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Title	Boosting and sustaining passion: A long-term perspective on the effects of entrepreneurship training
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Citation	Gielnik, M. M., Uy, M. A., Funken, R., & Bischoff, K. M. (2017). Boosting and sustaining passion: A long-term perspective on the effects of entrepreneurship training. <i>Journal of Business Venturing</i> , 32(3), 334–353.
Date	2017
URL	<a href="http://hdl.handle.net/10220/42401">http://hdl.handle.net/10220/42401</a>
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**Boosting and sustaining passion: A long-term perspective on the effects of  
entrepreneurship training**

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**Accepted for Publication (Feb. 15, 2017), *Journal of Business Venturing***

**Acknowledgements:** This study was supported by the German Commission for UNESCO and the BASF Stiftung. Furthermore, we acknowledge the support by the Deutscher Akademischer Austausch Dienst (DAAD; ID 50020279 and ID 54391079). We would like to thank Charles Y. Murnieks and Shuhua Sun for their helpful comments on an earlier draft of the manuscript. Furthermore, we thank Jonas Thielemann, Torben Broders, Anna Pfahler, Lucia Lou-Anne Boileau, Shirin Betzler, Ann-Kathrin Krichel, and Merlyn Markus for their support in collecting the data. Special thanks go to Prof. Michael Frese as the principal investigator of the STEP project and to the STEP team at Kenyatta University, in particular Peter Wanderi Mwangi and Jacqueline Kisato.

# **Boosting and sustaining passion: A long-term perspective on the effects of entrepreneurship training**

## **Abstract**

We know that entrepreneurship training is effective but we lack a theoretical understanding of the dynamic processes after training leading to business creation. In this study, we develop a theoretical model to explain short- and long-term effects of entrepreneurship training on entrepreneurial self-efficacy, passion, and business creation. We hypothesize that entrepreneurship training boosts entrepreneurial self-efficacy and passion, and that entrepreneurial self-efficacy sustains the positive effect of entrepreneurship training on passion over time. Furthermore, we hypothesize that entrepreneurship training impacts business creation through passion. We conducted a field experiment with four measurement waves over 32 months resulting in 784 observations from 227 participants. Discontinuous growth curve modeling and joint lagged analyses supported our hypotheses. Our findings indicate that post-training processes are dynamic and that entrepreneurial self-efficacy is important to maintain high passion after training. Maintaining high passion after training eventually leads to business creation.

Keywords: entrepreneurship; business creation; passion; entrepreneurial self-efficacy; training, time

Entrepreneurship training programs focus on equipping individuals with knowledge and skills for launching and operating business ventures (Katz, 2007). Entrepreneurship training is regarded as a practical means to increase new business creation and entrepreneurial activity (Martinez, Levie, Kelley, Saemundsson, & Schott, 2010). Indeed, meta-analytic research has provided evidence that entrepreneurship training is effective in promoting cognitive and motivational outcomes resulting in more start-ups and higher performance (Martin, McNally, & Kay, 2013). However, what is lacking is a profound theoretical understanding of the mechanisms and boundary conditions explaining why and under which conditions entrepreneurship training exerts a positive effect (Martin et al., 2013). Accordingly, researchers have noted that our knowledge about how to design and improve training to effectively promote entrepreneurship is still limited (Edelman, Manolova, & Brush, 2008; Gielnik, Frese, et al., 2015; Pittaway & Cope, 2007).

There are at least two reasons for the lack of a theoretical understanding of the effects of entrepreneurship training. First, previous research on entrepreneurship training mainly focused either on short- or long-term outcomes without linking the two. In fact, Martin et al.'s (2013) meta-analytic overview reports that only four out of 42 evaluation studies included both short-term outcomes in terms of knowledge, motivation, or intention and long-term outcomes in terms of nascent behavior, start-up, or performance. Linking short- and long-term outcomes, however, is important to identify the mechanisms through which entrepreneurship training exerts an influence on entrepreneurial behavior. Thus, previous research oftentimes failed to offer an integrated perspective on the processes leading to start-up and higher performance after the training.

Second, previous research assessing the impact of entrepreneurship training took mainly a static perspective and neglected to take into account the dynamic nature of short-term training outcomes in terms of people's motivation (Martin et al., 2013). A static perspective assumes that entrepreneurship training enhances participants' motivation and that participants

maintain high levels even over extended periods of time, which eventually translates into business creation and higher performance (e.g., Gielnik, Frese, et al., 2015; Souitaris, Zerbinati, & Al-Laham, 2007). However, the literature on motivation and training transfer suggests that a static perspective is overly simplistic. Specifically, the motivation literature suggests that motivational constructs are not stable trait-like constructs but rather dynamic state-like constructs that change substantially over time (Lord, Diefendorff, Schmidt, & Hall, 2010). In fact, evidence indicates that about half of the variance in motivational constructs is within-person variance (Bledow, Schmitt, Frese, & Kuehnel, 2011; Gielnik, Spitzmuller, Schmitt, Klemann, & Frese, 2015; Lord et al., 2010). Furthermore, the literature on training transfer suggests that the positive effects of training on motivational outcomes usually wear off over time (Baldwin & Ford, 1988; Blume, Ford, Baldwin, & Huang, 2010). So, we cannot simply assume that participants of entrepreneurship training keep up high levels of motivation after the training. Rather, we need to examine the process after the training to gain a better understanding of the factors that influence the extent to which people's motivation increases, decreases, or remains stable over time.

In this study, we seek to address the key limitations of previous research by linking short- and long-term training outcomes and by taking a dynamic perspective on training participants' motivation. Specifically, we use the setting of an action-oriented entrepreneurship training to examine the flow of effects from entrepreneurship training to business creation through entrepreneurial self-efficacy and passion (see Figure 1). In our theoretical model, we put passion center stage and use it as an indicator reflecting people's motivation for entrepreneurship. In the entrepreneurship literature, scholars have regarded passion as a central motivational force fueling entrepreneurship (Baum, Locke, & Smith, 2001; Cardon, Wincent, Singh, & Drnovsek, 2009; Shane, Locke, & Collins, 2003). The underlying argument is that passion is a strong energizing driver that enables entrepreneurs to work hard, persistently, and with dedication toward the realization of their business ideas

(Cardon et al., 2009; Vallerand et al., 2003). Accordingly, we hypothesize that passion after entrepreneurship training is linked to business creation. Furthermore, we examine the dynamic development of passion over time. We use discontinuous growth modeling (Lang & Bliese, 2009; Lang & Kersting, 2007) to demonstrate the short- and long-term impact of entrepreneurship training on passion across a total period of 32 months. This allows us to produce maintenance curves that represent changes in training outcomes as a function of the time elapsed after training (Baldwin & Ford, 1988). We argue that entrepreneurship training boosts participants' passion in the short-term and that entrepreneurial self-efficacy mediates the effect of entrepreneurship training on passion. Moreover, we examine the long-term effect of entrepreneurship training on passion. The transfer literature suggests that a boost in motivation generally decreases over time (Baldwin & Ford, 1988). However, we argue that it is possible to forestall the decline in passion after training and that entrepreneurial self-efficacy is a factor sustaining the positive effect of entrepreneurship training on passion in the long-term. Drawing on theories of the development of passion (Mageau et al., 2009; Vallerand et al., 2003), we hypothesize that training participants remain high in passion over time if they simultaneously develop a feeling of mastery. A feeling of mastery is reflected in self-efficacy beliefs (Bandura, 2001, 2012). In our model, entrepreneurial self-efficacy is thus a moderator of the positive effect of entrepreneurship training on passion over time.

We contribute to the entrepreneurship literature in at least two ways. First, our study seeks to identify mechanisms through which entrepreneurship training impacts entrepreneurial outcomes. Such research is important to develop a theory of entrepreneurship education and training (Martin et al., 2013; Pittaway & Cope, 2007). Our theoretical model holds that entrepreneurial self-efficacy is a factor that explains why and under which conditions training has positive short- and long-term effects on passion (see Figure 1). We thus explain how training participants gain and maintain high passion after the training. Examining the long-term impact is particularly important in entrepreneurship because business creation is a

complex phenomenon that takes several months or years with countless hours of persistent work (Reynolds & Curtin, 2008). Therefore, effective training programs need to consider the processes that help participants to keep up their motivation for entrepreneurship over extended periods of time. Our theoretical model is a step into this direction because it uncovers how participants maintain high passion after training and how this translates into business creation in the long-run.

