those relationships for which measurement reliabilities were available. We utilized the respective internal reliability estimates for those studies that provided this information and used the average internal reliability estimate across all studies reporting reliability information for the respective variable otherwise (Lipsey & Wilson, 2001). The heterogeneity of effect sizes was assessed using the chi-squared based *Q* statistic and the I^2 (Huedo-Medina et al., 2006).

Meta-analytic structural equation modeling.

We used MASEM to test the hypothesized relationships. We followed the recommendations in the literature (Landis, 2013; Viswesvaran & Ones, 1995) and constructed the correlation matrix based on the results of the bivariate meta-analyses and sample size-adjusted mean correlation coefficients. We used the harmonic mean (N_{HM} = 10,783) of the total sample size per relationship across all examined relationships as the sample size in the MASEM (Viswesvaran & Ones, 1995). We used AMOS 21 (Arbuckle, 2012) and maximum likelihood estimation to test the path model. Given the sensitivity of the chi-square (χ^2) statistics to sample size (Bentler & Bonett, 1980), we used the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) in addition to the chi-square test to evaluate the model fit.

3.3 Results

3.3.1 Results of bivariate meta-analysis

Table 3.2 presents the results of the bivariate meta-analysis regarding the relationships between the respective constructs included in our research model. All three attitudinal determinants of the TPB have a significant ($p < .001$) and positive relationship with EI (attitude $r_c = .49$; subjective norm $r_c = .30$; perceived behavioral control $r_c = .32$). Further, our results show that the relationships between prior founding experience and EI ($r_c = .19$) as well as the attitudinal determinants of the TPB are significant ($p < .001$) and positive (attitude $r_c = .14$; subjective norm $r_c = .12$; perceived behavioral control $r_c = .21$). The relationships between exposure to entrepreneurial role models and EI ($r_c = .14$; $p < .001$) as well as with the attitudinal determinants of the TPB are positive (attitude $r_c = .11$; subjective norm $r_c = .14$; perceived behavioral control $r_c = .14$) and significant ($p < .001$). Work experience is significantly and positively related to EI ($r_c = .10$; $p < .001$), attitude ($r_c = .05$; $p < .05$), and perceived behavioral control ($r_c = .12$; $p < .001$), whereas the relationship with subjective norm ($r_c = -.04$) is insignificant. General education has a positive and significant relation with attitude ($r_c = .05$; $p < .05$), while the relationships with EI ($r_c = .03$), subjective norm ($r_c = -.01$), as well as with perceived behavioral control ($r_c = .05$) are not significant. Lastly, entrepreneurship education has a positive and significant ($p < .001$) relation with EI ($r_c = .13$) as well as with perceived behavioral control ($r_c = .10$). The relationships between entrepreneurship education and attitude ($r_c = .03$) as well as between entrepreneurship education and subjective norm ($r_c = -.04$) are statistically insignificant.

We followed the recommendations in the literature (O'Boyle, Rutherford, & Banks, 2014) and tested whether and to what extent possible publication bias affects our results. We applied a combination of different tests to reduce Type I error in publication bias analysis and used Duval and Tweedie's (2000) trim-and-fill procedure, Egger's regression test (Egger et al.,

1997), as well as Begg and Mazumdar's (1994) rank correlation test. The results are presented on the right side of Table 3.2. The results of the publication bias analysis suggest that publication bias impacts the effect size for the relationships between subjective norm and EI as well as between entrepreneurship education and PBC (change in effect size and significant results for Egger's test as well as Begg and Mazumdar's test. These two effect sizes are overestimated and the trim-and-fill adjusted effect sizes are smaller than the unadjusted effect sizes. While we use the unadjusted effect sizes in the following MASEM and mediation analysis, we also performed robustness checks using the trim-and-fill adjusted effect sizes to examine if our results are driven by publication bias.

Table 3.2 Bivariate meta-analytic results for the main relationships and result of publication bias analyses

										Trim and Fill				Egger	B & M
Relationship	***k***	***N***	***r***	r_c	**SE**	**95 % CI**		***Q***	I^2	***ik***	r_{cTF}	**95 % CI**		**Δ*r***	***B***	***Kendall's Tau a***
ATB - EI	106	43,306	.45	.49***	.02	.44	.62	2351.67***	.96	0	.49	.44	.62	.00	2.03 (.14)	-.07 (.26)
SN - EI	99	37,237	.39	.30***	.02	.27	.34	1232.85***	.92	2	.28	.25	.32	.02	-1.15 (.00)	.16 (.02)
PBC - EI	120	54,573	.37	.36***	.02	.35	.37	1627.70***	.93	0	.36	.35	.37	.00	1.01 (.20)	-.10 (.12)
PFE - EI	47	25,471	.20	.19***	.01	.16	.22	2010.84***	.78	0	.19	.16	.22	.00	.17 (.75)	.11 (.27)
PFE - ATB	30	8,290	.14	.14***	.02	.10	.17	74.68***	.61	0	.14	.10	.17	.00	.09 (.67)	.05 (.70)
PFE - SN	31	8,595	.13	.12***	.02	.07	.16	119.13***	.75	4	.10	.05	.14	.02	.04 (.64)	.06 (.61)
PFE - PBC	33	8,746	.18	.21***	.02	.16	.25	125.65***	.75	0	.21	.16	.25	.00	.33 (.47)	.00 (.99)
ERM - EI	74	49,042	.14	.14***	.01	.12	.17	420.90***	.83	9	.12	.10	.15	.02	.07 (.56)	.01 (.87)
ERM - ATB	22	17,694	.10	.11***	.02	.07	.15	138.75***	.85	3	.08	.05	.12	.03	.27 (.63)	-.03 (.83)
ERM - SN	23	10,703	.14	.14***	.02	.10	.17	72.16***	.70	3	.11	.07	.14	.03	-.08 (.12)	.15 (.33)
ERM - PBC	28	20,060	.12	.14***	.02	.10	.17	127.12***	.79	0	.14	.10	.17	.00	.10 (.90)	-.02 (87)
WE - EI	23	20,217	.09	.10***	.02	.07	.14	117.96***	.81	0	.10	.07	.14	.00	-.11 (.91)	.02 (.89)
WE - ATB	6	6,707	.10	.05*	.02	.02	.09	10.39†	.52	na	na	na	na	na	na	na
WE - SN	6	6,707	.00	-.04	.03	-.09	.01	19.25**	.74	na	na	na	na	na	na	na
WE - PBC	7	6,809	.10	.12***	.02	.08	.16	17.95**	.67	na	na	na	na	na	na	na
GE - EI	15	13,861	.05	.03	.02	-.01	.07	74.79*	.81	3	.01	-.02	.04	.02	-.19 (.21)	.23 (.24)
GE - ATB	5	2,221	.05	.05*	.02	.02	.09	2.63	.52	na	na	na	na	na	na	na
GE - SN	4	2,040	.06	-.01	.05	-.10	.08	16.83***	.82	na	na	na	na	na	na	na
GE - PBC	7	7,133	.12	.05	.03	-.01	.11	47.40***	.87	na	na	na	na	na	na	na
EE - EI	36	25,882	.14	.13***	.02	.08	.18	460.82***	.92	0	13	.08	.18	.00	-.78 (.01)	.22 (.06)
EE - ATB	16	7,912	.09	.03	.05	-.07	.13	254.17***	.94	0	.03	-.07	.13	.00	-.44 (.78)	.17 (.37)
EE - SN	12	6,783	.01	-.04	.05	-.14	.07	175.12***	.94	1	-.05	-.15	.08	.01	-1.93 (.12)	.00 (.99)
EE - PBC	21	9,107	.18	.10***	.03	.07	.12	185.54***	.89	0	.10	.07	.02	.00	-1.29 (.05)	.37 (.02)

Note: EI = Entrepreneurial intention, ATB = Attitude, SN = Subjective norm, PBC = Perceived behavioral control, PFE = Prior founding experience, WE = Work experience, ERM = Entrepreneurial role models, EE = Entrepreneurship education, GE = General education. *k* = number of independent samples, *N* = aggregated sample size, *r* = uncorrected mean correlation coefficient, r_c = reliability and sample size corrected mean correlation coefficient, SE = standard error, CI = confidence interval, *ik* = number of trim and fill imputed correlations, r_{cTF} = trim and fill adjusted corrected mean correlation coefficient, Δ*r* = difference between r_c and r_{cTF}. For both the Egger's test as well as the Begg and Mazumdar procedure *p* Values are shown in parentheses.
* $p < .05$; ** $p < .01$; *** $p < .001$.

3.3.2 Results of meta-analytic structural equation modeling

Consistent with Ajzen (1991), we argue that personal background factors impact EI mediated through the attitudinal variables included in the TPB. We utilized MASEM and mediation analysis (Preacher & Hayes, 2008) to test our hypotheses. Table 3.3 presents sample descriptives and the meta-analytic correlation matrix.

Table 3.3 Meta-analytic correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11
1 Entrepreneurial intention	.83	106 (43,306)	99 (37,337)	120 (54,573)	47 (25,461)	74 (49,116)	36 (25,882)	15 (13,861)	23 (20,217)	40 (38,571)	70 (55,016)
2 Attitude	.40	.82	80 (27,538)	83 (33,231)	31 (8,290)	22 (17,694)	16 (7,912)	5 (2,221)	6 (6,707)	26 (12,635)	37 (21,678)
3 Subjective norm	.31	.27	.80	79 (26,608)	31 (8,595)	23 (10,703)	12 (6,783)	4 (2,040)	6 (6,707)	24 (11,462)	33 (12,380)
4 Perceived behavioral control	.33	.35	.27	.78	33 (8,746)	28 (20,060)	21 (9,107)	7 (7,133)	7 (6,809)	25 (14,626)	41 (28,811)
5 Prior founding experience	.17	.12	.10	.18	-	20 (17,994)	16 (17,009)	5 (7,228)	6 (6,491)	25 (11,723)	33 (21,460)
6 Entrepreneurial role models	.13	.09	.12	.12	.18	-	21 (21,657)	8 (8,574)	15 (14,307)	18 (14,995)	37 (37,113)
7 Entrepreneurship education	.12	.03	-.03	.09	.22	.10	-	5 (6,736)	9 (9,276)	8 (8,119)	18 (20,141)
8 General education	.03	.05	-.01	.05	.01	-.01	.07	-	5 (6,383)	9 (13,195)	12 (14,107)
9 Work experience	.09	.12	-.03	.09	.22	.02	.10	.03	-	6 (12,264)	12 (11,350)
10 Age	.06	.02	-.03	.04	.20	-.01	.08	.15	.42	-	37 (24,703)
11 Gender	.02	.02	.02	.05	-.04	-.01	-.05	.07	-.05	-.03	-

Note: Sample size weighted correlation coefficients are presented below the diagonal. The number of independent effect sizes and the respective total sample size (in parentheses) are presented above the diagonal. Mean reliability coefficients are presented in the diagonal.

Consistent with Ajzen's (1991) formulation of the TPB, we selected a full mediation model as the hypothesized baseline model. We followed the procedure suggested by James, Mulaik, and Brett (2006) to test the type of mediation (partial vs. full mediation) in structural equation models. More specifically, we contrasted the hypothesized full mediation model with a partial mediation model (direct paths to EI for all five personal background factors) and a non-mediation model (direct paths to EI for all five personal background factors and no paths to EI for TPB's three attitudinal variables) to further test the mediating role of the attitudinal

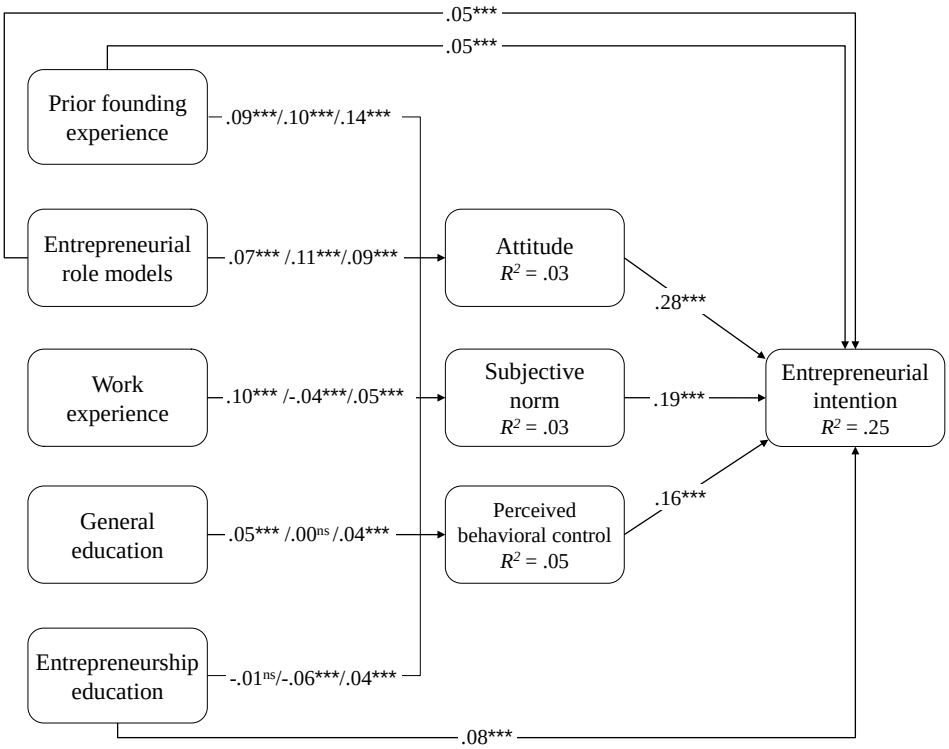
variables. The results of the model comparison are presented in Table 3.4 and Figure 3.2 shows the results of the partial mediation model.

Table 3.4 Summary of MASEM model fit and model comparison

Model	χ^2	*df*	*p*	CFI	RMSEA	SRMR	Model comparison $\Delta\chi^2(\Delta df)$
M1: Full mediation model	256.98	9	.000	.98	.05	.02	
M2: Partial mediation model	.71	2	.700	1.00	.00	.00	M1 vs. M2 256.27(7)***
M3: Non-mediation model	2,557.51	7	.000	.77	.18	.07	M2 vs. M3 2556.8(5)***

*** $p < .001$.

Figure 3.2 Results of meta-analytic structural equation modeling (revised model)



Note: All parameter estimates shown are standardized. Non-significant paths are denoted with "ns". The estimates for the relationships between the distal and proximal variables are given in the order attitude/subjective norms/perceived behavioral control. Fit statistics: $\chi^2 = 0.71$; $df = 2$; $p < .70$; CFI = 1.00; RMSEA = .00; SRMR = .00; $N_{HM} = 10{,}783$.
* $p < .05$; ** $p < .01$; *** $p < .001$.

In sum, the results of the MASEM suggest that a partial mediation model fits the data better compared to the hypothesized full mediation model as three of the five personal background factors have a significant direct effect on EI. This general result is robust to

corrections for publication bias. To further assess the mediation hypotheses and estimate the total indirect effects (Preacher & Hayes, 2008; Zhao, Lynch, & Chen, 2010), we apply a parametric bootstrapping procedure (5,000 bootstrap samples and Monte Carlo method given that a meta-analytic correlation matrix and no raw primary data is used in the analysis). In addition to the bootstrapping procedure, we used the correlation matrix to generate a data set and use the procedure suggested by Preacher and Hayes (2008) to test the indirect effects of multiple mediators. To test our hypotheses, we draw on Figure 3.2 (displaying the respective effect sizes and significance levels) and Table 3.5 (presenting the results of mediation analysis).

Table 3.5 Results of mediation analysis

Relationship	Hypothesis	Direct effect	Total and specific indirect effects		Total effect
Prior founding experience (PFE) - TPB - EI		.05**	.07*	(.060/.077)	.12**
PFE - Attitude - EI	HII-1a		.02*	(.019/.030)	
PFE - Subjective norm - EI	HII-1b		.02*	(.016/.024)	
PFE - PBC - EI	HII-1c		.02*	(.019/.027)	
Entrepreneurial role models (ERM) - TPB – EI		.05**	.06**	(.047/.062)	.10**
ERM - Attitude - EI	HII-2a		.02*	(.015/.026)	
ERM - Subjective norm - EI	HII-2b		.02*	(.016/.024)	
ERM - PBC - EI	HII-2c		.01*	(.011/.018)	
Work experience (WE) - TPB - EI		.01	.03*	(.030/.046)	.04**
WE - Attitude - EI	HII-3a		.03*	(.022/.033)	
WE - Subjective norm - EI	HII-3b		-.01**	(-.013/-.006)	
WE - PBC - EI	HII-3c		.01*	(.005/.011)	
General education (GE) - TPB - EI		.00	.02*	(.015/.027)	.02*
GE - Attitude - EI	HII-4a		.01*	(.008/.019)	
GE - Subjective norm - EI	HII-4b		.00	(-.004/.003)	
GE - PBC - EI	HII-4c		.01*	(.004/.010)	
Entrepreneurship education (EE) - TPB - EI		.08**	-.01	(-.007/.002)	.08**
EE - Attitude -EI	HII-5a		.00	(-.008/.003)	
EE - Subjective norm - EI	HII-5b		-.01*	(-.015/-.007)	
EE - PBC - EI	HII-5c		.01*	(.003/.010)	

Note: EI = entrepreneurial intention, PBC = perceived behavioral control, TPB = theory of planned behavior.
* $p < .05$; ** $p < .01$.

The MASEM results confirm the results of the bivariate meta-analysis and provide strong support for the TPB as all three determinants display a significantly ($p < .001$) positive impact on EI (attitude: .28; subjective norm: .19; perceived behavioral control: .16) (see Figure 3.2). Additionally, our findings indicate how the respective personal background factors influence

EI mediated through TPB's attitudinal variables. Hypothesis II-1 predicts that prior founding experience has a positive effect on EI mediated through attitude (HII-1a), subjective norm (HII-1b), and perceived behavioral control (HII-1c). We find that prior founding experience significantly ($p < .001$) and positively affects attitude (.09), subjective norm (.10), as well as perceived behavioral control (.14) (see Figure 3.2). Moreover, mediation analysis (see Table 3.4) suggests that the three specific indirect effects are positive and statistically significant lending support for Hypotheses II-1a, II-1b, and II-1c.

Hypothesis II-2 predicts that entrepreneurial role models have a positive effect on EI mediated through TPB's three attitudinal determinants. Exposure to entrepreneurial role models significantly ($p < .001$) influences individuals' EI through attitude (.07), subjective norm (.11) and perceived behavioral control (.09). The respective indirect effects are positive and significant supporting Hypotheses II-2a, II-2b and II-2c.

Hypothesis II-3 states that work experience has a positive effect on EI and is mediated by the attitudinal determinants of the TPB. Work experience has a significant ($p < .001$) and positive effect on attitude (.10) and perceived behavioral control (.05). Both specific indirect effects are positive and significant, supporting Hypothesis II-3a and II-3c. In contrast to our Hypothesis II-3b, work experience has a significantly negative effect on subjective norm (-.04, $p < .001$) and a negative indirect effect on EI.

Hypothesis II-4 posits that general education has a positive effect on EI mediated by the attitudinal variables of the TPB. General education displays a significant ($p < .001$) and positive effect on attitude (.05) and perceived behavioral control (.04). The respective indirect effects are positive and significant, supporting Hypotheses II-4a and II-4c. In contrast, there is no significant effect on subjective norm and no significant indirect effect on EI leading us to reject Hypothesis II-4b.

Finally, Hypothesis II-5 posits that entrepreneurship education has a positive effect on TPB's predictors of EI. Entrepreneurship education exerts a non-significant (-.01) effect on attitude, a negative and significant effect on subjective norm (-.06, $p < .001$), as well as a positive and significant effect on perceived behavioral control (.04, $p < .001$). We find no significant indirect effect of entrepreneurship education through attitude leading us to reject Hypothesis II-5a. Contrary to Hypothesis II-5b, the significant indirect effect of entrepreneurship education on EI through subjective norm is negative. In support of Hypothesis II-5c, we find a positive and significant indirect effect on EI via perceived behavioral control. The general results for the indirect effects are robust to corrections for publication bias. While the indirect effects are smaller in magnitude, they remain statistically significant.

As described above, the partial mediation model fits the meta-analytic correlation matrix significantly better than the full mediation model. The findings of the MASEM suggest that prior founding experience (.05, $p < .001$), entrepreneurial role models (.05, $p < .001$), as well as entrepreneurship education (.08, $p < .001$) have significant direct effects on EI. We also calculated the explained variance for structural equations predicting attitude (R^2 = .03), subjective norm (R^2 = .03), perceived behavioral control (R^2 = .05), and EI (R^2 = .25). These results indicate that the partial mediation model explains a moderate amount of variance in EI but only a small amount of variance in the direct TPB antecedents.

3.3.3 Additional analyses

Following the recommendations in the literature (e.g., Nimon & Oswald, 2013), we use a combination of structure coefficients (e.g., Thompson & Borrello, 1985), commonality analysis (e.g., Pedhazur, 1997), and relative importance analysis (e.g., Johnson, 2000; Tonidandel & LeBreton, 2011) to assess the relative importance of personal background factors and to examine their unique and shared effects in predicting the attitudinal TPB determinants as well as EI. Table 3.6 presents a summary of the results of these analyses.

Table 3.6 Results of regression analysis, commonality analysis, and relative weights analysis

Variable	R	R^2	β	r_{uc}	r_s	r_s^2	Unique	Common	RIW	% of R^2
Entrepreneurial intention	.50	.25								
Attitude			.278	.40	.80	.64	.065	.096	.105	42
Subjective norm			.185	.31	.62	.38	.030	.066	.058	23
Perceived behavioral control			.157	.33	.66	.44	.020	.089	.056	22
Prior founding experience			.058	.17	.34	.12	.003	.026	.012	5
Entrepreneurial role models			.045	.13	.26	.07	.002	.015	.006	2
Work experience			.026	.09	.18	.03	.001	.008	.003	1
General education			.003	.03	.06	.00	.000	.001	.000	0
Entrepreneurship education			.083	.12	.24	.06	.006	.008	.010	4
Attitude	.176	.031								
Prior founding experience			.087	.12	.68	.46	.007	.008	.010	33
Entrepreneurial role models			.074	.09	.51	.26	.005	.003	.007	21
Work experience			.099	.12	.68	.46	.009	.005	.012	38
General education			.048	.05	.28	.08	.002	.000	.002	8
Entrepreneurship education			-.010	.03	.17	.03	.000	.001	.000	0
Subjective norm	.164	.027								
Prior founding experience			.104	.10	.57	.32	.010	.000	.009	37
Entrepreneurial role models			.108	.12	.73	.53	.011	.003	.013	49
Work experience			-.049	-.03	.18	.03	.002	-.001	.002	6
General education			-.004	-.01	.06	.00	.000	.000	.000	0
Entrepreneurship education			-.059	-.03	.18	.03	.003	-.002	.002	8
Perceived behavioral control	.217	.047								
Prior founding experience			.143	.18	.83	.69	.018	.014	.025	52
Entrepreneurial role models			.090	.12	.55	.31	.008	.007	.011	23
Work experience			.051	.09	.41	.17	.003	.006	.005	11
General education			.045	.05	.23	.05	.002	.001	.002	5
Entrepreneurship education			.041	.09	.41	.17	.002	.007	.004	9

Note: β denotes beta weight, r_{uc} denotes uncorrected random effects sample-weighted mean correlation coefficients, r_s denotes structure coefficient, r_s^2 denotes squared structure coefficient. Unique = proportion of variance of the respective dependent variable explained uniquely by the respective independent variable. Common = proportion of variance in the respective dependent variable explained by the independent variable that is also explained by one or more other independent variables. RIW denotes relative importance weight.

Structure coefficients (r_s) are the Pearson correlations between each independent variable and the predicted dependent variable scores. In turn, the squared structure coefficient (r_s^2) provides the proportion of variance in the effect that can be accounted for by the independent variable, irrespective of collinearity with other independent variables (Kraha et al., 2012). For example, regarding EI, the squared structure coefficient for attitude amounts to .64, indicating that attitude accounts for 64 percent of the 25 percent explained variance (R^2) in EI. Table 3.5 indicates that despite for subjective norm, the sum of the squared structure coefficients for each of our focal constructs exceeds one, suggesting collinearity among TPB's attitudinal variables and the personal background factors.

Next, we conducted commonality analysis to divide all of the explained variance in the dependent variables (i.e., TPB's attitudinal variables and entrepreneurial intention) into unique and shared (common) parts. To this end, we computed the unique and common coefficient using the meta-analytic correlation matrix and the R code by Nimon, Oswald, and Roberts (2013). Table 5 displays that attitude (6.5%), subjective norm (3.0%), and perceived behavioral control (2.0%) uniquely explain the largest part of the variance in EI. In contrast, all five personal background factors uniquely explain less than one percent of the variance in EI. The same result can be observed for personal background factors' influence on the three TPB determinants. For the majority of relationships the personal background variables uniquely explain less than one percent of the variance of the TPB determinants. Only, prior founding experience has a unique effect equal to or larger than one percent for subjective norm (1.0%) and perceived behavioral control (1.8%). Moreover, entrepreneurial role models uniquely explain 1.1 percent of the variance in subjective norm.

Relative importance weights provide the proportionate contribution from each independent variable to R^2, after correcting for the intercorrelations among the independent variables (Kraha et al., 2012). We computed the relative importance weights using the meta-

analytic correlation matrix and the SPSS code by Lorenzo-Serva, Ferrando, and Chico (2010). Attitude is the most important predictor for EI (RIW = .105), followed by subjective norm (RIW = .058) and perceived behavioral control (RIW = .056). Prior founding experience (RIW = .012) and entrepreneurship education (RIW = .010) are the most important personal background factors relative to the other three variables in predicting EI. In turn, work experience (RIW = .012), prior founding experience (RIW = .010), and entrepreneurial role models (RIW = .007) are the most important predictors for attitude. Moreover, prior founding experience (RIW = .009; RIW = .025) and entrepreneurial role models (RIW = .013; RIW = .011) are the most important predictors for subjective norm and perceived behavioral control respectively.

Overall, these findings show that the common effect of personal background factors is often equal to or even larger than the unique effect, suggesting that these factors together influence the attitudinal determinants of the TPB. Moreover, our findings show that in particular prior founding experience and entrepreneurial role models are important drivers of the TPB determinants and that work experience, general education, and entrepreneurship education influence TPB's attitudinal variables to a lesser extent.

3.4 Discussion

The present study examines the impact of personal background factors (i.e., prior founding experience, entrepreneurial role models, work experience as well as general and entrepreneurship education) on EI, mediated by the attitudinal variables (attitude, subjective norm, and perceived behavioral control) of the TPB. Using data from 145,705 individuals reported in 160 studies, our meta-analytic study demonstrates that TPB's attitudinal determinants mediate the relationship between personal background factors and EI. However, variations in the specific pathways exist for the influence of different personal background factors on EI mediated through TPB's attitudinal determinants. Next, we discuss the theoretical and then the practical implications of our findings.

3.4.1 Implications for theory

In investigating the impact of personal background factors on EI through individuals' attitudes, we aim to make two important theoretical contributions to the literature on EI. First, aggregating the extant literature and determining the direction and strength of the relationships between different personal background factors and EI helps to clarify the ambiguous findings in previous studies. Moreover, a more complete understanding of the differential effects of personal background factors on EI offers guidance in evaluating the importance of these factors compared to other factors influencing EI.

Our results suggest that the direct effect of entrepreneurial role models, general work experience, general education, and entrepreneurship education on EI is rather small and the respective effect is smaller compared to the effect sizes for personality traits, such as risk propensity (r = .30) and those proposed in the big five model (r = .03 - .20) (Zhao, Seibert, & Lumpkin, 2010). The effect of prior founding experience can be considered as moderate and comparable to the effect of personality traits (openness: r = .20, emotional stability: r = .19) (Zhao, Seibert, & Lumpkin, 2010). Except for general education, all personal background factors have a stronger direct effect on EI than gender (female: r = -.05) (Haus et al., 2013). Compared to existing meta-analytic reviews, our findings are similar in effect size for the entrepreneurship education-EI relationship (present study: r = .13; Martin, McNally, and Kay (2013): r = .14; Bae et al. (2014): r = .13). Martin, McNally, and Kay (2013) have also examined the influence of entrepreneurship education on a set of cognitive factors (attitude, desirability, feasibility, and self-efficacy) and found a small but significant effect (r = .11). While our result for perceived behavioral control (r = .10) is comparable to this effect size, the results for attitude (r = .03) and subjective norm (r = -.04) are smaller in size. Bae et al. (2014) have also examined the relationship between general business education and EI and found a small effect (r = .05) that is similar in size to our result for general education (r = .05). Overall, these findings suggest

that the direct effect of personal background factors is rather small. Supporting previous meta-analytic evidence (Haus et al., 2013; Schlaegel & Koenig, 2014), our results further suggest that all three attitudinal variables of the TPB significantly increase individuals' EI.

As a second theoretical contribution, our study extends previous primary and meta-analytic studies examining direct effects of personal background factors such as entrepreneurship education (Martin, McNally, & Kay, 2013) on EI as well as meta-analytic evidence emphasizing that the TPB variables mediate the relationship between individual characteristics (such as gender) and EI (Haus et al., 2013).

Extant empirical research shows that EI is an important predictor of entrepreneurial behavior (e.g., Kautonen, Van Gelderen, & Fink, 2013; Kautonen, Van Gelderen, & Tornikoski, 2013; Kolvereid & Isaksen, 2006; Liñán & Rodríguez-Cohard, 2015; Rauch & Hulsink, 2014; Van Gelderen, Kautonen, & Fink, 2015). Therefore, it is imperative to identify the antecedents of EI. Prior empirical evidence (Schlaegel & Koenig, 2014) suggests that across the various theories that have been suggested in the literature, cognitive factors are able to explain a relatively large part of the intention to start a business. Thus, it is important to understand the factors affecting these cognitive variables and, in turn, EI. The theory that is primarily applied in entrepreneurship research to explain the formation of EI – Ajzen's (1991) TPB – suggests that personal background factors influence the formation of EI through cognitive variables (i.e., attitude, subjective norm, and perceived behavioral control).[1] Using the TPB as a theoretical framework to explain the impact of personal background factors on EI and based on broad empirical evidence, we identify the specific mediators and thereby the specific pathways through which these factors influence EI. The original TPB literature and most primary TPB-

[1] Besides the TPB, other theoretical models also aim at explaining the formation of EI (e.g., the entrepreneurial event model (Shapero & Sokol, 1982), Bird's (1988) contexts of intentionality model, or Davidsson's (1995) economic-psychological model). All these models explicitly propose that personal background factors indirectly influence EI through cognitive variables rather than having a direct effect.

based entrepreneurship studies have implicitly assumed that EI is influenced through all TPB determinants. In other words, no theoretical distinction has been made as to whether the influence of personal background factors on EI occurs (only) through specific TPB determinants. Our results challenge this view and suggest that future primary research may apply more fine-grained theoretical concepts and empirical analyses.

The results of the MASEM and the mediation analysis suggest that both prior founding experience and entrepreneurial role models positively influence EI through all three TPB determinants. For these two personal background factors the strengths of the indirect effects are equal for all three mediated pathways. This finding is consistent with the view that personal characteristics influence EI through all three cognitive TPB variables in the same way and, hence, that the mediators are equally important. Likewise, work experience influences EI through all three determinants of the TPB. However, in contradiction to our hypothesis, the indirect influence of work experience on EI through subjective norms is negative. Moreover, the indirect effect of work experience through attitude is stronger than the indirect effect through perceived behavioral control. General education positively influences EI only through attitude and perceived behavioral control. Moreover, for this personal background factor, attitude is a stronger mediator compared to perceived behavioral control. Entrepreneurship education has a negative indirect effect on EI through subjective norm and a positive indirect effect on EI through perceived behavioral control. Particularly the negative indirect influence of work experience and entrepreneurship education on EI through subjective norm emphasizes the importance of a more precise theorization of the different mechanisms through which personal background factors influence EI.

Overall, the findings of the current study suggest that personal background factors influence EI a) mainly *indirect* through mediators, b) through *multiple* mediational pathways, and c) that there are *specific* mediating mechanisms for some personal background factors,

resulting in different directions and effect sizes across mediational pathways. Thus, our results show researchers that different personal background factors may have unique relationships with EI through specific TPB determinants. Own entrepreneurial experience and role models result in a more favorable attitude, subjective norm, and perceived behavioral control. In contrast, work experience and general education influence EI particularly through a more favorable attitude. The findings of the commonalty analysis indicate that personal background factors and, in particular, the entrepreneurship-specific factors should be viewed as distinct but related preconditions rather than interchangeable indicators of entrepreneurial exposure. These findings are important both in theory and methodology of testing mediation as they challenge previous research testing direct effects in which the prevailing view appears to be that only specific personal background factors are direct determinants of EI.

The current findings also explain some of the ambiguous results in the existing literature. Personal background factors are distinct in their effect on EI and its direct antecedents. In addition, these factors also operate through different pathways. If personal background factors, such as prior founding experience, entrepreneurial role models, and work experience have both unique and shared effects on EI, not including a comprehensive set of personal background factors in an analysis may compromise the overall impact of personal background factors on EI or may lead to inaccurate results and implications. Moreover, if personal background factors influence EI through different mediational pathways, not including a comprehensive set of mediators and only focusing on a single mediator (e.g., entrepreneurial self-efficacy) may also lead to inaccurate results and implications. Therefore, we encourage researchers to include all personal background factors when accounting for prior entrepreneurial exposure, experience, and education and all potential cognitive mediators belonging to a specific theory such as the three attitudinal variables of the TPB.

In view of the relative strength of the indirect effects and in terms of their practical significance, our findings suggest that personal background factors explain the formation of favorable or less favorable attitudes, ultimately resulting in a higher/lower EI, only to a limited extend. Besides, our results suggest that prior founding experience, entrepreneurial role models, and entrepreneurship education also have a direct (non-mediated) effect on EI that is contrary to TPB-reasoning (Ajzen, 1991). However, this finding is consistent with previous studies suggesting that the TPB should in general be extended by direct effects of prior experience on intention (Conner & Abraham, 2001) and in the entrepreneurship context more specifically by direct effects of personality factors on EI (Krueger, 2009). However, these statistical significant direct effects should also be interpreted in light of the large sample size (harmonic mean N_{HM} = 10,783), the resulting statistical power, and the practical relevance of the relatively small effect sizes.

3.4.2 Implications for practice

The present study also has practical implications for initiatives promoting entrepreneurial activities. Our results shed light on the ways through which entrepreneurship educators, government officials, and policy makers can positively influence individuals' EI. Our findings indicate that prior founding experience and entrepreneurial role models enhance all three TPB variables. Schools, universities, and business development institutions should therefore inspire and support individuals early in life to make own experiences in being an entrepreneur. In addition to own experiences, the observation of other entrepreneurs acting as role models is another important factor to positively influence individuals' attitudes. A primary implication of our results is that schools and universities should frequently invite entrepreneurs as guest lecturers, should regularly organize events with entrepreneurs, and may use entrepreneurs as mentors in entrepreneurship courses and workshops. Moreover, integrating entrepreneurial role models and direct entrepreneurial experiences such as work experience in small or newly

founded firms which compare to prior founding experience (Kautonen, Luoto, & Tornikoski, 2010b) in curricular programs besides specific entrepreneurship education have a positive influence on individuals' attitudes towards an entrepreneurial career and in turn on their EI. These findings suggest that programs aiming at raising individuals' attitudes towards starting a business should consist of complementary theoretical and active elements, repeating earlier calls for such contents (Kautonen, Luoto, & Tornikoski, 2010b; Zapkau et al., 2015).