Second, we contribute to the literature on the development of passion. Given the importance of passion in entrepreneurship, a central theoretical question is how passion develops and changes over time. Several scholars have called for research to go beyond a stable trait-based perspective and to focus on the dynamic development of passion (Cardon, Foo, Shepherd, & Wiklund, 2012; P. Chen, Ellsworth, & Schwarz, 2015; Collewaert, Anseel, Crommelinck, De Beuckelaer, & Vermeire, 2016; Murnieks, Mosakowski, & Cardon, 2014). So far, only a few studies have explicitly looked at antecedents of passion (Cardon & Kirk, 2015; Collewaert et al., 2016; Dalborg & Wincent, 2015; Gielnik, Spitzmuller, et al., 2015; Murnieks et al., 2014) and even fewer studies, to the best of our knowledge, that have considered longer timeframes with several measurement waves (cf., Cardon, 2015; Collewaert et al., 2016). We address this gap by employing a longitudinal design over 32 months with four measurement waves to examine long-term developments of passion after a training intervention. In our analyses, we used discontinuous growth curve and lagged design models to draw stronger conclusions regarding the nature and directionality of effects. Our design helps us to uncover the dynamic development of passion and its antecedents, thus adding to the stream of research that investigates the non-static nature of passion and advances theoretical models to explain how passion develops over time.

### **Passion in Entrepreneurship**

In the literature, there are various definitions of passion across different domains and disciplines. For example, Vallerand et al. (2003) have provided a general definition of passion

as “a strong inclination toward an activity that people like, that they find important, and in which they invest time and energy” (p. 757). In the specific domain of entrepreneurship, scholars have defined passion as “consciously accessible, intense positive feelings experienced by engagement in entrepreneurial activities associated with roles that are meaningful and salient to the self-identity of the entrepreneur” (Cardon et al., 2009, p. 517).

We follow previous research in entrepreneurship and draw on Vallerand et al.’s (2003) concept of harmonious passion to theorize about passion in entrepreneurship (cf., Dalborg & Wincent, 2015; V. T. Ho & Pollack, 2014; Murnieks, Cardon, Sudek, White, & Brooks, 2016; Murnieks et al., 2014; Thorgren & Wincent, 2015). Vallerand et al. (2003) have introduced a dualistic model of passion. The core idea of this model is that there are two types of passion: harmonious passion and obsessive passion. Harmonious passion means that people’s passion for an activity is in harmony with other aspects of life. In contrast, obsessive passion entails an internal pressure to perform an activity. Obsessive passion means engaging in an activity because of an obsessive urge to do so. In this study, we focus on harmonious passion.

Harmonious passion represents a motivational force to engage in an activity because people freely choose to do so and because of people’s personal endorsement of the activity.

Harmonious passion is associated with experiencing positive affect during and after task engagement (Vallerand et al., 2003). Harmonious passion therefore corresponds to the type of passion conceptualized by Cardon et al. (2009) and Gielnik et al. (2015) in previous research on passion in entrepreneurship (see also Dalborg & Wincent, 2015; Murnieks et al., 2014). Therefore, we refer to harmonious passion when we use the term passion in this study.

We acknowledge that Cardon et al. (2009) have presented a model of entrepreneurial passion that has been exceptionally influential, as it has considerably spurred research on passion in entrepreneurship (e.g., Breugst, Domurath, Patzelt, & Klaukien, 2012; Cardon, Gregoire, Stevens, & Patel, 2013; Drnovsek, Cardon, & Patel, 2016). The model holds that entrepreneurs experience passion for different activities, i.e., inventing, founding, and

developing. The different types of passion are a source of energy for succeeding in opportunity identification, business creation, and business growth, respectively (Cardon et al., 2009). Both Vallerand et al. (2003) and Cardon et al. (2009) agree that passion has a motivational function exerting positive effects on performance. In this study, we build on Vallerand et al.'s (2003) model for two reasons. First, we are interested in passion for entrepreneurship in general, rather than passion for a specific entrepreneurial activity. We therefore follow previous research in entrepreneurship, which suggested that Vallerand et al.'s (2003) model is suited to conceptualize passion for entrepreneurship broadly (V. T. Ho & Pollack, 2014; Murnieks et al., 2016). Second, we are interested in the long-term development of passion after the training. The model by Vallerand et al. (2003) provides a theoretical framework for making predictions in this regard because it elaborates on the internalization processes underlying the development of passion over time (cf., Mageau et al., 2009).

### **The Effect of Entrepreneurship Training on Entrepreneurial Self-Efficacy, Passion, and Business Creation**

In this study, we examine the short- and long-term effects of an action-oriented entrepreneurship training. The training was a 12-week intervention to increase participants' entrepreneurial attitudes, activity, and success in terms of business creation (Frese, Gielnik, & Mensmann, 2016; Gielnik, Frese, et al., 2015). The training consisted of 12 modules from the disciplines of business administration and psychology (business opportunities, business plan, laws and regulation, starting capital, accounting, marketing, financial management, leadership/strategy, action planning, personal initiative, persuasion/negotiation, and networking). The training had weekly sessions, which were three hours long. The trainers were local university lecturers who had been trained in the action-oriented methodology of the training in a three-day, train-the-trainers workshop (Bischoff, Gielnik, & Frese, 2014).

We developed the training using didactical elements from action regulation theory, which emphasizes active learning, feedback, and teaching action principles (Frese & Zapf,

1994). We incorporated active learning by asking the participants to form entrepreneurial teams of four to six members at the beginning of the training. The teams had to start and operate a micro business within the 12 weeks of training. In the teams, training participants experienced the entrepreneurial process from preparing to launching and managing a business under real business conditions. To facilitate the process, the teams received seed capital of 100 USD, which they had to repay at the end of the training. During the 12 weeks of training, participants acquired equipment and raw materials, negotiated with customers and suppliers, and eventually introduced their product or service to the market. Participants started different types of businesses, such as baking cakes and dealing in computer accessories or second hand clothes. The participants presented the progress of their micro business during the weekly sessions and received feedback from the trainers about their weaknesses and mistakes. The participants had then the opportunity to reflect on the feedback and refine their behavior in the following week. Furthermore, during the weekly sessions, the participants learnt action principles. Action principles are heuristics or rules-of-thumb, which provide hands-on knowledge and specific guidelines about the actions in entrepreneurship (Gielnik, Frese, et al., 2015). The action principles formed the content of the 12 modules and were also the basis for providing feedback to the participants about their business progress.

The didactical elements of our training are elements that according to the literature on expertise, lead to mastery and high performance. The literature on expertise suggests that key to mastery is extended and intensive training (Ericsson, 2008; Ericsson & Charness, 1994). In particular, training should provide feedback and ample opportunities for evaluating and repeating key activities. Furthermore, the training should lead to a successive refinement of performance by focusing on the improvement of weaknesses and deficient behavior (Ericsson, 2008; Ericsson & Charness, 1994). The expertise literature refers to trainings with these features as deliberate practice and has shown that deliberate practice is consistently related to mastery and high performance in various domains (Ericsson, Krampe, & Tesch-Romer,

1993). In the entrepreneurship domain, scholars also found that deliberate practice is linked to high performance (Baron & Henry, 2010; Keith, Unger, Rauch, & Frese, 2016; Unger, Keith, Hilling, Gielnik, & Frese, 2009).

The expertise literature suggests that training and deliberate practice enhances people's skills (Ericsson & Lehmann, 1996), which translates into higher self-efficacy. Self-efficacy captures people's confidence in their skills (Bandura, 1997). In our training, participants learnt skills to successfully set up and manage a business by engaging in the start-up process of a real business. Successfully engaging in the start-up process represents a mastery experience that enhances participants' confidence in their entrepreneurial skills (Gielnik, Frese, et al., 2015; Gist & Mitchell, 1992). Indeed, there is evidence that past performance, e.g., in terms of successfully starting a business, leads to an increase in self-efficacy (Sitzmann & Yeo, 2013; Zhao, Seibert, & Hills, 2005). Consequently, we hypothesize that entrepreneurship training has a positive effect on entrepreneurial self-efficacy.

According to Mageau et al. (2009), deliberate practice is associated with engagement in an activity and improved performance and therefore facilitates the development of passion. In our training, participants engaged in entrepreneurship, which should facilitate developing passion for entrepreneurship. Furthermore, the participants experienced continuous progress during the training. In the training, they identified a business opportunity and worked on implementing the idea. Participants assembled the necessary resources, made the first sale, and generated profit during the training. The progress positively influences participants' passion. Gielnik et al. (2015) have shown that engaging in entrepreneurship and making progress result in positive feelings associated with passion. This is in line with control and self-regulation theories which posit that progress and goal accomplishment are related to experiencing positive emotions characteristic of passion (Bandura, 1997; Carver & Scheier, 1982; Locke & Latham, 2002). Consequently, we hypothesize that entrepreneurship training has a positive effect on passion.

Finally, the expertise literature suggests that training and deliberate practice lead to higher performance because people acquire and refine domain-related skills (Ericsson & Lehmann, 1996). In the context of our study, higher performance means being more likely to create a new business. Furthermore, the tasks during the training were identical to the tasks of an entrepreneur (i.e., setting up a new business). Thus, participants performed actions that resemble those they have to undertake when starting a new business after the training. The resemblance between training tasks and real entrepreneurial tasks facilitates training transfer, and increases the likelihood of successfully applying the knowledge and skills gained in the training to subsequent entrepreneurial ventures (Baldwin & Ford, 1988). Consequently, we hypothesize that entrepreneurship training has a positive effect on business creation.