Our study indicates that work experience and entrepreneurship education have a *negative* influence on subjective norm, indicating that once individuals have made some general work experience or participate in entrepreneurship courses these individuals perceive important other persons as being less supportive and open towards the idea that the individual may become an entrepreneur. Educators should address these perceptions directly and openly in the entrepreneurship courses and confront the participants with potential arguments that important others may bring up against an entrepreneurial career. Such interventions might include messages about the specific positive aspects of an entrepreneurial career and should clarify issues that may cause misconceptions about entrepreneurship. Government institutions and policy makers may positively influence group beliefs of the society and thereby social norms that form subjective norms. This could be achieved by frequently emphasizing the importance of entrepreneurship and by presenting the different measures that the government and related institutions use to reduce potential downsides of entrepreneurship. If important others have a more favorable view of the aspects related to entrepreneurship, individuals will get a more positive reaction from important others and will hence perceive stronger support from them.

Our results suggest a beneficial indirect (via perceived behavioral control) and direct impact of entrepreneurship education programs on individuals' EI. Thus, educators and policy makers should explore interventions that increase perceived behavioral control. Perceived behavioral control consists of two distinct sets of beliefs (Ajzen, 2002), namely beliefs about

the ease of executing the behavior and beliefs about the controllability of the behavior. Each belief set reflects both internal and external drivers or barriers. In the entrepreneurship context, starting a business could be difficult because of missing skills and competences (internal barrier) or because high bureaucratic hurdles exist (external barrier). The controllability of becoming an entrepreneur could be perceived as limited because of fear of failure (internal barrier) or because business-related laws and regulations are not fully stable (external barrier). In order to improve the effectiveness of educational interventions aiming to create more perceived behavioral control and, in turn, EI is to address all four distinct belief facets. Individuals' perceptions of the different internal and external drivers and barriers to become an entrepreneur ground in objective as well as subjective realities of individuals regarding themselves (internal) and the environment (external). Thus, perceptions of whether an individual possesses the skills and competencies to start a business could be the result of both the actual existence of skills and competencies (or the lack thereof) and of the background of the perceiver (e.g., people with different backgrounds may differ in perceptions of the same set and level of skills and competencies). The objective and subjective assessment of the ease and controllability to become an entrepreneur requires educators to customize educational experiences and to develop educational programs that accommodate to this complexity in order to be more effective.

3.4.3 Limitations and directions for future research

Our study has several limitations. First, meta-analytic procedures are limited to the studies that are included in the meta-analysis. Given the low number of longitudinal studies, our results are based solely on cross-sectional studies, limiting the ability to make causal conclusions (Aguinis, Gottfredson, & Wright, 2011) about the relationship between the personal background factors and the TPB variables as well as between these variables and EI. Moreover, prior research suggests that for some of the relationships reverse causality and/or reciprocal

influences may exist (e.g., Walter & Dohse, 2009). Based on conceptual reasoning previous empirical research provides more evidence of the causal relationships suggested by our theorizing. However, future (longitudinal) research is needed to entirely eliminate the question of causality.

Second, while the TPB is the theory that is utilized most often in this field (Schlaegel & Koenig, 2014), it is only one of several theories (e.g., the entrepreneurial event model) that are utilized in the literature to examine the formation of EI. Future primary and meta-analytic research may try to examine the direct and indirect effects of personal background factors on EI and its direct antecedents using other intention-based theories.

Third, heterogeneity tests suggest that the relationships between the TPB determinants and EI as well as the relationships between the background factors and the TPB variables are influenced by possible moderators. An examination of potential moderators was beyond the scope of this study. The current MASEM enables us to test the proposed conceptual model across a different study samples, including different national and temporal contexts, providing strong support for our hypotheses and the model. However, future research could strengthen our understanding of the boundary conditions of the proposed model by identifying and empirically examining individual, situational, contextual, and methodological moderators of the different relationships.

Finally, the results of the present study suggest that future research would benefit from exploring other mediators of the relationship between personal background factors and EI. The direct effects of prior founding experience, entrepreneurial role models, and entrepreneurship education on EI suggests a too narrow specification of the TPB. Future research may broaden and deepen the TPB by integrating deep belief structures as well as additional mediating variables such as desires (Krueger, 2009). Given the relatively high Q and I^2 values in the bivariate meta-analysis as well as the findings of previous studies (Haus et al., 2013), future

studies might also investigate potential moderators of the relationship between personal background factors, attitudinal variables, and EI.

Despite these limitations, bivariate meta-analysis and MASEM allowed us to aggregate the findings of previous studies and test a mechanism that to some extent explains the ample evidence in the existing literature. Our meta-analytic findings highlight that understanding which personal background factors determine EI and how they determine EI, is an important avenue for future primary studies, which should be examined in more depth.

4. Study III - Entrepreneurial personality traits, active performance characteristics, and entrepreneurial success: A meta-analysis

Over the past decades, the reasons for the differences in entrepreneurs' success have been widely discussed in the entrepreneurship literature. While some researchers have proposed the entrepreneur and his or her personality as being an important factor to performance (Carland, Hoy, & Carland, 1988; Rauch & Frese, 2007a; Rauch, 2014), the usefulness of personality traits in the explanation of an entrepreneurs' success has also been criticized (Brockhaus & Horwitz, 1986; Gartner, 1989; Low & MacMillan, 1988). Instead of focusing on the trait approach, researchers (e.g., Gartner, 1988) have recommended that future studies should focus on a behavioral approach and on what an entrepreneur actually does. Nevertheless, a large and still growing number of studies has examined the outcomes of various personality traits, as this approach is considered as crucial to fully understand the concept of entrepreneurship (e.g., Brandstätter, 2011; Carland, Hoy, & Carland, 1988; Rauch & Frese 2007b; Rauch, 2014). This stream of research argues that in small and young corporations the entrepreneur is the main decision maker. An entrepreneur's personality influences decisions related to the firm's strategic direction and specific actions, which in the end determine the economic success of the firm (Johnson, 1990; Shane, Locke, & Collins, 2003). In particular, personality traits that are relevant in the entrepreneurship context (hereafter entrepreneurial traits), such as need for achievement and self-efficacy, should rather indirectly influence entrepreneurial success through the specific actions taken by an entrepreneur as only these actions may have an impact on the costs and revenues.

During the last decades a large amount of empirical research has been devoted to the understanding of the determinants of entrepreneurial success. Several meta-analytic studies have systematically reviewed the results of existing primary studies (for an overview of meta-

analyses see Brandtstätter, 2011; Frese & Gielnik, 2014; Rauch, 2014). These meta-analyses have investigated the influence of broader personality traits (Zhao, Seibert & Lumpkin, 2010), such as those comprising the five-factor model of personality as well as the influence of narrower personality traits (Collins, Hanges, & Locke, 2004; Rauch & Frese, 2007a; Stewart & Roth, 2001) on entrepreneurial success. In sum, these studies show that more entrepreneurship specific (narrow) personality traits seem to have a stronger effect on entrepreneurial success compared to the influence of broader personality traits as well as compared to the effect of human capital, skills, and experiences on entrepreneurial success (Frese & Gielnik, 2014).

A characteristic of the studies that have analyzed the influence of personality on entrepreneurs' success is that both primary studies and meta-analytic studies have focused on the *direct* effect of personality traits on entrepreneurial success and few studies have examined the role of potential mediators of this relationship (Brandstätter, 2011; Rauch, 2014). Of the 53 empirical primary studies that have examined entrepreneurial traits and entrepreneurial success (Table 4.1 provides detailed characteristics of all included studies) as few as 10 studies have employed a mediational model and only 3 of these studies have applied statistical procedures to test the significance of the indirect effect. Therefore, this research field remains controversial and still lacks a thorough understanding of the specific mechanism connecting entrepreneurs' personality and their economic success. An in-depth understanding of the mechanism through which personality influences entrepreneurial success is essential to improve existing theories, develop new theories, and improve the research methodology. It also provides important implications for practice as entrepreneurial traits can be trained and cultivated through specific interventions (Rauch, 2014), which makes information of the relative importance of different entrepreneurial traits valuable in designing specific programs, projects, and other initiatives.

More recently researchers have begun to reconceptualize and redefine the personality approach to entrepreneurship (e.g., Brandtstätter, 2011; Frese, 2009; Frese & Gielnik, 2014;

Hisrich, Langan-Fox, & Grant, 2007; Rauch, 2014), addressing the issues that have been criticized in the past, such as the rather weak theoretical foundation of earlier studies and the missing coherent framework in this research field. Frese's (2009) active performance characteristics and entrepreneurial success model posits that the actual behavior of entrepreneurs and the specific actions they and therewith their firms take function as the mechanism through which entrepreneurial traits affect the economic success of entrepreneurs' firms. Based on this model we argue that an entrepreneur's personality traits influence the firm's entrepreneurial orientation, which in turn together with the entrepreneurial traits affect firm innovation. Entrepreneurial orientation and firm innovation ultimately influence the performance of the firm.

The purpose of this study is twofold. First, based on a meta-analytic synthesis of 97 studies, including a total of 22,765 firms, the present study aims to clarify the direction, magnitude, and significance of the relationship between four specific entrepreneurial traits (need for achievement, locus of control, self-efficacy, and risk taking) and entrepreneurial orientation, firm innovation, and entrepreneurial success. Second, using meta-analytic structural equation modeling (MASEM) we empirically test part of Frese's (2009) active performance characteristics and entrepreneurial success model by examining the mechanism of how entrepreneurial traits influence success through a mediating chain involving entrepreneurial orientation and firm innovation.

The present study aims to contribute to the existing literature in two aspects. First, we update the existing meta-analytic evidence (e.g., Rauch & Frese, 2007a) regarding the traits-success relationship and extend existing studies by examining the traits-entrepreneurial orientation relationship as well as the traits-firm innovation relationship. Therewith we provide a comprehensive and contemporary overview of the existing research and identify as well as reconcile inconsistencies in the existing literature (Brandstätter, 2011). Second, by testing the

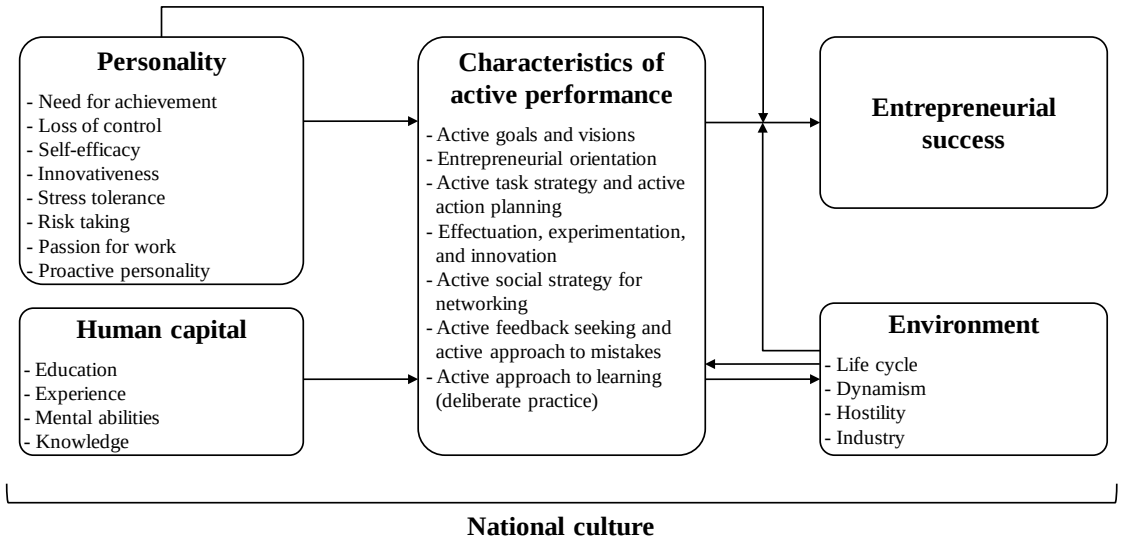
main proposition of Frese's (2009) model we aim to analyze the mechanism through which entrepreneurial traits influence firm performance and in this way to explain the ambiguous findings in prior studies. A better conceptual understanding of the mechanism that links an entrepreneur's personality traits and an entrepreneur's economic success begins to answer recent calls to identify the process through which personality traits affect performance in the entrepreneurship context (Davidsson, 2007; Hisrich, Langan-Fox, & Grant, 2007; Rauch, 2014; Townsend et al., 2014) and put entrepreneurs' actions in the focus of the analysis (Shepherd, 2015). In addition, by examining the mediating role of firm innovation in the entrepreneurial orientation-performance relationship, we begin to answer recent calls to identify the mechanism through which entrepreneurial orientation influences firm performance (e.g., Rosenbusch, Rauch, & Bausch, 2013) and we extend previous meta-analytic evidence that examined determinants of firm innovation (e.g., Damanpour, 1991). Together these contributions underline the importance of entrepreneurial traits for entrepreneurial orientation, firm innovation, and entrepreneurial success.

4.1 Conceptual background and hypotheses

Why are some entrepreneurs more successful than others? During the last decades, various theoretical models have been developed to explain entrepreneurs' economic success. From the beginning researchers have focused on firm characteristics, firm strategy, and personal characteristics of the entrepreneur, such as demographic variables, experience, education, and personality traits, as main determinants of entrepreneurial success. In earlier models researchers have proposed a direct influence of entrepreneurial characteristics, such as an entrepreneur's experience, on firm performance parallel to the firm's strategy and the industry context (Sandberg & Hofer, 1986). The model proposed by Herron and Robison's (1993) suggests that an entrepreneur's personality and skills influence the entrepreneur's motivation which in turn influences performance through entrepreneurial behavior. Extending and refining the

framework suggested by Sandberg and Hofer (1996), Chrisman, Bauerschmidt, and Hofer (1998) proposed that entrepreneurs' personality, skills, and experience influence their decisions and behavior which in turn influence the performance of entrepreneurs' firms. In the so-called Giessen-Amsterdam model of small business owners' success, Rauch and Frese (2000) suggested that an entrepreneur's personality influences an entrepreneur's success through the entrepreneur's goals and strategy. Based on action theory and action regulation theory (e.g., Frese & Sabini, 1985; Frese & Zapf, 1994; Hacker, 1985) and building on the Giessen-Amsterdam model, the active performance characteristics and entrepreneurial success model (Frese, 2009) posits that entrepreneurs' actions are the key factors that influence entrepreneurial success. These actions may vary across the entrepreneurial process as different phases of entrepreneurship require different actions taken by the entrepreneur. Frese (2009) distinguishes four phases; namely the *pre-launch phase*, the *launch phase*, the *success* phase, and the *decline and organizational death* phase. The present study focuses on the success stage as the main purpose of the current study is to examine the mechanism through which entrepreneurial traits influence entrepreneurial success. Frese's (2009) active performance characteristics and entrepreneurial success model is depicted in Figure 4.1.

Figure 4.1 Frese's (2009) active performance characteristics and entrepreneurial success model



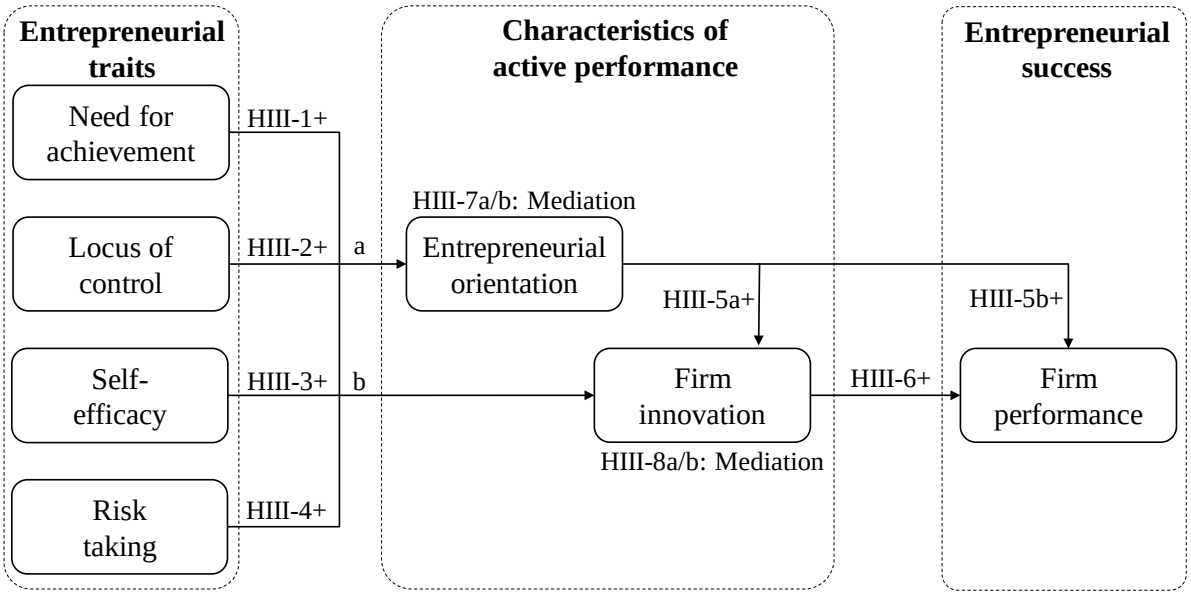
Note: Adapted from Frese (2009).

In Frese's (2009) model, entrepreneurial personality traits as well as human capital and the environment influence entrepreneurial success through characteristics of active performance. Frese (2009) argues that personality traits cannot directly influence firm performance and rather the entrepreneur takes actions, which result in specific economic outcomes. The different active performance characteristics vary in their degree of activity and in general characteristics with a higher degree of activity are more proximal to entrepreneurial success. One of these active performance characteristics and a central predictor of firm success in the model is entrepreneurial orientation (EO). A firm's strategic orientation, such as EO, is the guiding principle that influences a firm's strategy preference (Noble, Sinha, & Kumar, 2002). Firms build orientations to set strategic directions and broad outlines for the firm's strategy with the goal to keep up or achieve superior performance of the business through suitable behavior. The details of strategy content and strategy implementation are left to be completed.

The conceptualization, operationalization, and dimensionality of EO is controversially discussed in the literature (e.g., Anderson et al., 2014; Covin & Lumpkin, 2011; Covin & Wales, 2012; Kreiser, Marino, & Weaver, 2002; Lyon, Lumpkin, & Dess, 2000; Miller, 2011). While EO is proposed as a construct at the firm level, it can be argued that EO is the respective respondent's perception of the firm's strategic stance and the climate of the firm (Frese, 2009; Frese & Gielnik, 2014). The latter view is consistent with earlier work as well as more recent studies on EO (for an overview see Anderson & Covin, 2014) that argue that the key-decision maker's dispositions toward entrepreneurial decisions are reflected in the behaviors and actions taken by the decision maker and therewith by the firm. EO can thus be seen as a construct that may function as a link that connects entrepreneurs' characteristics and entrepreneurs' success (Khedhaouria, Gurău, & Torrès, 2015; Wiklund, Patzelt, & Shepherd, 2009).

Based on the theoretical framework provided by the active performance characteristics and entrepreneurial success model (Frese, 2009), we argue that a set of specific entrepreneurial traits positively influence the EO of the entrepreneur's firm. Following Frese's (2009) line of thought we argue that EO as a strategic orientation is more distal to the venture's success compared to a specific strategy, such as an innovation strategy. Firm innovation as a specific strategy is more proximal to the economic success of a venture as new products, new services, and new processes have the potential to influence revenues and cost. Both an entrepreneur's entrepreneurial personality traits and the EO in turn influence firm innovation. Finally, EO and firm innovation positively influence the economic performance of the entrepreneur's firm. The conceptual model is depicted in Figure 4.2. In the next sections we describe the model in more detail and develop hypotheses associated with it.

Figure 4.2 Conceptual model



4.1.1 Entrepreneurial traits, entrepreneurial orientation, and firm innovation

Previous research has identified various narrower personality traits that are of relevance for entrepreneurship and in particular for explaining entrepreneurs' success. Entrepreneurship researchers have used personality traits, describing single dimensions of personality (Chell, 2008), to relate differences in economic success to a single specific trait or a set of traits. While a large number of traits have been identified in previous studies, the present study focuses on four entrepreneurial traits, namely need for achievement, locus of control, risk taking propensity, and self-efficacy as they have been of particular interest in the entrepreneurship literature (e.g., Chell, 2008; Rauch, 2014). The following sections describe the relationships of the four traits with EO and firm innovation outcomes.

The first entrepreneurial trait, need for achievement, can be defined as an individual's tendency to strive for excellence in performance by meeting or exceeding the high standards set by oneself or other individuals, by achieving relevant unique accomplishments, or by long-term involvement in an activity (McClelland, 1962). Individuals with high need for achievement have an inherent desire to do things rapidly and efficiently to surpass oneself, to

surpass others, or to improve their self-concept by engaging in activities which represent specific desirable accomplishments (Murray, 1938). Individuals who have a high need for achievement will have the innate need to accomplish difficult tasks as independently as possible and the ability to overcome obstacles (Murray, 1938).

EO has been conceptualized as a multidimensional construct, including the dimensions of proactiveness, innovativeness, and risk taking (Covin & Slevin, 1989; Miller, 1983) as well as autonomy and competitive aggressiveness in an alternative view of the construct (Lumpkin & Dess, 1996). Proactiveness promotes identifying new opportunities and acting on them if they are deemed to be positive or favorable for the firm (Miller & Friesen, 1982). A proactive firm is rather a leader than a follower within exploiting new opportunities (Lumpkin & Dess, 1996). The second EO dimension, innovativeness, can be described as the tendency of the firm to engage in and support new ideas, novelty, experimentation, and creative processes which may result in new products, services, or processes (Covin & Slevin, 1988; Lumpkin & Dess, 1996). Innovativeness enhances the ability to create and implement new ideas as well as to generate new products and services and to successfully introduce them to the market. Innovativeness includes searching for new and creative solutions to occurring business problems and upcoming opportunities. It represents some developing willingness beyond the current state of the art (Kimberly, 1981), and thereby, to depart from established technologies and practices. Innovativeness is closely related to proactiveness as both constructs focus to some extent on initiating activities (Lumpkin & Dess, 1996). Proactiveness and innovativeness require substantial financial commitment. The risk-taking dimension, the third EO dimension, includes the tendency to take business related risks (Covin & Slevin, 1988). Risk taking refers to firms ambitious actions, including the commitment of significant resources, the acting in unknown and unfamiliar situations, as well as the acceptance that expected outcomes are financially difficult to predict (Rauch et al., 2009).

Entrepreneurs with a higher need for achievement, who therefore set themselves challenging goals, try to achieve these goals, and strive for success will be more proactive and less reactive in their efforts to achieve their goals and to perceive themselves as responsible for their achievements. These entrepreneurs are more willing to take calculated risks to achieve their goals and to develop strategies to attain them. Entrepreneurs with a high need for achievement are more open to make innovations and changes in the firm to achieve an excellent performance in relation to their own standards or the standards of others. Entrepreneurs with a high need for achievement are more likely to overcome the obstacles that small entrepreneur-led firms may face when adopting an EO. Only a small number of prior studies have analyzed the relationship between the need for achievement and EO. The findings are mixed in the sense that some of these studies have found a statistically significant positive relationship (e.g., Poon, Ainuddin, & Junit, 2006), while other studies have found no significant association (e.g., Lumpkin & Erdogan, 1999) between need for achievement and EO. Therefore, we hypothesize:

Hypothesis III-1a: Entrepreneurs' need for achievement is positively related to their firms' entrepreneurial orientation.

The process of firm innovation itself and the introduction or implementation of innovations is often connected with a certain amount of uncertainty and risk entrepreneurs and firms in general have to face. Entrepreneurs with a high need for achievement are more ambitious and proactively seek innovative solutions to achieve better results (McClelland, 1961). This disposition leads entrepreneurs to face the uncertainty and risks related to the innovation process and to rather pursue potential opportunities instead of giving up on them. Entrepreneurs with a high need for achievement are likely to be more open for innovation and more strongly motivated to invest time, effort, and resources in innovation activities as these investments may lead to firm innovation outcomes such as the discovery of new technologies,

new products, or new processes. Previous studies have shown that need for achievement is positively associated with firm innovation (e.g., Utsch & Rauch, 2000). Thus:

Hypothesis III-1b: Entrepreneurs' need for achievement is positively related to their firms' innovation activities.

Locus of control refers to the degree to which individuals perceive that the outcome of an event is under their personal control and is contingent upon their own behavior (internal locus of control) or is under the control of others or other outside forces that are beyond the control of the individual (external locus of control) (Rotter, 1966). In the context of entrepreneurial behavior, an internal locus of control is of particular relevance as the economic outcomes of a business venture and therewith the success of the entrepreneur are likely to be determined by the abilities an entrepreneur possesses and the effort an entrepreneur invests in running the venture among other factors that are less under the control of the entrepreneur (Brockhaus, 1982). Individuals with a high degree of internal locus of control are attracted to situations that will offer opportunities for achievement and success. They are more likely to perceive being responsible for influencing the outcomes of their actions and, thus, are likely to see themselves and their behavior as a major factor in determining the strategic direction of their venture. Internal locus of control leads entrepreneurs to initiate entrepreneurial activities (McClelland, 1961). On the contrary, entrepreneurs with a lower internal locus of control or an external locus of control are likely to be more passive and may consider business related events beyond their scope of influence. Adopting an EO allows the entrepreneur to proactively seek and pursue opportunities and to follow innovative strategies, and therewith, to perceive that economic outcomes of the venture and their own success and achievements are more within their personal control. Entrepreneurs with a high locus of control are able to face potential difficulties in adopting an EO as they are better able to cope with stressful situations. An entrepreneur's locus of control also determines the boundaries of their employees work activities. The more control

entrepreneurs perceive to be able to exercise in unexpected situations, the more they are willing to allow and encourage risk taking and innovative decisions. Previous studies have shown that locus of control is positively related to EO (e.g., Di Zhang & Bruning, 2011; Lumpkin & Erdogan, 1999; Miller & Friesen, 1982; Miller, 1983). Therefore, we propose the following hypothesis:

Hypothesis III-2a: Entrepreneurs' internal locus of control is positively related to their firms' entrepreneurial orientation.

Individuals who have an internal locus of control have a vision of the future and perceive that a reward is a result of their own actions. They are more long-term oriented and take risks in pursuing their goals. As firm innovation activities are often characterized by upfront long-term investment of resources and uncertainty about economic success, entrepreneurs with a high internal locus of control are better able to cope with uncertain situations and are willing to accept challenges and risks. Entrepreneurs with a high internal locus of control believe in their ability to change situations and are willing to improve their business by developing new products and services, by modernizing processes, and through implementing new technologies that are likely to enhance firm performance. Entrepreneurs with a high internal locus of control desire to have control over their environment and an innovation strategy will enable them to take advantage of a broader range of market opportunities. In contrast, entrepreneurs with an external locus of control might rather expect that the outcomes of own innovation activities are largely influenced by factors that are not within the control of the entrepreneur, ultimately reducing the entrepreneurs willingness to invest in innovation activities. Previous research has shown that entrepreneurs with a high internal locus of control prefer an innovation strategy to exert control over their task environment (e.g., Miller, 1983; Miller & Toulouse, 1986; Mueller & Thomas, 2001). Thus, we hypothesize:

Hypothesis III-2b: Entrepreneurs' internal locus of control is positively related to their firms' innovation activities.

Self-efficacy can be defined as individual's assessment of their ability to both organize and successfully perform an action (Bandura, 1986). Individuals with high self-efficacy are more likely to take action, are more persistent, and will exert more effort to attain a desirable outcome despite of difficulties and potential problems compared to individuals with less self-efficacy (Bandura, 1986). The adoption of an EO, and therewith the development and implementation of the necessary practices and processes, require the utilization of firm resources. Given the often limited amount of resources available for small and medium-sized firms, an EO is adopted by entrepreneur led firms within resource constraints that might lead to challenges faced by the entrepreneur and the firm. Entrepreneurs who possess a high degree of self-efficacy are more likely to attempt a challenging task, such as adopting an EO, and to exert more persistence and effort in the face of difficulty. Entrepreneurs with a high degree of self-efficacy are more likely to take the necessary actions to adopt an EO and are better able to manage and persist in the face of potential challenges and setbacks when adopting an EO compared to entrepreneurs with a low degree of self-efficacy. Entrepreneurs characterized by high self-efficacy believe in their own abilities, and as a result, set more challenging goals and tasks. Being proactive, innovative, and willing to take some degree of risks will allow entrepreneurs to overcome constraints and pursue more ambiguous goals. Prior research has shown mixed results for the relationship between self-efficacy and EO. While some studies have found a statistically significant and positive relationship (e.g., Poon, Ainuddin, & Junit, 2006), other studies have found no significant association (e.g., Khedhaouria, Gurau, & Torrès, 2015) between self-efficacy and EO. Therefore, we hypothesize:

Hypothesis III-3a: Entrepreneurs' self-efficacy is positively related to their firms' entrepreneurial orientation.

The ability to overcome obstacles and challenges, the desire to be successful, and the capacity to recover from setbacks and persevere in the face of difficulties helps entrepreneurs to enhance the outcomes of firm innovation. Innovation activities can be costly in time and resources and these investments do not necessarily lead to innovation outcomes that create value for the venture. The outcomes of the different forms of firm innovation are inherently uncertain because of the complexity of the innovation process and the various factors that inhibit or facilitate the process. Entrepreneurs with high self-efficacy are more likely to persist through difficult challenges in their effort to enhance firm performance through innovation activities. Compared to entrepreneurs with low self-efficacy, these entrepreneurs show more effort over a longer period of time and continue despite of failures that are likely to occur when undertaking innovation activities. Previous studies have found mixed results for the association between self-efficacy and firm innovation. While some studies have found a statistical significant and positive relationship between entrepreneurs' self-efficacy and firm innovation outcomes (e.g., Ahlin, Drnovšek, & Hisrich, 2014), other studies have found no significant relationship (e.g., Hechavarria, Renko, & Matthews, 2010). Therefore, we hypothesize:

Hypothesis III-3b: Entrepreneurs' self-efficacy is positively related to their firms' innovation activities.

An individual's risk taking propensity can be defined as "the perceived probability of receiving the rewards associated with success of a proposed situation, which is required by an individual before he will subject himself to the consequences associated with failure, the alternative situation providing less reward as well as less severe consequences than the proposed situation" (Brockhaus, 1980, p. 513). The development and implementation of an EO requires access to resources (Covin & Slevin, 1991) and a willingness to commit these resources to the strategic orientation. Entrepreneurs with a higher risk taking propensity are more likely to adopt an EO as they are more likely to accept the risk which is related to adopting the

particular strategic orientation. To be proactive means to take initiative on opportunities as well as to foresee challenges and anticipate circumstances. Further, it means that the entrepreneur has to plan to manage these challenges and circumstances to be better aligned with them once they occur. The outcomes of such proactive behaviors may be positive or negative, and thus the likelihood that an entrepreneur is willing to accept such risks depends (at least in part) on the entrepreneur's risk taking propensity. Giving attention to and capturing innovations within the firm is costly. The outcomes of an EO are uncertain and therewith the returns are variable. Entrepreneurs with a higher risk taking propensity are more likely to accept the uncertainties and the risks and to adopt an organizational posture that facilitates innovative activities. As the major strategic decision maker within the firm, entrepreneurs transfer their risk-taking propensity to the firms' general stance towards risk. Therefore we hypothesize:

Hypothesis III-4a: Entrepreneurs' risk taking is positively related to their firms' entrepreneurial orientation.

Prior research has shown that risk is an important factor in firm innovation (e.g., Zahra, 2005). In particular the risk taking propensity of key strategic decision makers is an essential determinant of innovation performance (e.g., March, 1987; March & Shapira, 1987). Risk taking involves initially investing and committing a significant amount of resources in business activities that eventually result in failure in the hope to realize potential benefits in the future (Lumpkin & Dess, 1996). Managers' risk taking propensity has been associated with higher innovation outcomes (e.g., García-Granero et al., 2015). Prior studies that have compared the risk taking of entrepreneurs and non-entrepreneurs found mixed results (e.g., Brockhaus, 1980; Miner & Raju, 2004; Stewart & Roth, 2001; Xu & Ruef, 2004). Entrepreneurs vary in the degree to which they are willing to take risk (e.g., Carland et al., 1995). General management research has shown that risk taking is related to innovation outcomes, and therefore one may assume that entrepreneurs with a higher risk taking propensity will also be more likely to identify and

consider the potential benefits from innovation activities compared to entrepreneurs with a lower risk taking propensity. Innovation activities are costly, uncertain, and innovation outcomes are difficult to predict. Effort, time, and resources are needed in order for innovation activities to occur and to result in potentially valuable innovation outcomes that facilitate firm performance. Entrepreneurs with a high risk taking propensity focus more strongly on the potential benefits of innovation outcomes, and therefore, are more likely to encourage innovation activities and to take action despite the hard to predict economic success and the potential losses that are associated to a potential failure. An entrepreneur with a higher risk taking propensity is more likely to promote the positive aspects of innovations for the firm, as the entrepreneur has a more positive perception of innovation activities. In line with the above argumentation we propose the following hypothesis:

Hypothesis III-4b: Entrepreneurs' risk taking is positively related to their firms' innovation activities.

4.1.2 Entrepreneurial orientation, innovation activities, and firm performance

As outlined above, EO has been conceptualized as a multidimensional construct including an innovativeness dimension (Covin & Slevin, 1989; Miller, 1983). The EO sub-dimensions are originally assumed to make equal contributions to the overall EO construct (Kreiser, Marino, & Weaver, 2002). Nevertheless the majority of studies used and still use the aggregated total of the three-dimensional conceptualization to measure EO (Wales, Gupta, & Mousa, 2011). Compared to the innovativeness dimension of EO and the associated openness to new ideas, firm innovation describes the actual innovative behavior or specific outcome of innovation activities, like introducing ideas, processes, products, forms of organization, and production or distribution methods, which lead to a concrete outcome. Innovation can be divided in four complementary types: Product/service, process, market, and organizational innovation. The creation and introduction of new products distinguishes entrepreneurial firms

from the remaining ones (Zahra, 1993). Since entrepreneur led firms are usually not able to exploit scale economies compared to large and established firms, they are forced to gain competitive advantage through developing innovative products (Pelham, 1999). Entrepreneurially oriented firms are willing to take on high risk projects and proactively seek opportunities and act upon them to generate and adopt innovations (Covin & Slevin, 1991; Pérez-Luño, Wiklund, & Valle Cabrera, 2011). With its risk-taking nature, a firm with high EO is willing to devote financial resources to opportunities that have a chance of costly failures (Naman & Slevin, 1993). In sum, firms that are proactive, innovative, and willing to take risks will be more innovative than firms operating less entrepreneurial. Previous studies have shown that EO is positively related to firm innovation (e.g., Hoq & Ha, 2009). Thus, we hypothesize:

Hypothesis III-5a: Entrepreneurial orientation is positively related to firm innovation.