**Hypothesis 1:** Entrepreneurship training has a positive effect on (a) entrepreneurial self-efficacy, (b) passion, and (c) business creation.

### **Mediating and Moderating Effects of Entrepreneurial Self-Efficacy on the Relationship between Entrepreneurship Training and Passion**

Entrepreneurial self-efficacy is defined as people's confidence in their capabilities to accomplish entrepreneurial tasks, such as identifying and exploiting business opportunities as well as starting and managing a new business (C. C. Chen, Greene, & Crick, 1998). We have hypothesized that entrepreneurship training impacts entrepreneurial self-efficacy and passion (Hypotheses 1a-b). We argue that entrepreneurial self-efficacy mediates the relationship between entrepreneurship training and passion for two reasons.

First, self-efficacy has a mediating function in the process leading to passion because self-efficacy is the cognitive representation of past goal achievements and the progress made so far (Bandura, 1997). People become passionate about domains in which they experience success and believe they can excel (Mageau et al., 2009). The belief to be capable of excelling in entrepreneurship is reflected in people's entrepreneurial self-efficacy. Entrepreneurial self-efficacy is therefore a mechanism through which entrepreneurship training enhances passion.

Second, social cognitive theory argues that people high in self-efficacy are better able to discard negative feelings when experiencing negative progress, i.e. discrepancies between their standards and actual achievements (Bandura, 1991). Correspondingly, people low in self-efficacy become despondent when experiencing negative disparities (Bandura, 1991). Self-efficacy is thus a cognitive-motivational resource that buffers negative emotions when experiencing setbacks (Bandura, 1989; Ozer & Bandura, 1990). Entrepreneurs frequently experience setbacks in the process of starting and managing a business (Cope, 2003). Following social cognitive theory, entrepreneurs with high self-efficacy are better able to mitigate the strain following setbacks and maintain positive emotions associated with passion (Hmieleski & Baron, 2008). Entrepreneurship training, which enhances entrepreneurial self-efficacy, therefore exerts a positive effect on passion through entrepreneurial self-efficacy.

**Hypothesis 2:** Entrepreneurial self-efficacy mediates the effect of entrepreneurship training on passion.

We also theorize that entrepreneurial self-efficacy moderates the effect of entrepreneurship training on passion, such that entrepreneurial self-efficacy sustains the positive effect of training on passion in the long-run. Examining the long-term impact of training is particularly important in entrepreneurship because to be successful in entrepreneurship people have to be motivated over longer timeframes (Reynolds & Curtin, 2008). We base our line of reasoning on the transfer literature and on theories of the development of passion. The transfer literature suggests that in general, positive effects of training decay over time (Baldwin & Ford, 1988; Blume et al., 2010). This means that post-training processes are important to understand how people maintain high levels in training outcomes after the training. In our case, we use theories on the development of passion to understand post-training processes that lead to the maintenance of passion over time. Theories on the development of passion suggest that passion is more prevalent when people start spending time and effort on an activity (Mageau et al., 2009; Vallerand et al., 2003). When

spending time and effort on an activity, people are likely to experience some achievements and this leads to higher involvement and passion (Mageau et al., 2009). Accordingly, passion is not a stable personality trait but an attitude towards an activity that people develop over time because of the positive outcomes that result from engaging in the activity. Furthermore, the extent to which people develop passion is contingent upon internalization processes. People are more likely to become passionate when they believe that they have autonomous control over the activity they are engaging in. In other words, passion emerges as a result of internalization processes related to having internal control and autonomy over the activity that is being carried out (Mageau et al., 2009; Vallerand et al., 2003). Similarly, Chen et al. (2015) have argued that developing passion, in consequence of engaging in an activity, is contingent upon additional psychological processes. Specifically, the strong and positive emotion of passion only emerges when people, who engage in a domain, cultivate the belief that they are good at what they are doing and eventually feel that they have mastered the domain (P. Chen et al., 2015). Collewaert et al. (2016) have put forward a similar line of reasoning arguing that a sense of control and mastery is important to maintain passion over time<sup>1</sup>.

A feeling of mastery and having control over an activity is reflected in people's self-efficacy. Bandura (1997) has noted that self-efficacy reflects people's capabilities to exercise control over their actions in a specific domain. Moreover, self-efficacy is an indicator of whether or not people have mastered a domain (Bandura, 1997; Gist & Mitchell, 1992). Having mastered a domain means that one can control (to a certain extent) what will happen when carrying-out actions in this domain. In the domain of entrepreneurship, it is entrepreneurial self-efficacy that captures people's feelings of mastery and beliefs in their capabilities to exert control over their actions. Applying this line of reasoning to our study, we hypothesize that participants of the training maintain high passion in the long-run if they have

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<sup>1</sup> Mastery means having comprehensive knowledge and skills in a particular domain (Ericsson, 2008). Mastery does not necessarily mean being an expert or professional. Only at a certain level of mastery, people are considered to be experts or professionals (Ericsson, 2008). Thus, our line of reasoning also holds for non-professionals, who have developed comprehensive knowledge and skills, e.g., in entrepreneurship.

also developed high entrepreneurial self-efficacy. Conversely, training participants who are low in entrepreneurial self-efficacy do not undergo the post-training processes that maintain high passion and therefore experience the usual decay in passion after the training.

**Hypothesis 3:** Entrepreneurial self-efficacy moderates the effect of entrepreneurship training on passion, such that high self-efficacy sustains the effect of entrepreneurship training on passion in the long-term.

### **Effects of Passion on Business Creation**

We build on Vallerand et al.'s theory (2003) to argue for a positive effect of passion on business creation. Vallerand et al. (2003) have noted that passion is a source of energy that drives behavior. Passion leads people to dedicate themselves fully to an activity and achieve high performance. Indeed, research has provided evidence that passion is conducive to prolonged engagement in activities and thus facilitates goal achievement and performance (Mageau et al., 2009; Mageau & Vallerand, 2007; Vallerand et al., 2007). There are at least two lines of reasoning that explain why passion has a positive effect on performance.

First, passion is related to experiencing flow and positive affect during and after task engagement (Mageau et al., 2009; Vallerand et al., 2003). Experiencing positive affect leads to an approach tendency and active efforts as well as to setting higher goals and being more committed to goal achievement (Seo, Barrett, & Bartunek, 2004). Research has supported this link by showing that passion is related to being more likely to act on opportunities (Klauckien, Shepherd, & Patzelt, 2013), to attention and absorption (V. T. Ho, Wong, & Lee, 2011), and to engaging in activities for longer periods of time (Mageau & Vallerand, 2007).

Second, the positive affect associated with passion positively influences several processes conducive to entrepreneurship (Baron, 2008). For example, Liu et al. (2011) have shown that passion enables people to make associations between divergent concepts and to experiment with original ideas which enhances people's creativity. New venture implementation involves a host of creative tasks (Gielnik, Frese, Graf, & Kampschulte, 2012;

Gielnik, Kramer, Kappel, & Frese, 2014). Research supports these lines of reasoning showing that passion drives success in entrepreneurship (Baum & Locke, 2004; Cardon & Kirk, 2015; Drnovsek et al., 2016; Murnieks et al., 2014).

**Hypothesis 4:** Passion has a positive effect on business creation.

We hypothesized that entrepreneurship training has positive effects on passion and business creation (Hypotheses 1b-c) and that passion has a positive effect on business creation (Hypothesis 4). In general, training exerts positive effects on distal post-training behavior, such as business creation, through more proximal training outcomes, such as motivation (Kraiger, Ford, & Salas, 1993). Consequently, passion after the training and the associated higher motivation is one reason why people are more likely to create new businesses.

**Hypothesis 5:** Passion mediates the effect of entrepreneurship training on business creation.

## **Method**

### **Procedure**

The study design was a randomized controlled field experiment with a training and control group. We compared the training group with a non-intervention control group. We randomly assigned the study participants to the training or the control group. We used a longitudinal pre-/post-test design with four measurements waves (T1, T2, T3, and T4) over a period of 32 months. The first measurement wave (T1) took place in the month before the training (August 2012). The second measurement wave (T2) took place in the month after the training (December 2012). The third measurement wave (T3) took place 12 months after the training (November 2013). The fourth measurement wave (T4) took place 16 months after the third measurement wave (April 2015). The pre-/post-test design with a random assignment to the training or control group addresses potential biases, such as maturation, testing, history, and self-selection (Campbell, 1957).

### **Sample**

Our study participants were students from a university in Nairobi, Kenya. We informed the students about the opportunity to participate in the entrepreneurship training during the registration week when students register for the new semester. We had a permanent desk at the student services office and promoted the training through personal communication and brochures. The training was open to students from all faculties. We emphasized that the training was not part of the regular curriculum but a voluntary training course providing skills in entrepreneurship. We explicitly told the students that they could also attend the training even if they did not immediately intend to start a new business or if they preferred to pursue a career as an employee because we wanted to attract a broad range of students. At the end of the training, we provided certificates for successful completion.

Students who were interested in participating in the training had to complete and submit an application form and the baseline questionnaire (T1). In total, 363 students applied and completed the questionnaire. Most of the students were in the fourth (81.9%) or third year (9.4%) of their studies. We received applications from students from 13 different schools, including School of Education (19.9%), School of Economics (18.8%), School of Business (16.8%), School of Engineering and Technology (11.3%), and School of Pure and Applied Sciences (11.0%). We had resources to train approximately 220 students. From the list of 363 applicants, we randomly selected 216 students to participate in the training. The 216 students were divided into four classes with a range of 41 to 66 students in each class. The remaining 147 students were assigned to the non-treatment control group. Out of the 216 students who were selected for the training, 178 students (82.4%) attended the training regularly (i.e., a minimum of eight out of 12 sessions). We excluded the 38 students who did not attend the training regularly from all further analyses to avoid any biases due to incomplete treatment<sup>2</sup>.

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<sup>2</sup> We also ran the statistical analyses including the participants, who did not complete the training. The pattern of results remained the same with consistent significant findings. These analyses correspond to intent-to-treat effects (Shadish & Cook, 2009).

We collected data through questionnaires at four measurement waves (T1-T4). We obtained data from 363 students at T1, from 320 students at T2, from 253 students at T3, and from 121 students at T4. To test whether there was a non-response bias, we analyzed whether the non-respondents at T2, T3, or T4 differed from the respondents with respect to measures from T1. There were no significant differences between the respondents and non-respondents at T2. Furthermore, there were no significant differences at T3 or T4 except for gender and entrepreneurial identity. Males and participants with higher entrepreneurial identity at T1 were more likely to respond at T3 and T4.

Following recommendations for a true longitudinal design (Ployhart & Vandenberg, 2010), our final sample comprised all participants who took part in at least three measurement waves. The final sample in all our analyses included 784 observations from 227 participants (training group = 125; control group = 102). This means that we had on average 3.45 observations per participant. To test whether the randomization was successful, we compared the training group with the control group at T1. We did not find significant differences between the training and control group indicating that the two groups were equivalent before the training. In the final sample, 77.5% of the participants were male, 72.7% were fourth-year students, 59.9% of the participants indicated that a family member was a business owner, and the same proportion (59.9%) had taken business courses before. Furthermore, 60.1% of our sample reported that they have been or were currently employed at T1.

It is important to note that the third and fourth measurement waves (T3 and T4) took place after most of the students graduated from university. In our sample 72.7% were fourth year students who graduated after the training. Accordingly, we found that 72.9% of our sample were either managing their business and/or employed at T3. The percentage increased to 92.4% at T4. Moreover, the business owners reported that they were running businesses, such as such as producing agriculture products, retailing of grocery and household items, and offering computer and software development services. They were employing up to seven full-

time employees at T3 ( $M = 1.04$ ,  $SD = 1.40$ ) and up to 21 full-time employees at T4 ( $M = 1.86$ ,  $SD = 2.97$ ). This means that in the long-term analyses, our participants were not students but part of the workforce running actual businesses. Moreover, the students dissolved their teams and businesses at the end of training (i.e., before T2). In week 12 of the training, the students had to repay the starting capital and deliver a final presentation. We then officially declared the training to be over and told the students that they could stop business operations. This means that the businesses created after the training (i.e., from T2 onwards) came into existence outside the training setting and were the result of the participants' own entrepreneurial behavior independent of the teams formed during the training.

## Measures

*Business creation.* We measured business creation at all four measurement waves with the item “*Are you currently the owner of a business*”. We coded the responses as “1” for “yes” and “0” for “no”. Participants could change their status of being a business owner from one measurement wave to the next one (e.g., becoming or abandoning being a business owner from T2 to T3).

*Entrepreneurial self-efficacy.* We measured entrepreneurial self-efficacy at all four measurement waves. We used 12 items developed by Krauss et al. (2005) on the basis of Bandura's (1997) theoretical conceptions. The items have been applied in previous research in similar settings (Frese et al., 2007; Gielnik, Frese, et al., 2015). We asked respondents “*How confident are you that you can*” followed by 12 entrepreneurial tasks (e.g., “*perceive business opportunities well*”, “*start a business*”, and “*manage a business well*”). We used 5-point Likert scales ranging from “20% confident” to 100% confident”. The internal consistency of the scale at all measurement waves was good (ranging between  $\alpha = .89$  and  $\alpha = .93$ ).

*Passion.* We measured passion at all four measurement waves. Following previous research (Dalborg & Wincent, 2015; Murnieks et al., 2014), we operationalized passion using seven items developed by Vallerand et al. (2003) to assess harmonious passion. We adapted

the items such that they were referring to the role of an entrepreneur. A sample item was “*For me, being an entrepreneur is a passion*”. We used 5-point Likert scales ranging from “strongly disagree” to “strongly agree”. The internal consistency for the scale at each measurement wave was good (ranging between  $\alpha = .89$  and  $\alpha = .90$ ).

*Control variables.* We created a measure for entrepreneurship training and for time. The measure for entrepreneurship training reflects participants’ assignment to the training or control group. Participants who were in the training group had a value of “1” and participants in the control group had a value of “0”. The measure for time reflects the measurement wave with values from “1” to “4”. We measured the following control variables in the questionnaire at T1. We asked about participants’ gender (female = 0, male = 1). We measured family business ownership by asking whether anybody in the participants’ family owned a business (yes = 1, no = 0). We measured business education by asking whether the participants had taken any business courses prior to the training (yes = 1, no = 0). We included family business ownership and business education as control variables because previous research provided support for the importance of these variables in entrepreneurship (Davidsson & Honig, 2003). We also assessed year of studies to control for participants’ progress in their studies. Finally, we controlled for entrepreneurial identity as previous research has identified this as a pathway leading to passion (Murnieks et al., 2014). Entrepreneurial identity is the cognitive representation (schema) of the current self as an entrepreneur (Farmer, Yao, & Kung-Mcintyre, 2011; Hoang & Gimeno, 2010). We used entrepreneurial identity only as a predictor in our analyses and therefore measured it at T1, T2, and T3. We used two items by Callero (1985), which have been adapted to the entrepreneurship context (Farmer et al., 2011; Murnieks et al., 2014). The items were “*Being an entrepreneur is an important part of who I am*” and “*For me, being an entrepreneur means more than just running my business*”. We used 5-point Likert scales ranging from “strongly disagree” to strongly agree”. The internal consistencies ranged between  $\alpha = .66$  and  $\alpha = .75$ .

## **Method of analysis**

Our data set includes 784 observations from 227 participants. We used random coefficient modeling to account for the nested structure in our data and to get unbiased parameter estimates (Ployhart & Vandenberg, 2010). Specifically, we used discontinuous growth curve models to examine short- and long-term effects of the training (Lang & Bliese, 2009; Lang & Kersting, 2007). In general, growth curve modeling is the appropriate approach when outcome variables are dynamic across measurement waves (Bliese & Ployhart, 2002; Ployhart & Vandenberg, 2010). Discontinuous growth curve modeling is a modification of growth curve modeling that allows us to differentiate between short- and long-term effects. This is relevant for our study insofar as we want to test the role of entrepreneurial self-efficacy in sustaining the effect of entrepreneurship training on passion in the long-run. Discontinuous growth curve modeling requires recoding of the independent variable in such a way that it reflects the timing of effects (Lang & Bliese, 2009; Lang & Kersting, 2007). To capture the short- and long-term effects of the training, we created two training variables based on the dynamic coding approach by Lang and colleagues (Lang & Bliese, 2009; Lang & Kersting, 2007). Table 1 presents the dynamic coding of the variables. We have four measurement waves. To capture the short-term effect of entrepreneurship training, we created a variable that indicates no effect before the training (T1), a short-term effect after the training (T2), and no effects in the long-term. Accordingly, the coding is 0-1-0-0 for the four measurement waves. Similarly, for the long-term effect of entrepreneurship training, we coded no effect before (T1) and shortly after the training (T2). We coded a linear long-term effect after the training (T3 and T4). Accordingly, the coding was 0-0-1-2. In the two variables, we coded no effect for the control group across the four measurement waves (0-0-0-0).