Over recent years a large and still growing number of studies have examined the direct relationship between EO and firm performance. Firm performance is a multidimensional concept that includes all outcomes that result from interaction of a firm's value creation activities with its environment (Combs, Crook, & Shook, 2005). Firm performance has been measured with various indicators, such as financial and non-financial measures (Kaplan & Norton, 1992), accounting and marked based indicators (Combs, Crook, & Shook, 2005), or economic and innovative performance (Damanpour & Evan, 1984), in previous research. Firms that adopt an innovative, proactive, and risk-taking posture perform better than firms that lack such a strategic orientation. Meta-analytic studies have shown that EO is positively related to various measures of firm performance (Rauch et al., 2009; Rosenbusch, Rauch, & Bausch, 2013; Saeed, Yousafzai, & Engelen, 2014). Thus, we hypothesize:

Hypothesis III-5b: Entrepreneurial orientation is positively related to firm performance.

Innovation is a way for firms to adapt to the environment (Cooper, 1984) and take advantage of arising opportunities in order to become more competitive and enhance

performance (Brown & Eisenhardt, 1997). According to Schumpeter (1934; 1939) entrepreneurs disrupt equilibrium, and therefore, drive economic growth through the introduction of innovations. Innovations enhance firm performance through new or improved goods and services, production methods, or new organizational methods that lead to decreasing costs or increasing productivity. Innovation enables firms to respond to and meet customers' demands, which are key factors to determine firm performance. The development and introduction of innovative products with the potential for greater competitive advantage increases a firms' profitability (Steensma et al., 2000) and thereby significantly contributes to its firm performance. The customers' willingness to pay is often higher for innovative products, especially if they are unique among the competitors (Robinson & Min, 2002). Despite high risk and financial commitment throughout the innovation process, meta-analytic evidence suggests that the benefits of innovation activities appear to outweigh the costs (Bierwerth et al., 2015; Karna, Richter, & Riesenkampff, 2015; Rosenbusch, Brinckmann, & Bausch, 2011; Saeed et al., 2015). Therefore, we hypothesize:

Hypothesis III-6: Firm innovation is positively related to firm performance.

Following the arguments above, we posit that the proposed set of entrepreneurial traits positively influence EO. Because we also argue that EO positively influences firm innovation and firm performance, we believe that EO represents a mechanism underlying the relationship between entrepreneurial traits and firm innovation as well as the relationship between entrepreneurial traits and firm performance. Previous studies have shown that EO acts as a mediator of the relationship between entrepreneurial traits and firm innovation (Maeckelburger & Zapkau, 2011) as well as between entrepreneurial traits and firm performance (e.g., Di Zhang & Bruning, 2011; Khedhaouria, Gurău, & Torrès, 2015; Poon, Ainuddin, & Junit, 2006). Accordingly, we offer the following mediation hypothesis:

Hypothesis III-7: Entrepreneurial orientation mediates the positive relationships between entrepreneurial traits and firm innovation (HIII-7a) as well the positive relationships between entrepreneurial traits and firm performance (HIII-7b).

Given our arguments above, we expect that the different entrepreneurial traits as well as EO positively influence firm innovation. Because we also argue that firm innovation positively affects firm performance, we believe firm innovation represents a second mechanism underlying the relationship between entrepreneurial traits and firm performance and a mechanism underlying the EO-firm performance relationship. Previous studies have theoretically suggested and empirically demonstrated that firm innovation functions as a mechanism through which entrepreneurial traits influence firm performance (e.g., Utsch & Rauch, 2000). An entrepreneur is not successful because he or she posits specific entrepreneurial traits, rather the entrepreneur must act to influence the economic outcomes of the firm (Rauch, 2014). Compared to entrepreneurial traits, which are more distal to firm performance, firm innovation is an activity that is more proximal to firm performance.

Lumpkin and Dess (1996) among others (e.g., Harms, 2013; Rosenbusch, Rauch, & Bausch, 2013) have suggested that potential mediators may function as bridges for the EO-firm performance relationship. Extending Frese's (2009) model, we propose that EO may in particular provide a framework for action and that firm innovation represents the organizational activity that functions as a mediator that links EO and firm performance (e.g., Harms, 2013). Prior studies have empirically demonstrated that firm innovation mediates the relationship between EO and firm performance (e.g., Helm, Mauroner, & Dowling, 2010; Hoq & Ha, 2009). Based on the conceptual arguments provided by Frese's (2009) model as well as on the existing empirical evidence we formulate the following mediation hypothesis:

Hypothesis III-8: Firm innovation mediates the positive relationships between entrepreneurial traits and firm performance (HIII-8a) as well the positive relationship between entrepreneurial orientation and firm performance (HIII-8b).

4.2 Method

4.2.1 Literature search

Based on an evidence-based approach (Frese, Rousseau, & Wiklund, 2014; Frese et al., 2012; Rauch & Frese, 2006; Rauch, 2014) we used MASEM to test our hypotheses. MASEM has the ability to overcome the limitations of bivariate meta-analysis which focuses on direct relationships and is unable to assess more complex theoretical models (Bergh et al., 2014; Brandstätter, 2011; Rauch, 2014). MASEM is particularly suited to assess mediational models (Bergh et al., 2015). We applied several procedures to identify published and unpublished empirical studies that have examined the relationships between the variables depicted in Figure 2. First, we consulted previous literature reviews (Brandstätter, 2011; Frese & Gielnik, 2014; Jain, 2011; Rauch, 2014) and meta-analyses (Collins, Hanges, & Locke, 2004; Rauch & Frese, 2007a; Zhao, Seibert, & Lumpkin, 2010; Miner & Raju, 2004). Second, we examined electronic databases (ABI/INFORM Global, EBSCO, Science direct, PsychINFO). We used variations and combinations of various keywords (*locus of control, self-efficacy, achievement motivation, need for achievement, entrepreneurial orientation, innovation, firm performance*) to identify studies of likely relevance. Third, we manually searched several entrepreneurship journals (*Entrepreneurship Theory and Practice, International Small Business Journal, Journal of Business Venturing, Journal of Small Business Management, Small Business Economics,* and *Strategic Entrepreneurship Journal*) and conference proceedings (annual meeting of the Academy of Management, Babson College Entrepreneurship Research Conference). We systematically searched the different databases and journals for studies from first date available up to February 2014. Fourth, we directly contacted researchers working in the same field of

research for relevant unpublished data and papers. The approach was extended through posting requests on electronic list servers, to elicit publicly untraceable research (Rosenthal, 1995). We also conducted an unstructured search using Google and Google Scholar (Cooper, 1998). Finally, we searched all studies citing the articles identified in the previous steps and searched the reference lists of all articles to identify prior studies of likely relevance (Cooper, 1998). We repeated this step until no more relevant literature could be identified.

4.2.2 Inclusion criteria and coding procedure

We selected studies for inclusion in the meta-analyses on the basis of four criteria. First, we only included quantitative empirical studies that reported an effect size and a samples size. When correlation coefficients were not available we used effect sizes that could be converted, such as *t*-statistics and beta coefficients, using the procedures suggested by Lipsey and Wilson (2001) and Peterson and Brown (2005) respectively. Second, we included only studies that surveyed entrepreneur led firms. Third we only included studies that are based on primary data to avoid overlapping samples. Finally, we controlled for multiple publications on the same sample, to ensure independence among the samples. These criteria resulted in a final sample of 97 studies (106 independent samples, n = 22,765), which contained sufficient information for analysis. Table 4.1 presents a summary of all primary studies included in the meta-analyses.

Following the procedures recommended by Lipsey and Wilson (2001), two of the authors independently coded the variables. The studies were coded for effect sizes, sample size, sampling country, publication status, and year of data collection. Instead of the names in the original studies, definition and measurement were used to code the variables. For the EO variable the mean value of innovation, risk-taking and proactiveness was used, if no unidimensional construct was provided. Inconsistencies throughout the coding were resolved through discussion. The intercoder reliability was .92, exceeding the threshold of .80 (Perreault & Leigh, 1989).

Table 4.1 Characteristics of the articles included in the meta-analysis in study III

Article	*k*	*N*	Publication status	Main variables	Country (established vs. emerging)	Mediation
Acharya, Rajan, & Schoar (2013)	1	100	WP	NA, LC, SE, FP	India (emerging)	no
Andersen (2010)	1	172	JA	EO, FP	Sweden (established)	no
Awang et al. (2009)	1	610	JA	EO, FP	Malaysia (emerging)	no
Babalola, & Nigeria (2009)	1	405	JA	LC, SE, FI	Nigeria (emerging)	no
Baker & Sinkula (2009)	1	88	JA	EO, FI, FP	U.S. (established)	EO-FI-FP
Baron, Tang, & Hmieleski (2011)	1	157	JA	FI, FP	U.S. (established)	na
Baum & Locke (2004)	1	229	JA	SE, FP	U.S. (established)	no
Becherer & Maurer (1999)	1	215	JA	EO, FP	U.S. (established)	no
Begley & Boyd (1987)	1	239	JA	NA, LC, RT, FP	U.S. (established)	no
Bettinelli, Randerson, & Dossena (2013)	1	163	CP	NA, SE, EO	France (established)	no
Box, Beisel, & Watts (1995)	1	187	JA	NA, LC, FP	Thailand (emerging)	no
Casillas & Moreno (2010)	1	449	JA	EO, FP	Spain (established)	no
Chandler & Hanks (1994)	1	102	JA	SE, FP	U.S. (established)	no
Colombo et al. (2013)	1	114	WP	FI, FP	Italy (established)	na
Cools (2006)	1	237	BC	NA, LC, SE, EO	mixed	no
Cruz et al. (2009)	1	354	JA	FI, FP	Spain (established)	na
Dada & Watson (2013)	1	95	JA	EO, FP	UK (established)	no
Desphandé et al. (2013)	2	586	JA	NA, FP	mixed	NA-TO/MO-FP
Dickson & Weaver (1997)	1	433	JA	EO, FP	Norway (established)	no
Di Zhang & Bruning (2011)	1	161	JA	NA, LC, EO, FP	Canada (established)	NA/LC-EO-FP
Duchesneau & Gartner (1990)	1	26	JA	LC, FP	U.S. (established)	no
Fairoz, Hirobumi, & Tanaka (2010)	1	25	JA	EO, FP	Sri Lanka (emerging)	no
Forbes (2005)	1	77	JA	SE, FP	United States (established)	no
Frank, Kessler, & Fink (2010)	1	125	JA	EO, FP	Austria (established)	no
Frese et al. (2007)	3	428	JA	NA, LC, SE, FP	various	NA/LC/SE-PP-FP
Frese, Brantjes, & Hoorn (2002)	1	87	JA	EO, FP	Namibia (emerging)	no
Gielnik, Zacher, & Frese (2012)	1	84	JA	NA, LC, FP	Germany (established)	no
Grande, Madsen, & Borch (2011)	1	168	JA	EO, FP	Norway (established)	no
Gubitta & Alessandra (2010)	1	40	CP	EO, FP	Italy (established)	no

Note: *k* = number of independent samples per study, *N* = total sample size per study, CP = conference proceedings or conference presentation, BO = book, JA = journal article, WP = working paper, DI = Dissertation. NA = Need for achievement, LC = Locus of control, SE = Self-efficacy, RT = Risk taking, EO = Entrepreneurial orientation, FI = Firm innovation, FP = Firm performance, na = not applicable, TO = technology orientation, MO = market orientation, PP = proactive planning, IU = information utilization, CA = competitive advantage, D = differentiation, BP = business plan. Studies with *various* countries provided individual data of more than one country, while studies with *mixed* data sets used pooled data of more than one country. Studies marked with * have not tested the statistical significance of the mediation effect.

Table 4.1 Characteristics of the articles included in the meta-analysis in Study III (continued)

Article	*k*	*N*	Publication status	Main variables	Country (established vs. emerging)	Mediation
Güler & Tinar (2009)	1	452	JA	NA, LC, RT	Turkey (emerging)	no
Hechavarria, Renko, & Matthews (2010)	1	342	JA	SE, FI	U.S. (established)	no
Hmieleski & Baron (2008)	1	159	JA	SE, FP	U.S. (established)	no
Hoq & Ha (2009)	1	321	JA	EO, FI, FP	Bangladesh (emerging)	EO-FI-FP
Iakovleva (2010)	1	466	BC	SE, EO	Russia (emerging)	na
Iakovleva & Kickul (2006)	1	457	BC	EO, FP	Russia (emerging)	no
Idar & Mahmood (2011)	1	356	CP	EO, FP	Malaysia (emerging)	EO-MO-FP
Keh, Nguyen, & Ng (2007)	1	294	JA	EO, FP	Singapore (emerging)	EO-IU-FP
Keskin (2006)	1	157	JA	FI, FP	Turkey (emerging)	na
Korunka et al. (2010)	1	370	JA	NA, LC, RT	Austria (established)	na
Krauss et al. (2005)	1	248	JA	RT, EO, FP	South Africa (emerging)	no
Kropp, Lindsay, & Shoham (2006)	1	449	JA	EO, FP	South Africa (emerging)	no
Lanivich (2011)	1	222	DI	SE, FP	mixed	no
Lee, Lee, & Pennings (2001)	1	137	JA	EO, FP	South Korea (emerging)	no
Lee & Lim (2009)	1	137	JA	EO, FP	South Korea (emerging)	no
Lee & Tsang (2001)	1	168	JA	NA, LC, SE, FP	Singapore (emerging)	no
Lerner & Haber (2001)	1	53	JA	NA, FP	Israel (emerging)	no
Li (2008)	1	244	DI	FI, FP	China (emerging)	na
Lumpkin & Erdogan (1999)	1	27	CP	NA, LC, RT, EO	U.S. (established)	na
Luthans & Ibrayeva (2006)	1	133	JA	NA, LC, SE, FP	Mixed (emerging)	no
Maekelburger & Zapkau (2011)	1	115	CP	LC, SE, RT, EO, FI	Germany (established)	LC/SE/RT-EO-FI
Maharati et al. (2010)	1	172	CP	NA, LC, FP	Iran (emerging)	no
Mahmood & Hanafi (2013)	1	165	JA	EO, FP	Malaysia (emerging)	EO-CA-FP
Man, Lau, & Snape (2008)	1	153	JA	FI, FP	China (emerging)	na
Mickiwicz, Sauka, & Stephan (2011)	1	270	WP	EO, FP	Lithuania (emerging)	no
Millet (2005)	1	146	DI	LC, FP	Sweden (established)	no
Moruku (2012)	1	463	JA	LC, EO	Nigeria (emerging)	na
Nwachuku (2011)	1	100	JA	LC, FP	U.S. (established)	LC-D-FP
Okhomina (2010)	1	90	JA	NA, LC, RT, EO	U.S. (established)	na

Note: *k* = number of independent samples per study, *N* = total sample size per study, CP = conference proceedings or conference presentation, BO = book, JA = journal article, WP = working paper, DI = Dissertation. NA = Need for achievement, LC = Locus of control, SE = Self-efficacy, RT = Risk taking, EO = Entrepreneurial orientation, FI = Firm innovation, FP = Firm performance, na = not applicable, TO = technology orientation, MO = market orientation, PP = proactive planning, IU = information utilization, CA = competitive advantage, D = differentiation, BP = business plan. Studies with *various* countries provided individual data of more than one country, while studies with *mixed* data sets used pooled data of more than one country. Studies marked with * have not tested the statistical significance of the mediation effect.

Table 4.1 Characteristics of the articles included in the meta-analysis in Study III (continued)

Article	*k*	*N*	Publication status	Main variables	Country (established vs. emerging)	Mediation
Okpara (2009)	1	143	JA	EO, FP	Nigeria (established)	no
Olakitan & Ayobami (2011)	1	35	JA	LC, FP	Nigeria (emerging)	no
Ong & Ismail (2011)	1	365	JA	NA, LC, FP	Malaysia (emerging)	no
O'Shea (2011)	1	64	DI	SE, EO, FP	Ireland (established)	EO-SE-FP
Päivi (2012)	2	222	WP	EO, FP	Various (established)	no
Papzan et al. (2008)	1	70	JA	NA, LC, FI, FP	Iran (emerging)	no
Poon, Ainuddin, & Junit (2006)	1	96	JA	NA, LC, SE, EO, FP	Malaysia (emerging)	LC/SE-EO-FP
Qureshi (2010)	1	143	DI	EO, FP	Germany (established)	no
Rauch, Frese, & Sonnentag (2000)	2	277	JA	NA, LC, SE, FP	various	NA-BP-FP
Rauch et al. (2010)	5	857	JA	EO, FI, FP	various	no
Raymond & St-Pierre (2003)	1	201	CP	FI, FP	Canada (established)	na
Ripollés & Blesa (2005)	1	119	JA	EO, FP	Spain (established)	no
Schlaegel (2012)	1	74	WP	FI, FP	Germany (established)	na
Sebora, Lee, & Sukasame (2009)	1	375	JA	NA, LC, RT, FP	Thailand (emerging)	no
Singh (1970)	1	80	JA	NA, FP	India (emerging)	no
Singh (1979)	1	200	JA	NA, FP	India (emerging)	no
Singh & Ray (1980)	1	300	JA	NA, FP	India (emerging)	no
Slavec & Drnovsek (2013)	2	1,080	CP	SE, FI	mixed	no
Smith, Okhomina, & Mosley (2005)	1	95	JA	NA, LC, RT	U.S. (established)	na
Soininen et al. (2013)	1	193	JA	EO, FP	Finland (established)	no
Stam & Elfring (2008)	1	87	JA	EO, FP	Netherlands (established)	no
Stenholm (2011)	1	232	JA	FI, FP	Finland (established)	na
Swierczek & Ha (2003)	2	172	JA	EO, FP	mixed (emerging)	no
Tajeddini (2010)	1	156	JA	EO, FI, FP	Switzerland (established)	EO-FI-FP
Tang & Tang (2007)	1	227	JA	NA, RT, FP	U.S. (established)	NA-RT-FP
Tayauova (2011)	1	114	CP	EO, FP	mixed	no
Tupinambá (1999)	2	199	BO	NA, LC, SE, RT, FI, FP	various	no
Unger (2006)	1	280	DI	SE, FP	Zimbabwe (emerging)	no
Ürü et al. (2011)	1	308	CP	NA, LC, RT, FI	Turkey (emerging)	no
Utsch & Rauch (2000)	1	201	JA	NA, LC, SE, FI, FP	Germany (established)	NA/LC/SE-FI-FP

Note: *k* = number of independent samples per study, *N* = total sample size per study, CP = conference proceedings or conference presentation, BO = book, JA = journal article, WP = working paper, DI = Dissertation. NA = Need for achievement, LC = Locus of control, SE = Self-efficacy, RT = Risk taking, EO = Entrepreneurial orientation, FI = Firm innovation, FP = Firm performance, na = not applicable, TO = technology orientation, MO = market orientation, PP = proactive planning, IU = information utilization, CA = competitive advantage, D = differentiation, BP = business plan. Studies with *various* countries provided individual data of more than one country, while studies with *mixed* data sets used pooled data of more than one country.