Furthermore, we used a joint lagged effects model to test effects of passion on business creation after the training (Ployhart, Weekley, & Ramsey, 2009). This approach is appropriate

when both predictor and outcome variables are dynamic and vary across the measurement waves. We were interested in the effects after the training. We therefore combined the measurement waves in our data set to use values at T2 to predict values at T3 and values at T3 to predict values at T4 in a joint analysis. The dependent variable in our model was the value from the respective subsequent wave (indicated as 'lagged' in Table 5). This design allows for stronger causal inferences because of the temporal separation of the predictor and outcome variables (Ployhart et al., 2009). Furthermore, we could control for the dependent variable at the previous wave to model change in the dependent variable.

## Results

Table 2 presents the descriptive statistics and correlations of the study variables. The table shows positive auto-correlations of the repeatedly measured variables (business creation, entrepreneurial self-efficacy, and passion) that ranged between  $r = .14$  and  $r = .57$  indicating moderately stable constructs. Analyses of a null model suggested that there was moderately high within-person variance across the four measurement waves for entrepreneurial self-efficacy (58.8%) and passion (57.4%). These findings justify our approach to examine changes in these variables over time.

### Test of hypotheses

To test Hypotheses 1a-c that the training had an effect on entrepreneurial self-efficacy, passion, and business creation, we used discontinuous growth curve modeling with the control variables and entrepreneurship training's short- and long-term effects as predictor variables. Table 3 presents the results for entrepreneurial self-efficacy and business creation. Table 4 presents the results for passion. Entrepreneurship training had significant short-term effects on entrepreneurial self-efficacy ( $b = 0.39, p < .01$ ), passion ( $b = 0.15, p < .01$ ), and business creation ( $b = 0.23, p < .01$ ). Furthermore, entrepreneurship training had significant long-term effects on entrepreneurial self-efficacy ( $b = 0.18, p < .01$ ), passion ( $b = 0.09, p < .01$ ), and business creation ( $b = 0.08, p < .05$ ). The findings indicate that entrepreneurship training had

significant short- and long-term effects on entrepreneurial self-efficacy, passion, and business creation supporting Hypotheses 1a-c. In Figure 2 we plotted the means of the training outcomes over time for the training group and the control group. The figures show the increase and higher levels over time for the training group compared to the control group for entrepreneurial self-efficacy (Panel A), passion (Panel B), and business creation (Panel C).

Hypothesis 2 states that entrepreneurial self-efficacy mediates the effect of entrepreneurship training on passion. In Model 2 in Table 4, we entered entrepreneurial self-efficacy as a predictor variable in the discontinuous growth curve model predicting passion. The results show that the effect of entrepreneurial self-efficacy was positive and significant ( $b = 0.26, p < .01$ ). Furthermore, the short- and long-term effects of training became non-significant (short-term:  $b = 0.05, ns.$ ; long-term:  $b = 0.04, ns.$ ). To test whether there was a significant mediation effect, we used the Monte Carlo method for assessing mediation (Bauer, Preacher, & Gil, 2006; Selig & Preacher, 2008). The findings showed that there were significant indirect short- and long-term effects from entrepreneurship training on passion via entrepreneurial self-efficacy (indirect effect short-term = 0.10,  $p < .01$ ; indirect effect long-term = 0.05,  $p < .01$ ). The data thus supported Hypothesis 2 that entrepreneurial self-efficacy mediates the effect of entrepreneurship training on passion.

Hypothesis 3 states that entrepreneurial self-efficacy moderates the long-term effect of entrepreneurship training on passion. In Model 3 in Table 4, we entered the interaction term between entrepreneurship training long-term effect and entrepreneurial self-efficacy into the equation. We mean centered the variables before computing the interaction term. The findings showed a positive and significant interaction term ( $b = 0.12, p < .05$ ). To illustrate the significant interaction, we predicted the values of passion over the four measurement waves for participants in the training group and control group contingent on their entrepreneurial self-efficacy (1SD above and below the group means). Figure 3 shows the maintenance curves. Participants in the training group consistently experienced an increase in passion from

T1 to T2. This is the short-term boost in passion due to the entrepreneurship training. Furthermore, Figure 3 also shows that training participants high in entrepreneurial self-efficacy maintained their high passion across T3 and T4 whereas training participants low in entrepreneurial self-efficacy experienced a decline in passion after T2. The findings provide support for Hypothesis 3 that entrepreneurial self-efficacy sustains the positive effect of entrepreneurship training on passion over time.

Hypotheses 4 and 5 state that passion has a positive effect on business creation and that passion mediates the effect of entrepreneurship training on business creation. We used random coefficient models to analyze joint lagged effects across the measurement waves after the training. We used a lagged effects model with the dependent variable (i.e., business creation) predicted by a time varying independent variable (i.e., passion). Table 5 displays the results. Model 1 shows that entrepreneurship training had a significant effect on business creation ( $b = 0.12, p < .05$ ). This finding corroborates the results regarding the long-term effect of entrepreneurship training on business creation from the discontinuous growth curve model (see Table 3). In Model 2, we entered passion to examine the lagged effect of passion on business creation. Passion had a significant effect on business creation at the subsequent measurement wave ( $b = 0.12, p < .05$ ). Entering passion reduced the effect of entrepreneurship training on business creation, which became marginally significant ( $b = 0.10, p < .10$ ). However, we note that we did not include business creation as a control variable in Model 1 and 2 to get the correct parameter estimates for entrepreneurship training<sup>3</sup>. This means that we did not test the effect of passion on changes in business creation. To examine whether passion predicted change in business creation, we entered

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<sup>3</sup> Entrepreneurship training had a strong effect on business creation at T2 and T3. Including business creation as a control variable in the lagged effects model would mean that the effect of entrepreneurship training on business creation is captured by the autocorrelation. Statistically, this corresponds to a mediation model (business creation at T2 and T3 mediate the effect of entrepreneurship training on business creation at T3 and T4). Because the autocorrelation has no conceptual meaning for the effect of entrepreneurship training on business creation at T3 and T4, we excluded business creation as a control variable from the model to obtain the direct effect of entrepreneurship training on business creation at T3 and T4.

business creation as a control variable in Model 3. Entering business creation as a control variable resulted in a non-significant coefficient for passion ( $b = 0.08, ns.$ ) suggesting that passion did not predict changes in business creation from one measurement wave to the next. To further probe the findings, we examined whether the effect changed over time. In Model 4, we included the interaction between passion and time. We mean centered both variables before computing the interaction term. The interaction term was positive and significant ( $b = 0.23, p < .05$ ). To illustrate the effect, we plotted the effect of passion on business creation for earlier in time (T2 predicting T3) and later in time (T3 predicting T4). Figure 4 shows that passion had a strong effect on business creation later in time and a weak effect on business creation earlier in time. We computed simple slope analyses to examine the effects of passion on business creation over time (Preacher, Curran, & Bauer, 2006; Tein, Sandler, MacKinnon, & Wolchik, 2004). The analyses revealed that passion did not have an effect on business creation earlier in time ( $b = -0.01, ns.$ ). The effect of passion on business creation later in time was significant ( $b = 0.21, p < .01$ ). These findings indicate that the predictive validity of passion increased over time. Given that the predictive validity of passion changed over time, we used different coefficients for passion earlier and later in time to compute the indirect effect of entrepreneurship training on business creation through passion (Selig & Preacher, 2008). The indirect effect earlier in time was not significant (indirect effect = 0.00,  $ns.$ ). The indirect effect later in time was significant (indirect effect = 0.04,  $p < .01$ ). In conclusion, the results supported Hypotheses 4 and 5 but only later in time. Although we did not formulate any hypothesis regarding the temporality of effects, we discuss the theoretical implications of these findings in the discussion section. We also examined the conditional indirect effects of entrepreneurship training on business creation through passion later in time contingent on entrepreneurial self-efficacy. The conditional indirect effect was significant for high entrepreneurial self-efficacy (indirect effect = 0.05,  $p < .01$ ). The conditional indirect effect was not significant for low entrepreneurial self-efficacy (indirect effect = 0.02,  $ns.$ ). These

findings provide support for our theoretical model insofar as entrepreneurship training has a long-term effect on business creation through passion in case of high entrepreneurial self-efficacy.

### **Robustness tests and supplemental analyses**

Given the synchronous structure of the time varying variables in the discontinuous growth curve models, we face issues of endogeneity regarding the effect of entrepreneurial self-efficacy on passion (Hypothesis 2). Specifically, omitted variables or reverse causality may account for the effect of entrepreneurial self-efficacy on passion. To address the issue of endogeneity, we used the two-stage least squares approach (2SLS) with training and gender as instruments (Antonakis, Bendahan, Jacquart, & Lalive, 2010; Bascle, 2008). According to Antonakis et al. (2010), studies using an experimental design “have the perfect instrument/s: the manipulated variables” (p. 1103) because of the random assignment to the groups. Using training as an instrument for entrepreneurial self-efficacy to predict passion in a 2SLS approach, we could correctly estimate the effect of entrepreneurial self-efficacy on passion (cf., Antonakis et al., 2010). We used gender as an additional instrument to have more instruments than endogenous variables, which allows us to test the validity of the instruments (Bascle, 2008). We used thresholds by Stock et al. (2002) to examine the strength of our instruments. Furthermore, we used the Sargan test to test for instrument exogeneity and the Durbin-Wu-Hausman test to test for endogeneity in the main model (Semadeni, Withers, & Certo, 2014). We applied the 2SLS approach to estimate the consistent effect of entrepreneurial self-efficacy on passion for each of the three measurement waves after the training (T2-T4).