Table 4.1 Characteristics of the articles included in the meta-analysis in Study III (continued)

Article	*k*	*N*	Publication status	Main variables	Country (established vs. emerging)	Mediation
Vesala, Peura, & McElwee (2007)	1	1,078	JA	SE, EO	Finland (established)	na
Wagener, Gorgievski, & Rijsdijk (2010)	1	194	JA	SE, RT, FI	Netherlands (established)	no
Walter, Auer, & Ritter (2006)	1	149	JA	EO, FP	Germany (established)	no
Wijbenga & van Witteloostuijn (2007)	1	84	JA	LC, FI	Netherlands (established)	no
Yasin (1996)	1	440	JA	NA, FP	Jordan (emerging)	no
Yucel (2011)	1	218	JA	EO, FP	US (established)	no
Yusuf (2002)	1	82	JA	EO, FP	Arabia (emerging)	no
Zaifuddin (2010)	1	371	DI	FI, FP	Malaysia (emerging)	na
Zainol & Ayadurai (2011)	1	162	JA	SE, EO, FP	Malaysia (emerging)	SE-EO-FP

Note: *k* = number of effects (independent samples per study), *N* = total sample size per study, CP = conference proceedings or conference presentation, BO = book, JA = journal article, WP = working paper, DI = Dissertation. NA = Need for achievement, LC = Locus of control, SE = Self-efficacy, RT = Risk taking, EO = Entrepreneurial orientation, FI = Firm innovation, FP = Firm performance, na = not applicable, TO = technology orientation, MO = market orientation, PP = proactive planning, IU = information utilization, CA = competitive advantage, D = differentiation, BP = business plan. Studies with *various* countries provided individual data of more than one country, while studies with *mixed* data sets used pooled data of more than one country. Studies marked with * have not tested the statistical significance of the indirect effect.

4.2.3 Meta-analytical procedure and path analysis

In the bivariate meta-analysis, we used the method proposed by Hedges and Olkin (1985) to normalize the variance of the correlation coefficients, as all relationships in our meta-analysis are characterized by relatively small samples. We converted the single correlation coefficients to Fisher z-scores, weighted by the inverse variance incorporating between-studies as well as within-studies variance, and calculated pooled mean correlations. We assessed potential heterogeneity by calculating *Q* (Hedges & Olkin, 1985). We used MASEM to test for the mediating role of EO and firm innovation. We constructed a pooled matrix of bivariate relations adjusted for sample size and used the structural equation modeling software AMOS 22 to test for the theoretically postulated relations with the maximum likelihood estimation. We used the harmonic mean (N_{HM}= 1,183) as the sample size for the path analysis (Landis, 2013; Viswesvaran & Ones, 1995). We provide chi-square test statistics, comparative fit index (CFI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR).

4.3 Results

4.3.1 Results of bivariate meta-analysis, moderator analysis, and assessment of publication bias

Table 4.2 reports the results of the bivariate meta-analysis for all relationships.

Table 4.2 Bivariate results and meta-analytic correlation matrix

Variables		1	2	3	4	5	6	7	8	9	10	11	12
1 Age[cv]		(-)	6 (1,525)	3 (623)	5 (1,163)	5 (1,086)	4 (1,271)	2 (454)	1 (222)	2 (597)	4 (802)	2 (401)	11 (2,631)
2 Education[cv]	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.00/.00 (-.07:.06) 8	(-)	6 (921)	6 (1,439)	4 (760)	6 (941)	4 (662)	4 (752)	4 (723)	3 (765)	3 (709)	11 (2,403)
3 Experience[cv]	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.31/.40 (-.05:.89) 71	-.13/-.14 (-.25:-.03) 13	(.81)	5 (774)	4 (467)	3 (317)	2 (264)	5 (722)	- (-)	2 (233)	2 (401)	9 (1,313)
4 Firm age[cv]	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.34/.35 (.13:.59) 58	.00/.00 (-.07:.06) 7	.16/.25 (-.29:.81) 231	(-)	14 (2,181)	5 (834)	5 (751)	9 (1,448)	1 (239)	12 (2,176)	5 (831)	23 (4,063)
5 Firm size[cv]	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.05/.07 (-.05:.19) 12	.14/.11 (-.05:.26) 13	.21/.20 (.04:.36) 9	.20/.24 (.14/:.34) 68	(-)	6 (1,484)	5 (811)	4 (570)	2 (547)	14 (2,373)	3 (549)	18 (3,365)
6 Need for achievement	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	-.12/-.11 (-.25:.03) 16	.11/.12 (-.03:.27) 24	.06/.07 (-.05:.18) 2	-.06/-.06 (-.15:.03) 8	-.03/-.02 (-.10:.06) 10	(.73)	22 (4,139)	12 (1,808)	8 (1,947)	6 (774)	2 (509)	27 (5,150)
7 Locus of control	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.08/.08 (-.01:.17) 0	.06/.13 (-.07:.34) 18	.06/.06 (-.06:.18) 0	-.04/-.04 (-.11:.04) 2	.03/.03 (-.04:.11) 5	.37/.39 (.32:.49) 152	(.74)	13 (2,160)	8 (1,835)	7 (1,189)	5 (1,113)	24 (3,562)
8 Self-efficacy	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.02/- (-) -	.22/.05 (-.25:.96) 197	.07/.06 (-.06:.18) 10	-.03/-.03 (-.08:.03) 9	.13/.13 (.05:.22) 2	.42/.46 (.36:.64) 98	.27/.29 (.19:.41) 78	(.79)	2 (309)	8 (2,541)	5 (1,932)	21 (3,363)
9 Risk taking	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.06/.06 (-.04:.16) 1	.01/.01 (-.06:.09) 2	-/- (-) -	-.01/.00 (-.39:.38) 40	.04/.05 (-.23:.34) 11	.22/.18 (.01:.36) 96	.16/.14 (-.07:.36) 134	.19/.19 (.08:.31) 1	(.71)	4 (480)	3 (617)	6 (1,288)
10 Entrepreneurial orientation	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.02/.01 (-.14:.16) 10	.09/.14 (-.07:.35) 14	.19/.18 (-.02:.39) 2	.08/.05 (-.03:.12) 33	.18/.21 (.14:.30) 46	.34/.34 (.28:.43) 6	.26/.26 (.12:.41) 31	.29/.26 (.14:.39) 50	.46/.38 (.10:.70) 226	(.80)	9 (1,537)	44 (8,882)
11 Firm innovation	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	.12/.12 (.02:.22) 10	-.08/-.09 (-.16:-.02) 33	.13/.13 (.04:.23) 14	.03/.09 (.01:.17) 17	-.15/-.13 (-.31:.05) 21	.31/.31 (.24:.41) 37	.27/.29 (.23:.35) 133	.36/.26 (.16:.37) 335	.45/.44 (.35:.58) 178	.32/.35 (.24:.49) 57	(.80)	20 (3,810)
12 Firm performance	$\bar{r}_n/\bar{r}_{nc}$ *CI95* *Q*	-.01/.00 (-.06:.06) 21	.07/.05 (-.02:.12) 21	.13/.14 (.04:.23) 22	-.03/-.02 (-.09:.04) 93	.09/.17 (.08:.27) 121	.19/.21 (.15:.28) 130	.17/.16 (.08:.25) 136	.17/.19 (.13:.25) 57	.06/.07 (-.02:.16) 13	.29/.31 (.25:.38) 365	.24/.24 (.19:.31) 184	(.83)

Note: $\bar{r}_n$ = sample size weighted average effect size, $\bar{r}_{nc}$ = estimated sample size weighted mean effect size across studies, *SE* = standard error, CI = confidence interval, *Q* = homogeneity of effect sizes test The numbers of effects with the total sample sizes in parentheses are given in the upper right of the matrix. Average construct reliabilities are depicted on the diagonal. Variables marked with [cv] are included as control variables in the MASEM in an effort to avoid an omitted variable bias.

Consistent with the hypothesized model all effect sizes are in the expected (positive) direction and statistically significant. The results of the *Q* test indicate heterogeneity across studies for nine of the eleven main relationships.[2] Publication bias is a potential threat to the validity of meta-analysis in entrepreneurship (O'Boyle, Rutherford, & Banks, 2014), strategic management (Harrison et al., 2014), and organizational sciences (Kepes et al., 2012) research. We followed the recommendations in the literature (O'Boyle, Rutherford, & Banks, 2014) and used a combination of different procedures to evaluate the influence of publication bias on the results of our bivariate meta-analysis. First, we used funnel plots and applied the trim-and-fill method (Duval & Tweedie, 2000) to examine the number of potentially missing studies that was required to make the funnel plot symmetrical as well as to provide an adjusted effect size. Second, we used Egger's regression test (Egger et al., 1997) as well as Begg and Mazumdar's (1994) rank correlation test to assess funnel plot asymmetry and to examine whether it was statistically significant. Finally, we employed cumulative meta-analysis (Borenstein, 2005) to determine whether the respective relationships change with primary studies' sample size. A summary of the results of the publication bias analysis is presented in Table 4.3.

[2] We were not able to conduct a moderator analysis for the hypothesized relationships as the number of primary studies that have examined these relationships was (except for the firm innovation-firm performance relationship) lower than ten (Card, 2012). We conducted a moderator analysis for the direct relationships between the different entrepreneurial traits and firm performance as well as between EO, firm innovation, and firm performance. We identified study year, study country (established vs. emerging country), publication status (published vs. unpublished), and journal impact factor as potential moderators. The results of weighted least squares regression analysis (Steel & Kammeyer-Mueller, 2002) show that the relationship between self-efficacy and firm performance is significantly higher in established than in emerging countries. The relationship between firm innovation and firm performance is significantly higher in emerging compared to established countries. The relationship between locus of control and firm performance was stronger in more recent studies. All other moderators were not significant.

Table 4.3 Assessment of publication bias (relationships with $k > 10$)

	Bivariate meta-analysis				Trim and fill procedure					Egger's test		Begg and Mazumdar	Cumulative meta-analysis			
Relationship	***k***	***N***	$\overline{r}_n$	**95% CI**	***ik***	$\overline{r}_{t\&f}$	**95 % CI**	$\Delta\overline{r}_{t\&f}$	***diff. %***	b_0 **(*p*)**	**95 % CI**	τ **(*p*)**	**Drift**	$\overline{r}_{prec}$	$\Delta\overline{r}_{prec}$	***diff. %***
NA-LC	22	4,139	.37	.29 to .44	3	.35	.27 to .43	.02	5	0.39 (.83)	-3.59 to 4.39	-.03 (.84)	No	.37	.00	0
NA-SE	12	1,808	.42	.30 to .52	0	.42	.30 to .52	.00	0	5.32 (.28)	-5.06 to 15.69	.20 (.37)	Yes	.34	.08	19
NA-FP	27	5,150	.19	.13 to .25	0	.19	.13 to .25	.00	0	1.00 (.48)	-1.91 to 3.91	.02 (.90)	No	.22	.03	16
LC-SE	13	2,160	.27	.17 to .37	0	.27	.17 to .37	.00	0	2.00 (.52)	-4.56 to 8.57	.08 (.71)	Yes	.31	.04	15
LC-FP	27	3,562	.17	.09 to .25	0	.17	.09 to .25	.00	0	-0.96 (.58)	-4.91 to 5.01	.07 (.63)	No	.14	.03	18
SE-FP	21	3,363	.17	.11 to .23	8	.12	.05 to .18	.05	29	3.40 (.02)	0.81 to 6.00	.34 (.03)	Yes	.15	.02	12
FA-EO	12	2,176	.08	.00 to .15	0	.08	.00 to .15	.00	0	-3.48 (.02)	-6.83 to -0.59	-.38 (.09)	No	.12	.04	50
FS-EO	14	2,373	.18	.11 to .26	1	.17	.10 to .25	.01	6	2.55 (.11)	-0.65 to 5.76	.14 (.48)	Yes	.14	.04	22
FS-FA	14	2181	.20	.10 to .29	0	.20	.10 to .29	.00	0	3.50 (.13)	-1.30 to 8.31	.12 (.55)	No	.16	.04	20
FA-FP	23	4,063	-.03	-.09 to .04	0	-.03	-.09 to .04	.00	0	0.97 (.55)	-2.39 to 4.34	.03 (.83)	No	-.04	.01	33
FS-FP	18	3,365	.09	.06 to .13	0	.09	.06 to .13	.00	0	4.71 (.00)	1.78 to 7.69	.42 (.01)	Yes	-.01	.10	111
Edu-FP	11	2403	.07	.00 to .14	0	.07	.00 to .14	.00	0	-3.69 (.05)	-7.36 to -0.02	-.53 (.02)	No	.11	.04	57
Age-FP	11	2,631	-.01	-.07 to .05	2	-.02	-.08 to .04	.01	100	1.18 (.39)	-1.77 to 4.14	.27 (.24)	Yes	-.03	.02	200
EO-FP	44	8,882	.29	.23 to .34	0	.29	.23 to .34	.00	0	0.57 (.80)	-3.90 to 5.04	.09 (.38)	No	.27	.02	7
FI-FP	20	3,810	.24	.16 to .32	0	.24	.16 to .32	.00	0	-1.33 (.58)	-6.38 to 3.71	.12 (.48)	No	.28	.04	17

Note: NA = Need for achievement, LC = Locus of control, SE = Self-efficacy, RT = Risk taking, Edu - education, EO = Entrepreneurial orientation, FA - firm age, FI = Firm innovation, FS - firm size, FP = Firm performance. *k* = number of independent samples, *N* = aggregated sample size, $\overline{r}_n$ = sample size weighted mean correlation coefficient, CI = confidence interval, *ik* = number of trim and fill imputed correlations, diff. = difference in percent, $\overline{r}_{t\&f}$ = trim and fill adjusted mean correlation coefficient, $\Delta\overline{r}_{t\&f}$ = difference between $\overline{r}_n$ and $\overline{r}_{t\&f}$, b_0 = intercept in Eggers' test, τ = Kendall's tau, $\overline{r}_{prec}$ = sample size weighted mean correlation coefficient of the five studies with the largest sample size, $\Delta\overline{r}_{prec}$ = difference between $\overline{r}_n$ and $\Delta\overline{r}_{prec}$. For both the Egger's test as well as the Begg and Mazumdar procedure *p* values are shown in parentheses. Funnel plots are available from the corresponding author upon request.

The results indicate an influence of publication bias across the different procedures only for one relationship (self-efficacy-firm performance). The difference between the mean correlations coefficient and the trim and fill adjusted mean correlation coefficients (see $\Delta\overline{r}_{t\&f}$ and "diff. %" in Table 4.3) as well as the mean correlation coefficients of the five studies with the largest sample sizes (see $\Delta\overline{r}_{prec}$ and "diff. %" in Table 4.3) is smaller than 20 percent for all other main relationships, indicating that publication bias has only a minor influence on our findings (Harrison et al., 2014; Kepes et al., 2012; O'Boyle, Rutherford, & Banks, 2014).

4.3.2 Results of meta-analytic structural equation modeling and mediation analysis

We tested the hypothesized direct relationships using MASEM. We followed the procedures suggested in the literature to test the mediation hypotheses and, in particular, to examine the statistical significance of specific indirect effects of the different mediational pathways (e.g., Zhao, Lynch, & Chen, 2010). Based on the sample-size adjusted correlation coefficients (Michel, Viswesvaran, & Thomas, 2011), we constructed a meta-analytic correlation matrix (Table 4.2) as the basis for the path analysis. The model fit statistics and comparisons for the different path models are presented in Table 4.4.

Table 4.4 Model comparison

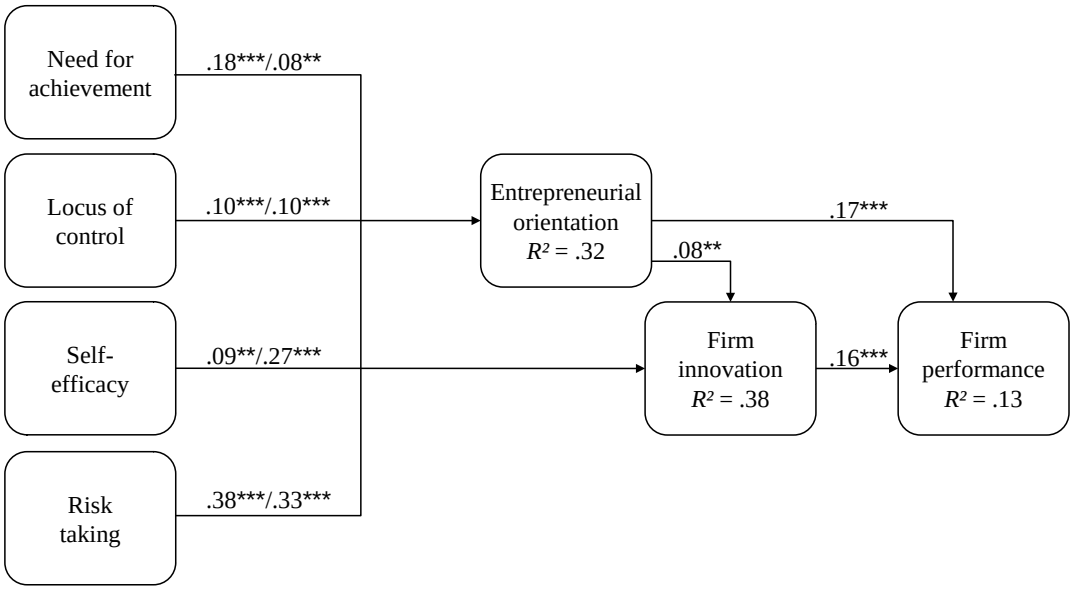
Model	χ^2 (*df*)	CFI	RMSEA	SRMR	$\Delta\chi^2$ (Δdf)	
M1 Hypothesized model	9.45 (4)	.99	.03	.01	-	-
M2 Partial mediation firm innovation	356.97 (8)	.75	.19	.07	M1 vs. M2	347.52 (4)***
M3 Non mediated model firm innovation	18.16 (5)	.99	.05	.01	M1 vs. M3	8.71 (1)**
M4 Partial mediation firm performance (FSM)	-	-	-	-	M1 vs. M4	-
M5 Non-mediated model firm performance	21.81 (1)	.99	.13	.01	M1 vs. M5	12.36 (3)**

Note: CFI = Comparative fit index, RMSEA = Root mean square error of approximation, SRMR = Standardized root mean square residual, FSM = fully saturated model. Harmonic mean sample size across all studies N_{HM} = 1,183.
** $p < .01$; *** $p < .001$.