At each measurement wave, the test regarding the strength of the instruments was significant (all  $p$ -values  $< .04$ ) suggesting that the instruments were sufficiently strong (Stock et al., 2002). Furthermore, all three Sargan tests showed no significant results (all  $p$ -values  $> .40$ ) suggesting that the instruments were exogenous and valid. Finally, we found that in all

three analyses, the Durbin-Wu-Hausman test was not significant (all  $p$ -values  $> .54$ ). This finding suggests that ordinary least squares (OLS) provided consistent estimates similar to 2SLS and thus, endogeneity was limited in the models. Nevertheless, we examined the coefficients of entrepreneurial self-efficacy in each second-stage model. We found significant effects on passion at T2 and T3 ( $p < .01$ ) and a marginally significant effect at T4 ( $p < .10$ ). Note that compared to OLS, the 2SLS approach provides less efficient estimates (Antonakis et al., 2010; Bascle, 2008). In conclusion, the results show that endogeneity was negligible in our models. Moreover, entrepreneurial self-efficacy had significant effects on passion even when using the 2SLS approach, which counters issues of endogeneity.

As supplemental analyses, we computed joint lagged effect models to test recursive effects of business creation on entrepreneurial self-efficacy and passion after the training, indicated by the dashed lines in our theoretical model (see Figure 1). Table 6 provides the results. Business creation predicted changes in entrepreneurial self-efficacy ( $b = 0.11, p < .05$ ) supporting meta-analytic findings that performance predicts self-efficacy (Sitzmann & Yeo, 2013). Business creation also predicted changes in passion ( $b = 0.13, p < .05$ ). This result is consistent with previous findings that passion is an outcome of business creation (Gielnik, Spitzmuller, et al., 2015). Finally, entrepreneurial self-efficacy predicted changes in passion ( $b = 0.17, p < .01$ ). The result provides support for our hypothesis that entrepreneurial self-efficacy has a positive function for passion and that the effect also holds in a lagged design (Hypothesis 2).

## Discussion

Entrepreneurship training is increasingly being recognized as an effective approach to promote entrepreneurship (Kuratko, 2005; Martin et al., 2013; Rauch & Hulsink, 2015). However, our theoretical understanding of how and when entrepreneurship training exerts positive effects is surprisingly inadequate (Neck & Greene, 2011; Pittaway & Cope, 2007). In particular, our understanding of the links between short- and long-term outcomes as well as of

the dynamic development of training outcomes after the training is limited. In this study, we sought to contribute to the field by theorizing about the short- and long-term effects of entrepreneurship training on entrepreneurial self-efficacy, passion, and business creation. We put a particular focus on passion as a central mechanism reflecting people's motivation for entrepreneurship. Our theoretical model makes three predictions. First, our model predicts that entrepreneurial self-efficacy mediates the effect of entrepreneurship training on passion. Second, entrepreneurial self-efficacy sustains the positive long-term effect of entrepreneurship training on passion; entrepreneurial self-efficacy thus thwarts decreases in passion over time. Third, passion mediates the effect of entrepreneurship training on business creation. The findings provided support for our theoretical model with regard to the first and second prediction. We also found support for our third prediction but this effect was contingent on time. Passion mediated the effect of entrepreneurship training on business creation only when some time elapsed after the entrepreneurship training. This finding underlines the importance of sustaining passion over time after training.

### **Theoretical implications**

Our findings have theoretical implications for the entrepreneurship training literature. We sought to answer the theoretical question of how entrepreneurship training boosts and sustains passion over time and how this increases the likelihood of business creation. So far, the underlying assumption of many theoretical models in the entrepreneurship training literature is that training increases participants motivation and this will lead to entrepreneurial behavior in a flow of direct effects (e.g., Gielnik, Frese, et al., 2015; Rauch & Hulsink, 2015; Souitaris et al., 2007). Our results suggest that the flow of effects is more complex and requires a more dynamic perspective on training outcomes. Specifically, our analyses and maintenance curves showed that entrepreneurial self-efficacy is a factor that systematically influences changes in training participants' passion after the training. Entrepreneurship training provides a kick-start in passion but in order to keep up high levels, participants need

to be self-efficacious in their entrepreneurial capabilities. Otherwise, they will experience a decline in passion over time. The decline in passion is detrimental for business creation in the long-term. Our study demonstrated the importance of maintaining high passion over time. The analyses showed that there was an effect of passion on business creation and this effect was particularly strong later in time. Our study thus demonstrates pathways through which entrepreneurship training positively influences business creation over time. We adopted a long-term perspective to show that passion can influence business creation if training participants sustain high passion in the long-run. We thus contribute to developing a theory of entrepreneurship training that describes short- and long-term mechanisms through which entrepreneurship training influences entrepreneurial behavior over time (Gielnik, Frese, et al., 2015; Martin et al., 2013; Pittaway & Cope, 2007).

Our findings also have theoretical implications for the entrepreneurship training literature because we used didactical elements that correspond to features of deliberate practice from the expertise literature (Ericsson et al., 1993). Thus, the concept of deliberate practice might be useful to understand and design effective entrepreneurship trainings. It is important to note, however, that we do not argue that our participants became experts during the training. Becoming an expert takes more time, usually about 10 years, in particular when the domain is complex, such as entrepreneurship (Baron & Ensley, 2006; Ericsson & Lehmann, 1996). According to the model by Ericsson and Charness (1994), our participants entered the first and second phase of acquiring expertise, which is engaging in playful activities and receiving limited amounts of deliberate practice. This means that the participants were at the very beginning of the process of acquiring expertise.

Our results point to the importance of the transfer literature in entrepreneurship education and training. We built on the transfer literature to argue that training effects may decay and post-training processes need to be taken into consideration to maintain positive effects in the long-run (Baldwin & Ford, 1988; Blume et al., 2010). Scholars have considered

entrepreneurship to be a job (Shane, Nicolaou, Cherkas, & Spector, 2010) and as such, entrepreneurship can be trained and learnt similar to other jobs (Martin et al., 2013).

Therefore, it is important to understand the processes underlying the transfer of skills and knowledge from the training to the job context.

Our findings have theoretical implications for the literature on the development of passion. We advance theoretical models that seek to explain how passion develops and changes with time (e.g., Cardon & Kirk, 2015; Collewaert et al., 2016; Gielnik, Spitzmuller, et al., 2015; Murnieks et al., 2014). Previous research identified entrepreneurial identity, entrepreneurial self-efficacy, developing the venture idea, and success in business creation as central factors in explaining changes in passion (Cardon & Kirk, 2015; Collewaert et al., 2016; Dalborg & Wincent, 2015; Gielnik, Spitzmuller, et al., 2015; Murnieks et al., 2014). However, most of these studies have either adopted a short-term perspective on changes in passion (Gielnik, Spitzmuller, et al., 2015) or used a cross-sectional design, which precludes drawing any causal inferences on the underlying dynamics of changes in passion (Cardon & Kirk, 2015; Dalborg & Wincent, 2015). This means that our theoretical understanding of factors and conditions influencing the development of passion is still limited. We adopted a dynamic perspective and examined the development of passion over a period of 32 months. We found that entrepreneurship training boosts passion and that entrepreneurial self-efficacy sustains this positive effect over time. Our findings thus emphasize the importance of entrepreneurial self-efficacy for maintaining high passion. Theories on the development of passion have posited that people become more passionate when engaging in an activity (Mageau et al., 2009; Vallerand et al., 2003). Our findings suggest that besides engaging in an activity, it is important to develop a feeling of mastery and control over the activity. Participants who have not mastered entrepreneurial skills are less likely to maintain high passion for entrepreneurship. This also means that any boost in passion, for example through

inspiration (Souitaris et al., 2007), should eventually wear off if it is not substantiated by a belief of 'I can do it'.

Our study contributes to the literature on the temporality of effects. Previous research has emphasized the importance of considering the temporality of effects to develop more precise theories in general and in entrepreneurship (Ancona, Goodman, Lawrence, & Tushman, 2001; George & Jones, 2000; Gielnik, Barabas, et al., 2014; McMullen & Dimov, 2013; Mitchell & James, 2001; Zaheer, Albert, & Zaheer, 1999). We found that passion predicts business creation but this effect only unfolds over time. We found that the effect of passion on business creation only occurred later in time after the training. A possible explanation for the delayed predictive validity of passion is that over time, valued activities and the associated intense positive feelings are gradually internalized and become part of people's identity (Mageau et al., 2009; Vallerand et al., 2003). As a result, people develop a certain passion that forms a central feature of their identity. Centrality to identity is important because the more central an activity to a person's identity, the stronger the affective experience aroused by engaging in that particular activity (Vallerand et al., 2003). This means that over time the affective response and the associated motivational function become stronger. Consequently, there is a stronger effect of passion on business creation over time.

Finally, we found recursive effects of business creation on entrepreneurial self-efficacy and passion. The recursive effect of business creation on entrepreneurial self-efficacy is in line with previous research showing that mastery experience and past performance, e.g., in terms of creating a business, leads to an increase in self-efficacy (Sitzmann & Yeo, 2013; Zhao et al., 2005). The recursive effect of business creation on passion supports theoretical notions that passion arises from active engagement in entrepreneurial behavior (Cardon et al., 2009; Gielnik, Spitzmuller, et al., 2015; Mageau et al., 2009; Vallerand et al., 2003). Thus, theoretical models on the development of passion need to consider that entrepreneurs who are successful in creating business ventures become more passionate about entrepreneurship.

## **Strengths and limitations**

A notable strength of our study is the longitudinal design with four measurement waves over a total period of 32 months (i.e., 2.67 years). Because of the longitudinal design, we could test discontinuous growth models and joint lagged effects with an autoregressive structure. This allowed us to identify predictors of change in the dependent variables. We were thus able to uncover how passion develops and how entrepreneurial self-efficacy unfolds its full impact on the development of passion in terms of a mediating and moderating effect in the long-run. Nevertheless, we also acknowledge that a period of 32 months does not fully consider the development of entrepreneurial self-efficacy, passion, and business creation that people experience over their entire career. Therefore, it is possible to argue that our study captures medium-term rather than long-term effects. Panel studies with an even longer scope might provide interesting insights into developments beyond 32 months (Reynolds, 2007).

A potential limitation might be the context of our study. We conducted our study with students in Kenya. Kenya is a low income country with a gross national income per capita of 930 USD (in comparison: the gross national income per capita in the US is 53,670 USD; The World Bank, 2013). In such a context, the rate of entrepreneurship is usually very high. Oftentimes, more than 30% of the adult population is engaged in entrepreneurship in countries similar to Kenya (Namatovu, Balunywa, Kyejjusa, & Dawa, 2011). An important question is whether our findings are generalizable and also hold in more developed countries and in other groups. Furthermore, the setting of our study involves entrepreneurship training for undergraduate students. Most of our students graduated from university after the training and transitioned to the workforce. Nevertheless, our participants were at the beginning of their entrepreneurial career, which might limit the generalizability of our findings. Young people who are at the beginning of their occupational career have a higher focus on opportunities (Cate & John, 2007; Zacher & Frese, 2011). The concept of focus on opportunities captures how many new goals, plans, options, and opportunities people believe to have in their

occupational future (Zacher & Frese, 2009). A higher focus on opportunities is related to entrepreneurial success (Gielnik, Zacher, & Frese, 2012; Gielnik, Zacher, & Schmitt, 2017). This means that the effect of entrepreneurship training on passion and business creation might be particularly strong for younger adults, who have a higher focus on opportunities. Similarly, university students might have more economic resources available than their peers who do not go to university. Economic resources facilitate business creation (Evans & Jovanovic, 1989; Y. P. Ho & Wong, 2007). Consequently, the impact of the entrepreneurship on business creation might be particularly strong for university students and the availability of economic resources might be an important boundary condition of the effectiveness of the entrepreneurship training. We did not collect data about the students' focus on opportunities or availability of economic resources, which might need to be taken into consideration to produce a more comprehensive theoretical model. Notwithstanding the potential limitations of our student sample, we also note that much of the entrepreneurship education and training takes place at the university level. Martin et al. (2013) reported in their meta-analysis that more than half of the studies (59.5%) took place in an academic setting. Our study thus provides important insights for the design of entrepreneurship training at the university level.

Conducting the study in an entrepreneurship training context with undergraduate students also poses the question whether the passion that students develop after the training is more artificial and less substantial than passion that develops independent of training. This implies that the predictive validity of passion should be different for the training group and the control group. We performed additional analyses and did not find significant moderating effects of training on the effect of passion on business creation ( $b = -0.08, p = .39$ ) nor on the effect of passion on business creation contingent on time ( $b = 0.11, p = .61$ ). This indicates that the passion reported by the training group is not qualitatively different from the passion reported by the control group. We note that passion might develop over time as it becomes more closely associated with their identity and thus increases in its predictive validity for

business creation (Mageau et al., 2009). However, this developmental process is similar for students in both training and control groups.

### **Future research**

There are several important avenues for future research. First, future research can examine the dynamic development and maintenance curves of other short-term training outcomes. Previous research on entrepreneurship training focused on various short-term outcomes, such as learning and inspiration (Souitaris et al., 2007), attitudes, perceived behavioral control, and intentions (Rauch & Hulsink, 2015), action-regulatory factors (Gielnik, Frese, et al., 2015), personal initiative (Glaub, Frese, Fischer, & Hoppe, 2014), or knowledge, skills and positive perceptions of entrepreneurship (Martin et al., 2013). Examining how participants maintain high levels of these factors and how these factors affect entrepreneurial behavior and business creation in the long-term contributes to developing a theory of entrepreneurship training that considers long-term transfer and effects.

Second, future research should focus on the temporality and dynamic properties of passion. To advance our theoretical understanding, it is important to specify over what timeframe effects hold, when effects wear off, and the time it takes for effects to unfold (Gielnik, Barabas, et al., 2014; Zaheer et al., 1999). We found that the predictive validity of passion increased over time. The finding suggests different time lags between cause and effect and different time intervals for the processes to unfold and hold over time (George & Jones, 2000; Zaheer et al., 1999). We argued that passion changes its quality over time. The qualitative differences in passion then exert different functions in the processes leading to business creation. Investigating such qualitative changes in passion would provide novel insights into the emergence of entrepreneurs' motivation and give full consideration to the dynamic nature of human functioning (Lord et al., 2010).

Third, future research could explicitly integrate different types of passion in entrepreneurship. Cardon et al. (2009) distinguishes between passion for inventing, founding,

and developing. Entrepreneurship research drawing on Vallerand et al. (2003) distinguishes between harmonious and obsessive passion (V. T. Ho & Pollack, 2014; Klaukien et al., 2013). Harmonious passion captures positive aspects of passion that are in harmony with the individual; in contrast, obsessive passion reflects obsessive engagement because it feels mandatory or compulsory (Vallerand et al., 2003). Obsessive passion means that engagement in an activity is not associated with experiencing positive affect but rather with an urge to satisfy internal and external needs (Mageau & Vallerand, 2007; Vallerand et al., 2003). Harmonious passion and obsessive passion constitute two different types of passion, which may play different roles in entrepreneurship. Indeed, previous research indicates that the two different types of passion exert different effects on opportunity exploitation and network building (V. T. Ho & Pollack, 2014; Klaukien et al., 2013). Moreover, different types of passion might influence each other in the entrepreneurial process. Huyghe et al. (2016) introduced the term of passion orchestra which is the coexistence and interplay of different types of passion. They noted that considering a passion orchestra better explains why and under which conditions people form entrepreneurial intentions. Thus, to develop a more comprehensive theory of passion in entrepreneurship, it is necessary to take into account different types of passion and their respective functions as antecedents and outcomes of entrepreneurship. Furthermore, it is important to examine in detail the differences and similarities between the models by Vallerand et al. (2003) and Cardon et al. (2009), which have been predominantly used to understand passion in entrepreneurship. Entrepreneurship research using Vallerand et al.'s model (2003) has conceptualized passion broadly (V. T. Ho & Pollack, 2014; Murnieks et al., 2016, 2014) whereas research building on Cardon et al.'s model (2009) has focused on passion for inventing, founding, or developing (e.g., Breugst et al., 2012; Cardon et al., 2013; Drnovsek et al., 2016). Future research examining other differences or similarities, e.g., passion as motivation or emotion, the role of identity, and the development of passion, might inform our understanding of passion in entrepreneurship.

Future research can identify additional pathways leading to and from passion. We found that training influences passion. Vallerand et al. (2007) examined the reverse effect and showed that passion predicts intensive training in the form of deliberate practice. Examining both causal directions is important to fully understand the reciprocal relationships between passion and training. Furthermore, we found that entrepreneurial self-efficacy is a mechanism through which people become passionate. It is likely that additional factors are relevant in the internalization process through which people develop passionate. For example, people's situational motivation could be an important factor in this regard. Situational motivation captures why people engage in a specific activity (Guay, Vallerand, & Blanchard, 2000). People, who engage in entrepreneurship because of intrinsic reasons, should be more likely to experience the positive affect associated with passion. In contrast, people who engage in entrepreneurship because of external reasons (e.g., because they want to obtain external rewards or avoid external negative consequences), should be more likely to experience no passion or to develop an obsessive form of passion (Guay et al., 2000; Vallerand et al., 2003). The reason is that there are contingencies attached to engaging in the activity and the internalization process results in feelings that engagement in the activity is mandatory or compulsory (Mageau & Vallerand, 2007).