The overall fit statistics for the hypothesized conceptual model (M1: $\chi^2 = 9.45$; $df = 4$; $p < .051$; CFI = 1.00; RMSEA = .03; SRMR = .01) fitted the data well and confirmed the results of the bivariate meta-analysis. As a first test of the mediation effects, the conceptual model was

compared with a fully mediated model, a partially mediated model, and a non-mediated model (James, Mulaik, & Brett, 2006). The results of the model comparison suggest that the proposed conceptual model (M1) achieved the best fit. In sum, the results of the MASEM suggest that a full mediation model (with respect to the influence of entrepreneurial traits on firm performance) fits the data better compared to a partial mediation model as none of the four entrepreneurial traits had a significant direct effect on performance. The MASEM results for the hypothesized conceptual model are depicted in Figure 4.3.

Figure 4.3 Results of meta-analytic structural equation modeling (revised model)



Note: Standardized path coefficients are presented. The effect of four of the five control variables (entrepreneur age, entrepreneur education, firm age, and firm size) on the three dependent variables is included in the MASEM. Entrepreneurs' age had a significant effect on firm innovation (.09). Entrepreneurs' education had a significant effect on firm innovation (-.14). Firm age had a significant effect on firm innovation (.06) as well as on firm performance (-.07). Firm size had a significant effect on entrepreneurial orientation (.14), firm innovation (-.24), and firm performance (.09). The model was estimated using the harmonic mean N_{HM} = 1,183. Fit statistics: χ^2 = 9,45 df = 4, p = .05; CFI = 1.00; RMSEA = .03; SRMR = .01.
** p < .01; *** p < .001.

Consistent with our hypotheses the MASEM results show that need for achievement (HIII-1a: .18), locus of control (HIII-2a: .10), self-efficacy (HIII-3a: .09), and risk taking (HIII-4a: .38) are all significant and positively associated with EO. Consistent with our second set of hypotheses the MASEM results also show that need for achievement (HIII-1b: .08), locus of

control (HIII-2b: .10), self-efficacy (HIII-3b: .27), and risk taking (HIII-4b: .33) are all statistically significant and positively related to firm innovation. Hypothesis III-5 predicts that EO has a positive effect on firm innovation. We find that EO is significant and positively associated (.08) with firm innovation. Thus, Hypothesis III-5 is supported. Hypothesis III-6 predicts that firm innovation has a positive effect on firm performance. The results show that firm innovation is significant and positively associated (.16) with firm performance, providing support for Hypothesis III-5.

To assess the mediating role of EO and firm innovation and to test the mediation hypotheses we followed the recommendations in the literature (Zhao, Lynch, & Chen, 2010) and applied a bootstrapping procedure to estimate the total indirect effects. Given that our analysis is based on a meta-analytic correlation matrix and not on raw primary data, we used the Monte Carlo method (5,000 bootstrap samples) to generate confidence intervals (Preacher & Selig, 2012). To further assess the specific indirect effects (Malhotra et al., 2014) of the two parallel mediational pathways (i.e., through EO and through firm innovation) we generated a data set based on the meta-analytic correlation matrix and applied the procedure suggested by Preacher and Hayes (2008) to test the respective indirect effects of the entrepreneurial traits on performance through EO and firm innovation. Table 4.5 presents the results of the mediation analysis.

Table 4.5 Results of mediation analysis

Relationship	Direct effect		Total and specific indirect effect		Total effect	
Firm innovation						
Need for achievement - EO - FI	.07*	(.02 - .12)	.01*	(.003 - .02)	.08**	(.04 - .13)
Locus of control - EO - FI	.10***	(.06 - .15)	.01*	(.002 - .01)	.11***	(.07 - .15)
Self-efficacy - EO - FI	.27***	(.22 - .31)	.01*	(.001 - .01)	.28***	(.23 - .32)
Risk taking - EO - FI	.34***	(.30 - .39)	.02*	(.007 - .04)	.37***	(.33 - .41)
Firm performance						
Need for achievement (TIE)	.05	(-.01 - .10)	.04***	(.02 - .05)	.08*	(.03 - .13)
Need for achievement - EO - FP	-		.05***	(.03 - .07)	-	
Need for achievement - FI - FP	-		.02***	(.01 - .03)	-	
Locus of control (TIE)	.05†	(.00 - .10)	.03***	(.02 - .05)	.08**	(.03 - .13)
Locus of control - EO - FP	-		.03***	(.02 - .05)	-	
Locus of control - FI - FP	-		.02***	(.01 - .04)	-	
Self-efficacy (TIE)	.00	(-.06 - .05)	.05***	(.04 - .07)	.05	(-.01 - .10)
Self-efficacy - EO - FP	-		.03***	(.02 - .05)	-	
Self-efficacy - FI - FP	-		.04***	(.03 - .06)	-	
Risk taking (TIE)	.07*	(.01 - .12)	.11***	(.08 - .14)	.18***	(.14 - .23)
Risk taking - EO - FP	-		.11***	(.08 - .14)	-	
Risk taking - FI - FP	-		.07***	(.05 - .10)	-	
Entrepreneurial orientation - FI - FP	.15***	(.09 - .21)	.01*	(.00 - .09)	.16***	(.10 - .21)

Note: EO = entrepreneurial orientation, FI = firm innovation, FP = firm performance, TIE = total indirect effect. 5000 bootstrap samples. 95 percent confidence intervals are shown in parentheses.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Hypothesis III-7 states that EO mediates the relationship between the four entrepreneur traits and firm innovation (HIII-7a) as well as between the four entrepreneurial traits and firm performance (HIII-7b). The results of the mediation analysis indicate that EO mediates the entrepreneurial traits-firm innovation relationships as well as the entrepreneurial traits-firm performance relationships (all indirect effects are statistically significant and the CIs do not include zero). These findings lend support for Hypotheses III-7a and III-7b. Hypothesis III-8 states that firm innovation mediates the relationship between entrepreneurial traits and firm performance (HIII-8a) as well as between EO and firm performance (HIII-8b). The indirect effects of all four entrepreneurial traits on firm performance through firm innovation are positive and statistically significant, providing support for Hypothesis III-8a. The results of the mediation analysis also show that the indirect link between EO and firm performance through

firm innovation is positive and statistically significant, providing support for Hypothesis III-8b.

Given the findings of the publication bias analysis we conducted a robustness check and tested the MASEM and the mediation analysis using the effect sizes suggested by the trim and fill procedure as well as the cumulative meta-analysis. The main findings for our hypotheses did not change.

4.3.3 Extension of the analysis

In line with our hypothesis, EO had a positive and statistically significant effect on firm innovation in the MASEM. While the correlation between EO and firm innovation was relatively high (.32), the standardized path coefficient was relatively small (.08) compared to the effects of the entrepreneurial traits on firm innovation. Inspection of the meta-analytic correlation matrix (see Table 4.2) shows that EO has the highest correlation with risk taking (.46) which itself has the strongest correlation with firm innovation (.45), suggesting that collinearity may restrict our ability to disentangle the independent effects of EO and risk taking on firm innovation. Moreover, the present study examines the influence of a set of entrepreneurial traits on EO and firm innovation. Thus, the question about the unique effect of each trait and its relative importance in explaining the two outcomes compared to the other traits arises.

We followed the recommendations in the literature (Nimon & Oswald, 2013) and use a combination of metrics to assess the importance of the determinants as well as the unique and shared contributions of EO and the entrepreneurial traits in explaining firm innovation. More specifically, we used structure coefficients (Thompson & Borrello, 1985), dominance analysis (Azen & Budescu, 2003; Budescu, 1993), and relative weight analysis (Fabbris, 1980; Johnson, 2000) to evaluate the relative contribution of the variables and we used commonality analysis to examine the unique and common contributions of the variables. We used the R package

'yhat' (Nimon & Roberts, 2009) and an extension of the package (Nimon & Oswald, 2013) to calculate the different metrics. The results are presented in Table 4.6.

Table 4.6 Predictor metrics and results of commonality analysis as well as importance analysis

Variable	R	R^2	β	$\overline{r}_n$	r_s	r_s^2	Unique	Common	GDW	Pratt	RLW
Entrepreneurial orientation	.541	.293									
Need for achievement			.241	.34	.628	.395	.054	.061	.078	.082	.080
Locus of control			.073	.26	.480	.231	.004	.063	.027	.019	.027
Self-efficacy			.087	.29	.536	.287	.006	.078	.036	.025	.035
Risk taking			.362	.46	.850	.723	.110	.102	.151	.167	.151
Firm innovation	.543	.295									
Entrepreneurial orientation			.044	.32	.590	.348	.001	.101	.036	.014	.034
Need for achievement			.195	.31	.572	.327	.033	.063	.053	.060	.055
Locus of control			.057	.27	.498	.248	.003	.070	.025	.015	.025
Self-efficacy			.177	.36	.664	.441	.023	.106	.061	.064	.062
Risk taking			.312	.45	.830	.689	.070	.132	.119	.140	.119

Note: β = beta weight, $\overline{r}_n$ = uncorrected random effects sample-weighted mean correlation coefficients, r_s = structure coefficient, r_s^2 = squared structure coefficient, unique = proportion of variance of the respective dependent variable explained uniquely by the respective independent variable, common = proportion of variance in the respective dependent variable explained by the independent variable that is also explained by one or more other independent variables, GDW = general dominance weight, Pratt = Pratt index, RLW = relative weight.

The squared structure coefficients provide information about how much variance a variable can explain of the observed R^2. The results for the squared structure coefficients suggest that risk taking explains the largest portion of the variance observed (.689), followed by self-efficacy (.441) and EO (.348). If the independent variables are uncorrelated the sum of all squared structure coefficients will equal 1. With 2.053 the sum of the squared structure coefficients is much larger than 1, indicating substantial shared variance among the independent variables. The results of the commonality analysis suggest that risk taking explains the largest portion of the explained variance in firm innovation (.07) followed by need for achievement (.033) and self-efficacy (.023). The unique variance explained by EO is the smallest (.001) compared to the entrepreneurial traits. The portion of shared variance with the other independent variables is largest for risk taking (.132), followed by self-efficacy (.106), and EO (.101). These findings suggest collinearity between risk taking and EO. In sum, these results suggest that the measures of risk taking and EO, which includes a risk-taking dimension, seem

to covary substantially. Moreover, the results suggest that risk-taking has the strongest influence on EO and firm innovation. While need for achievement is second strongest predictor for EO, self-efficacy is the second strongest predictor for firm innovation followed by need for achievement. The findings suggest that different entrepreneurial traits are relevant in explaining different action characteristics.

4.4 Discussion

The controversy about the influence of entrepreneurs' personality on their economic success has been the subject of a long-standing debate. We tested Frese's (2009) active performance characteristics and entrepreneurial success model based on meta-analytic data from 97 studies including 22,765 firms. Our results show that entrepreneurial orientation and firm innovation mediate the influence of a set of personality traits that are relevant in the entrepreneurship context. Our results help to resolve the ongoing controversy, originating from inconclusive and ambiguous findings reported in prior primary studies.

4.4.1 Theoretical implications

Although our findings offer several insights into the determinants of entrepreneurial success, one of the main contributions of the present study is the meta-analytic test of a mediational model that provides an explanation for the inconsistent findings in previous studies. Based on Frese's (2009) theoretical framework we show that active performance characteristics function as mediators of the relationship between entrepreneurial traits and firm performance. Our findings suggest that the action-characteristics model of entrepreneurship (Frese, 2009) has the potential to provide a useful theoretical framework for investigating the antecedents of entrepreneurial success. The model can serve as a common framework of reference for developing a better understanding of how and when personality is related to entrepreneurial success. Furthermore, the model helps to explain why entrepreneurs tend towards specific action characteristics. All four entrepreneurial traits are moderate to strong determinants of EO

and an innovation strategy when compared to the average effect size in the entrepreneurship literature (Connely et al., 2010: $\overline{r}_c$ = .28). We observe that the relationship between entrepreneurial traits and firm performance is fully mediated for three of the four entrepreneurial traits and partially mediated for risk taking. This supports the theoretical framework proposed by Frese (2009) and colleagues (Rauch & Frese, 2000; Rauch & Frese, 2007b; Frese & Gielnik, 2014) that posits an indirect influence of entrepreneurial traits on firm performance through the specific behaviors and actions taken by entrepreneurs' and their firms. The results of the mediation analysis show that all four entrepreneurial traits influence firm performance through the two proposed mediators, indicating that EO and firm innovation function as action characteristics which are central to this theoretical framework. The effect size of the relationship between these two action characteristics and firm performance are larger than the effect sizes identified in prior meta-analysis that have examined education and experience (Martin, McNally, & Kay, 2013: $\overline{r}_c$ = .17; Mayer-Haug et al., 2013: $\overline{r}_c$ = .07; Read, Song, & Smit, 2009: $\overline{r}_c$ = .12; Song et al., 2008: $\overline{r}_c$ = .11; Unger et al., 2011: $\overline{r}_c$ = .10), business planning (Brinckmann, Grichnik, & Kapsa, 2010: $\overline{r}_c$ = .10; Mayer-Haug et al., 2013: $\overline{r}_c$ = .12) as well as the effects of networks, partnerships, and social capital (Mayer-Haug et al., 2013: $\overline{r}_c$ = .13; Read, Song, & Smit, 2009: $\overline{r}_c$ = .11 to .17; Stam, Arzlanian, & Elfring, 2014: $\overline{r}_c$ = .21) on entrepreneurial success. In sum, our results provide a more complete picture of the mechanism through which a set of entrepreneurship relevant narrow personality traits influence entrepreneurial success, enriching our understanding of the later stage of the entrepreneurial process.

The results of our meta-analysis also have implications for the related literature on upper echelons (Hambrick & Mason, 1984). Upper echelons theory suggests that individual leaders make strategic choices that are influenced by biases and dispositions due to bounded rationality and imperfect information (Hambrick, 2007). As a consequence, organizational outcomes are

influenced by the characteristics of the individual decision maker, such as experience, personality, and values (Hambrick, 2007; Hambrick & Mason, 1984). Upper echelons theory has in particular focused on CEOs and top management teams as well as the demographic characteristics of these decision makers and little is known about how personality is reflected in organizational performance (Carpenter, Geletkanycz, & Sanders, 2004). Our findings provide novel insights for this literature by showing how an entrepreneur's personality influences firm-level outcomes.

Our results also provide novel insights for the literature on EO. In line with the existing meta-analytic evidence (Rauch et al., (2009): $\overline{r}_c$ = .24; Rosenbusch, Rauch, and Bausch, (2013): $\overline{r}_c$ = .26; Saeed, Yousafzai, and Engelen, (2014): $\overline{r}_c$ = .27) our results show that EO has a positive effect on firm performance ($\overline{r}_c$ = .29), indicating that firms that are more entrepreneurial oriented perform better. While a large number of studies have examined the economic outcomes of EO, there is relatively little research on how firms develop an EO and on the factors that contribute to differences in EO across firms or business units (Rosenbusch, Rauch, & Bausch, 2013; Wales, Monsen, & McKelvie, 2011; Wales, Gupta, & Mousa, 2011). Our findings suggest that specific personality traits of an entrepreneur foster the formation of EO in an entrepreneur's firm. The effects of traits on EO are comparable in size to those of the link between environment and EO (Rosenbusch, Rauch, & Bausch, (2013): $\overline{r}_c$ = .27 to .43), indicating that entrepreneurs' personality seems to be equally important in developing EO compared to the effect of environmental factors. Thus, the present study responds to recent calls to enrich understanding of the effects of personality traits on EO (Rauch & Frese, 2012) and contributes to the growing body of literature that aims to explain the development, management, and utilization of EO.

A second contribution to the EO literature is the test of the mediating role of firm innovation in the relationship between EO and firm performance. Prior primary research (for

an overview see Wales, Gupta, & Mousa, 2011) as well as meta-analytic studies (Rauch et al., 2009; Rosenbusch, Rauch, & Bausch, 2013; Saeed, Yousafzai, & Engelen, 2014) have focused on the direct relationship between EO and firm performance. The findings of the current study suggest that the influence of EO on firm performance is partially mediated by firm innovation, indicating that firms that are more entrepreneurial are also more innovative. Thus, the present study starts to answer calls for a more comprehensive view of the relationship between EO and firm performance and an examination of the mediating role of innovation (Rosenbusch, Rauch, & Bausch, 2013).

The findings presented in this study also enrich our understanding of the determinants and consequences of firm innovation. First, our results show that firm innovation has a positive effect on firm performance ($\overline{r}_c$ = .24), confirming the findings of the existing meta-analytic evidence (Bierwerth et al., (2015): $\overline{r}_c$ = .26; Bowen, Rostami, and Steel, (2010): $\overline{r}_c$ = .16; Karna, Richter, and Riesenkampff (2015): $\overline{r}_c$ = .22; Rosenbusch, Brinckmann, and Bausch, (2011): $\overline{r}_c$ = .13; Rubera & Kirca, (2012): $\overline{r}_c$ = .15; Saeed et al., (2015): $\overline{r}_c$ = .14; Song et al., (2008); $\overline{r}_c$ = .05). Compared to the majority of prior meta-analyses, a larger effect size was observed. An explanation for this finding may be that the current meta-analysis only includes primary studies of entrepreneur-led firms compared to most existing meta-analysis, which in particular included primary studies with manager-led firms. Entrepreneurs compared to managers may more directly influence the effectiveness with which an innovation strategy is implemented and with which a firm may leverage innovation capabilities for superior firm performance. In their meta-analysis, Bierwerth et al. (2015) focused on corporate entrepreneurship (including strategic renewal, innovation, and corporate venturing) and found a comparable effect size, indicating that innovation in the firm benefits from an entrepreneurial environment. Our results also contribute to the growing literature that examines the antecedents of firm innovation. Compared to the thirteen determinants of firm innovation examined in the meta-analysis by Damanpour

(1991: mean effect size ranged from -.16 to .47 with an average of .25 across all positive effect sizes), the effect sizes of the present study are comparable in magnitude ($\overline{r}_c$ ranged from .27 to .45), indicating that entrepreneurial traits contribute to the growing literature on the microfoundations of firm-level strategic behavior (Felin & Foss, 2005). Our findings highlight the role of entrepreneurs' personality as an important source of firm-level differences in innovation. These insights can inform understanding of individual-level characteristics as origins of competitive advantage.

4.4.2 Practical implications

The results of our study also offer practical implications. Our findings highlight the importance of favorable entrepreneurial traits as these traits impact firm performance through active performance characteristics, such as EO and an innovation strategy. Entrepreneurs with high levels of need for achievement, locus of control, self-efficacy, and risk taking become successful because they have been able to develop an EO in their firm and have employed an innovation strategy. Training and intervention programs could be utilized in entrepreneurship education, training, and development to positively influence those personality traits that are related to entrepreneurial tasks (Rauch, 2014). As described by Rauch (2014), such programs exist in different formats for various traits, such as need for achievement, proactivity, and self-efficacy. Schroeder and Schmitt-Rodermund (2006) have tested an intervention program aiming at creativity, locus of control, and risk taking to successfully increase enterprising interests. Intervention and training programs have been shown to be effective and these programs could be used to develop individuals' entrepreneurial traits by schools, universities, and professional development activities. Potential and actual entrepreneurs may benefit from building and strengthening entrepreneurial traits by participating in workshops, trainings, and other program components. Entrepreneurs must be aware that their personality may stimulate

or inhibit an entrepreneurial environment and innovative culture in their corporation and, thus, may ultimately make a difference to the performance of their firm.

The second practical implication of this study concerns external stakeholders such as venture capitalists, investors, and policy makers, who should include entrepreneurial traits and the development of these traits in a potential entrepreneur in their assessment of the likely performance of an entrepreneur's firm. Potential stakeholders of a firm should evaluate whether entrepreneurs possess the identified entrepreneurial traits and whether they show active performance characteristics in their actual behavior as the existence of, or lack of, these traits and activities is related to firm performance.

The third recommendation is that entrepreneurs should support an EO and firm innovation within their business as our results suggest that EO has a direct positive effect on firm performance as well as an indirect effect through an innovation strategy. Therefore, entrepreneurs should actively support their employees in becoming more entrepreneurial themselves by acting proactively, taking reasonable risks, and seeking innovative and creative solutions. Firm innovation is an action resulting from the entrepreneurial traits of the entrepreneur and the EO of the firm. A firm with a general strategic tendency to be proactive, risk taking, and innovative not only reacts but takes the initiative in finding novel solutions to existing practical problems and ultimately attain greater performance.

4.4.3 Limitations and directions for future research

The findings of the present meta-analysis should be interpreted in light of several limitations. First, meta-analysis is limited to the underlying primary studies and the information that is provided by these primary studies. We include four entrepreneurial traits, two active performance characteristic, and one measure of entrepreneurial success in our analysis. Only variables that are sufficient in number can be included in a meta-analysis and, therefore, the present meta-analysis should be considered a summary of the most commonly studied

determinants of firm performance in entrepreneur led firms. The variables included in our research model represent the most frequently examined variables in the literature as they are of focal interest to this research field. The indirect effect of other entrepreneurial traits, such as stress tolerance, passion for work, and proactive personality (Frese, 2009) should be examined in future research. Recent research (Miller, 2015) also suggests that some personality traits may give raise to facets of personality (e.g., aggressiveness, narcissism, and overconfidence) that may have negative influences of entrepreneurial success. Moreover, future studies should investigate the mediating role of other active performance characteristics, such as active goals and visions, active social strategy, or active learning. The literature may also gain valuable insights from an analysis of the specific determinants and outcomes of the EO sub-dimensions. A more detailed examination of the single dimensions could help to further understand inconsistencies of effect size magnitude related to the EO construct.

A second limitation concerns the heterogeneity of the effect sizes. While potential moderators were identified in the current meta-analysis, a moderator analysis was not conducted for the hypothesized relationships due to the small number of available studies for inclusion. However, the present meta-analysis enables us to test the proposed conceptual model across various samples, including different industries and institutional contexts. The conceptual model fits the data well across the different underlying primary studies, providing evidence of the validity of the proposed conceptual model. Future research on the effects of entrepreneurial traits on entrepreneurial performance would be strengthened by results obtained through a theoretically guided moderator analysis. The studies included in the present meta-analysis focused on the direct relationships between entrepreneurial traits and firm performance and, thus, more research is needed to complete a reliable moderator analysis. Frese (2009) argues that the model is embedded in the context of the respective national culture. Therefore, future research should examine the moderating role of cultural norms and values on the model's

relationships. Possible additional moderators identified by Frese (2009) also include the influence of personality as well as environment on the active performance characteristics-entrepreneurial success relationship. Conducting a detailed moderator analysis would provide valuable information about the boundary conditions that maximize or minimize the different effects (Rauch, 2014). As more research is completed, more primary studies will be available to conduct moderator analysis.

A third limitation of the underlying primary studies and therewith of this meta-analysis is that all included studies were based on a cross-sectional research design. This limits our ability to make causal references between the variables as meta-analysis is insensitive to causal directions (Aguinis et al., 2011; Rauch, 2014). While there are, for example, theoretical arguments that innovation is affecting firm performance, higher firm performance may stimulate further innovation. To establish causal linkages, future research should therefore include longitudinal data (Rauch, 2014).

Finally, we were only able to identify studies that have analyzed a single entrepreneur. A large share of entrepreneurial activity is the result of entrepreneurial teams (Davidsson, 2007), which may be characterized by team members with different personalities. In addition, all studies included in this meta-analysis have been conducted at the firm level and not at the business level. Entrepreneurs may run more than one business at the same time (parallel entrepreneurs) and may achieve very different entrepreneurial outcomes (Davidsson, 2007). Future research should focus on the personality characteristics of entrepreneurial teams as well as business and firm-level effects of personality traits and active performance characteristics.

Although personality traits have received significant attention in the entrepreneurship literature, what is not well known is *how* entrepreneurial traits influence entrepreneurial success. Based on Frese's (2009) model, this article offers an initial step in this direction and demonstrates that entrepreneurial traits influence firm performance in particular through active

performance characteristics and the strategic actions taken by an entrepreneur. Additional research is required to better understand the pathways involved in the mechanisms through which personality influences success. We hope that our meta-analytic review provides fruitful and promising avenues for future research and will spur more research on how and when entrepreneurial traits influence entrepreneurial success.

5. Summary and conclusion

The present thesis examined the process from starting a business to its final success, where the entrepreneur and his personality are of central interest. We investigated competing theories on EI, namely the TPB (Ajzen, 1991) and the EEM (Shapero & Sokol, 1982) with a systematic literature review. We compared and integrated these models to achieve a more clear and robust theoretical basis. We analyzed how personal background factors (i.e. prior founding experience, entrepreneurial role models, work experience, general education and entrepreneurship) affect EI through attitudes using the framework of the TPB and the influence of entrepreneurs' personality on their economic success. Using data from 317 studies including 385 independent samples with 198,920 individuals and 22,765 owner-manager led firms, our results help to resolve previous inconclusive finding in the complete process. We found an existing mediational influence of the attitudinal variables of the TPB (attitude towards the behavior, subjective norm, and perceived behavioral control), for the relation between personal background factors and EI, as well as of entrepreneurial orientation and firm innovation for the relation between several entrepreneurship relevant personality traits with success.

Theoretical implications

Despite inconclusive findings in the previous studies, our bivariate results of the TPB and the EEM indicate a positive effect all included determinants on EI. The comparison of the effect sizes showed a higher amount of explained variance in EI for the TPB, which challenges findings by Krueger et al. (2000) with opposite findings for the EEM. We set up an integrated model of EI using meta-analytic structural equation modelling and examined the relations of the determinants with their impact on EI. Our results indicate an impact of all determinants of both models on EI through perceived desirability, which confirms the MGB, that an individual's desire transforms other determinants into EI. Furthermore, we extended the MGB as our results indicate that the influence of PBC on EI is not fully mediated, but also affects intentions

directly. Contrary to previous research which assumed that attitudes and subjective norms as part of perceived desirability as well as ESE and PBC as part of perceived feasibility, we found ATB and subjective norms to impact EI through different pathways and ESE and PBC to vary at least in strength of their impact on an identical pathway. Furthermore, the findings recommend a closer look at the development of EI in a contextual perspective. Differences in cultural norms and values might cause different strengths of single relationships as can be seen for the relationships of subjective norms as well as perceived desirability with EI. Western societies show higher levels of independence and individualism, and highlight the uniqueness of individuals' goals and achievements (Brandl & Bullinger, 2009), which might cause subjective norms and perceived desirability to have a stronger effect on EI in here. A significant difference compared to the strength of more recent studies might be caused by changes in the economic and institutional conditions, as research showed an influence of economic conditions and institutional settings on EI (Griffiths et al., 2009; Shinnar et al., 2012). These moderating influences partially explain inconclusive findings of previous studies, in particular for the controversially discussed relationship between subjective norms and entrepreneurial intention.

We provid a better understanding for the evaluation of the importance of personal background factors compared to other impact factors on EI. The results suggest a rather small direct effect of entrepreneurial role models, general work experience, general education, and entrepreneurship education on EI compared to prior effect sizes of personality traits (e.g. Zhao et al., 2010a). We further contributed to the entrepreneurship literature and used the TPB as theoretical framework to empirical identify the pathways of the impact of personal background factors on EI through attitude, subjective norm, and perceived behavioral control.

We extend the original TPB literature and most primary TPB-based entrepreneurship studies as our results suggest that personal background factors influence EI in a unique way through specific determinants. Work experience and general education are such factors and

particulary influence EI through a more favorable attitude. However, we also found support for a direct influence of personal background factors on EI. Therefore, we contribute to the entrepreneurship literature in line with previous studies which suggest that direct effects of prior experience (Conner und Abraham, 2001), and in the entrepreneurship context personality factors (Krueger, 2009) should extend the TPB. Overall, the outcomes also help to resolve the ambiguous results in the existing literature.

We extend the literature on upper echelons (Hambrick & Manson, 1984), where only little is known about how personality is reflected in organizsational performance (Capenter et al., 2004) and show the influence of an entrepreneur's personality on the outcome of a firm. Furthermore, we found support that firms with a higher entrepreneurial orientation perform better. In an aim to explain how EO is developed, our findings suggest that specific personality traits of an entrepreneur foster the formation of EO in an owner-manager led firm. We also answered recent calls to examine the mediating role of innovation in the relationship between EO and firm performance (Rosenbusch, Rauch, & Bausch, 2013) and found support of partial mediation by firm innovation, which indicates that entrepreneurial firms are also more innovative. This firm innovation on the other hand is also positive for the firm performance, especially in owner-manager led firm, where the entrepreneur has a more direct influence on the way an innovation strategy is implemented to leverage innovation capabilities for a superior business success. We foster the entrepreneurial personality as an important factor that influences firm-level differences in innovation that supports the view of individual-characteristics as origins of competitive advantage.

Practical implications

Our results show the importance of perceived desirability in the development of EI. In practice, educators should focus to foster students' entrepreneurial capabilities in an attempt to increase ESE and PBC. Educators should also try to highlight the advantages of an

entrepreneurial career to direct stimulate the perceived desirability to become an entrepreneur. The outcomes may therefore be a useful instrument to evaluate components in entrepreneurship curricula. Furthermore, our results implicate that entrepreneurship educators at schools and universities should involve active entrepreneurs as guest lecturers and mentors in addition to the theoretical elements of the curriculum to raise individuals' attitudes towards starting a business, in support of the call for such content in recent studies (Kautonen et al., 2010b; Zapkau et al., 2015).

We found support that significant others might be seen as less supportive through the influence of work experience and entrepreneurship education, which educators have to address in entrepreneurship courses. They have to prepare potential entrepreneurs with respect to arguments against an entrepreneurial career and to clarify issues that may cause misconceptions about entrepreneurship. The government could also support to foster entrepreneurship and influence the reactions of significant others by frequently emphasizing the importance of entrepreneurship and by presenting the different measure they use to reduce potential downsides. Furthermore, educators and policy makers should seek opportunities to enhance perceived behavioral control. Individuals could fear failure or business-related laws and regulations that are not fully stable, so educators have to customize educational experiences and to develop educational programs in an attempt to increase effectiveness.

Once a business was set up, entrepreneurial traits influence the ability of entrepreneurs to develop EO with innovative strategies in their firms. The goal should therefore be to use intervention and training programs to develop individuals' entrepreneurial traits in schools, universities and through professional development activities. The personality of an entrepreneur might either stimulate or inhibit an entrepreneurial environment with innovations in the firm, which might be the difference in how the firm finally performs. Furthermore, external stakeholders get the possibility to assess a likely firm performance as they can evaluate

whether an entrepreneur possesses the necessary traits and shows active performance characteristics for a superior firm performance. Last, the results of the study implicate, that entrepreneurs should foster entrepreneurial behavior among their employees to support a strategic tendency towards proactivity, risk taking and innovation to possibly find novel solutions and finally attain greater performance.

Directions for future research

The thesis offers several avenues for further research. In general, meta-analysis is always constraint to variables for which sufficient data is available and should consequently be considered as a summary of the most commonly studied impact factors. Future research may examine alternative theoretical frameworks and identify further determinants for the several variables of interest in our three studies. Furthermore, meta-analyses of all three studies are based on primary data that resulted from a cross-sectional research design. Meta-analysis is insensitive to causal directions and therefore limits the ability to make causal references between the variables. In an attempt to establish causal linkages, future research should consequently include longitudinal data (Rauch, 2014), to eliminate the question of causality, and utilize more dynamic models to examine reverse causality and simultaneity in the models. In addition, meta-analysis is not suited to embrace the full complexity of inter-relationships between the variables (Cooper & Hedges, 2009), which need to be addressed in further primary studies.

For the theory building on EI in particular, further focus has to be laid on the postvolitional process in the entrepreneurial behavior. With only a few studies of the impact of EI on behavior (Kolvereid & Isaksen, 2006; Hulsink & Rauch, 2010; Kautonen, Van Gelderen, & Fink, 2013; Kautonen, Van Gelderen, & Tornikoski, 2013), future research should include actual behavior to test its relation to EI. For the influence of personal background factors on EI future studies should extent the scope of this thesis and try to examine direct as well as indirect

effects using other intention-based theories, apart from the TPB. Furthermore, research should pick up our model and examine the role of potential individual, situational, contextual, and methodological moderators, in the relationship between personal background factors and EI. For the relationship between personality traits and the success of a firm, future studies should investigate the mediating role of other active performance characteristics like active goals, visions, strategy and learning. In addition, the model could benefit from a broader basis of research on possible moderators. One potential fruitful direction is the role of cultural norms and values, as according to Frese (2009) the model is embedded in the context of the respective national culture.

Meta-analysis proved to be a valuable tool to examine the research gaps presented in this thesis. Overall, we were able to aggregate the findings of previous studies and examine inconsistencies among them. In doing so, we were able to test and integrate the most often used models on the development of EI, to understand the way how personal background factors determine EI, and to offer an initial step to demonstrate the influence of entrepreneurial traits on business success through active performance characteristics and the strategic actions taken by an entrepreneur. Future research should aim to meta-analytically include upcoming primary studies. The goal should be the creation of a publicly accessible database of all studies (Bosco et al., 2015b), which allows summarizing the data immediatly. According to Paterson et al. (2016) the majority of primary studies in the research field of management are statistically underpowered. To calculate the necessary sample sizes to improve statistical power and to produce better informed non-nilhypotheses of future primary studies (Bosco et al., 2015a), research is able to benefit from the calculated effect sizes of such a database-based meta-analysis. Furthermore, the effect sizes of these meta-analyses can serve as indicator for a priory beliefs in Bayesian methods (Block, Miller, & Wagner, 2014), to specify a prior distribution of effect sizes. While meta-analytic procedures as well as evidence-based entrepreneurship and

evidence-based management in general still have a long way to go (Dalton & Dalton, 2008), we hope that the present thesis helped and will help to master some of the steps along this road.

6. References

Studies included in the meta-analysis of study I are marked with ([a])
Studies included in the meta-analysis of study II are marked with ([b])
Studies included in the meta-analysis of study III are marked with ([c])

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