Finally, future research can also combine the aspects of temporality and types of passion. For example, an interesting question is under which conditions harmonious passion might turn into obsessive passion and vice versa. The internalization processes described by Vallerand et al. (2003) and Mageau et al. (2009) might not be a one-time process happening only in childhood. Instead, entrepreneurs' internal and external conditions can change which might trigger new internalization processes. For example, when entrepreneurs become older, their underlying motives why they are running their businesses change (Zacher, Schmitt, & Gielnik, 2012). According to the socio-emotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999), people put less emphasis on personal advancement and more on meaningful

social activities when becoming older. Furthermore, older people's attention shifts to experiencing the moment and seeking high emotional quality (Carstensen et al., 1999). Thus, with increasing age, entrepreneurs, who are obsessively passionate, might develop a more harmonious passion.

## **Conclusion**

In this study, we put passion center stage in our investigation on the short- and long-term effects of entrepreneurship training. Entrepreneurship training has significant short- and long-term effects on passion, which eventually translates into business creation. To better understand why and under which conditions entrepreneurship training exerts these effects, it is important to consider the underlying short- and long-term processes and conditions leading to passion. People participating in entrepreneurship training experience a short-term boost in passion through entrepreneurial self-efficacy. Furthermore, to sustain the positive effect on passion, training participants have to develop a feeling of control and mastery over entrepreneurship. Otherwise, training participants experience a decrease in passion for entrepreneurship over time. Tressie Lieberman, the vice president of digital innovation at Taco Bell, once stated: "The more I learn, the more passionate I get" (Fairchild, 2015). This corresponds to our notion that passion intensifies over time as people become more efficacious and gain mastery in the entrepreneurial domain.

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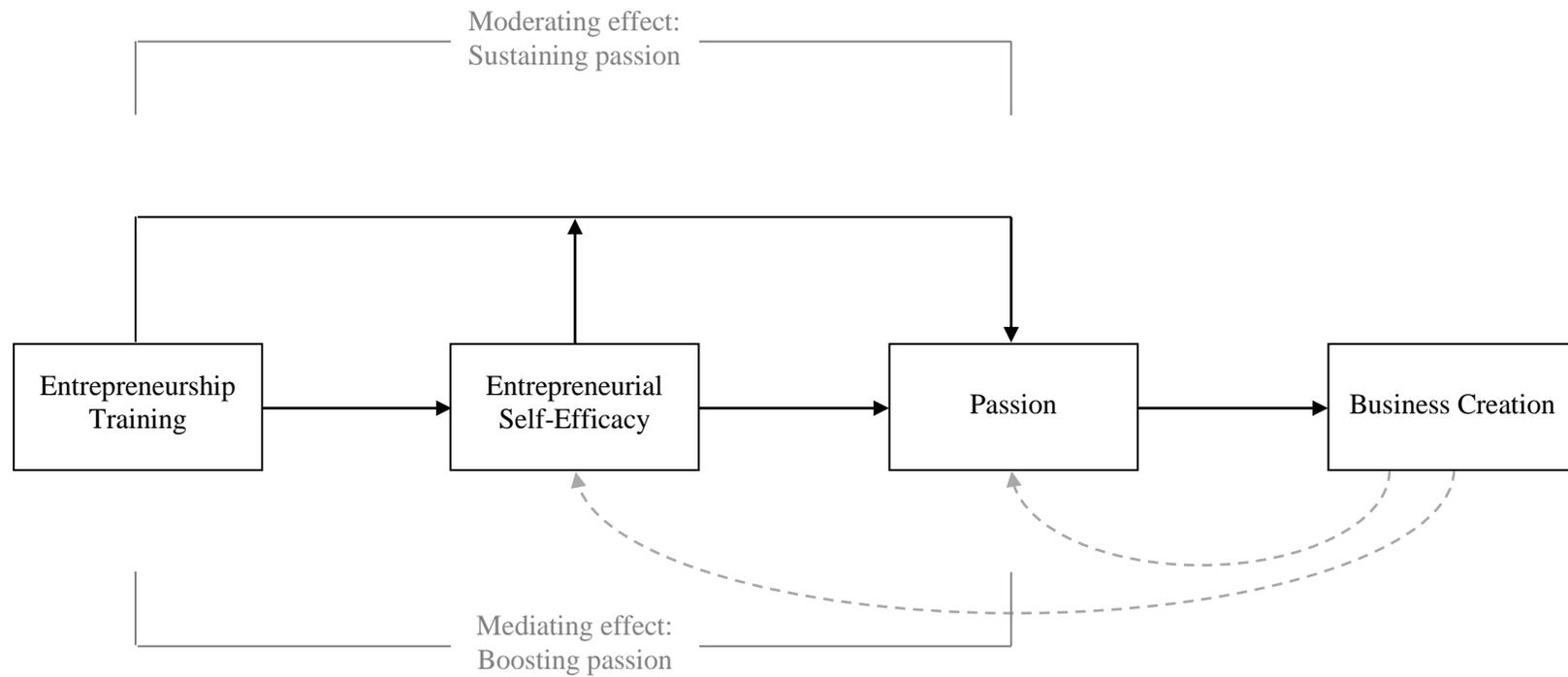
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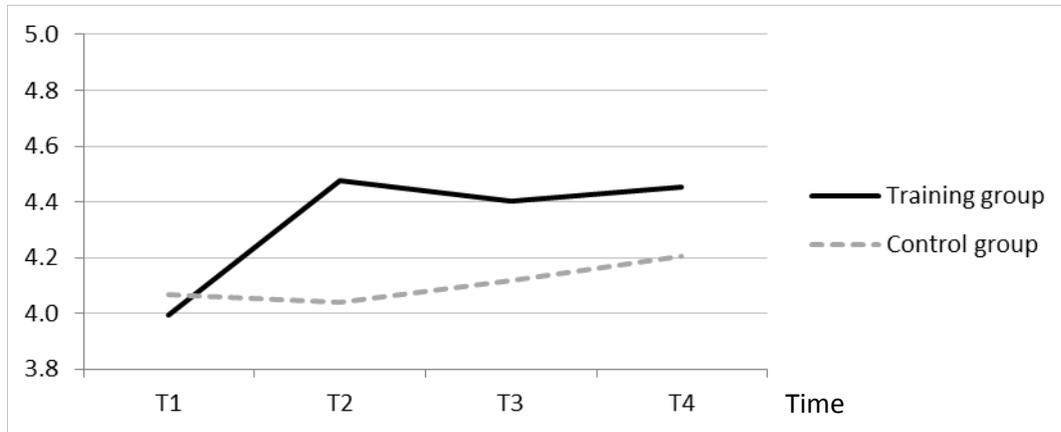
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**Figure 1.** Theoretical model of the study: Short- and long-term effects of entrepreneurship training on entrepreneurial self-efficacy, passion, and business creation (dashed lines indicate recursive effects of business creation on passion and entrepreneurial self-efficacy).

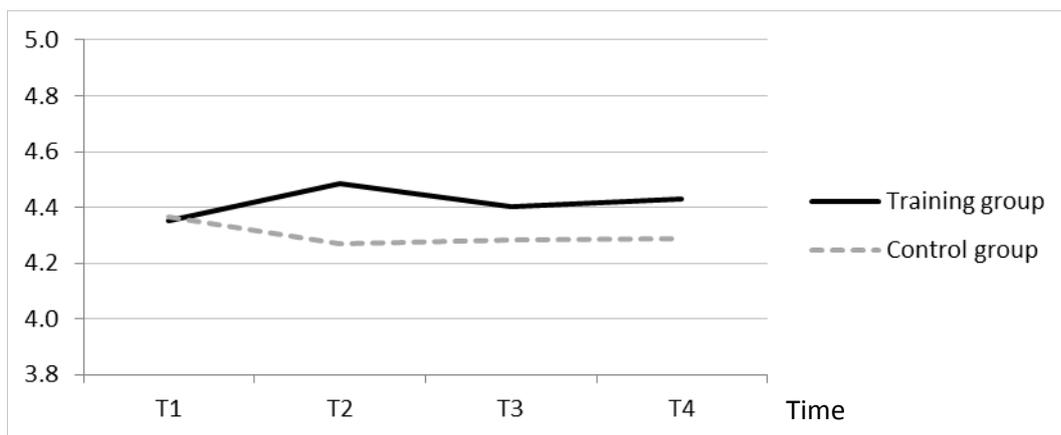


**Figure 2.** Maintenance curves of the development of entrepreneurial self-efficacy, passion, and business creation over time for training group and control group.

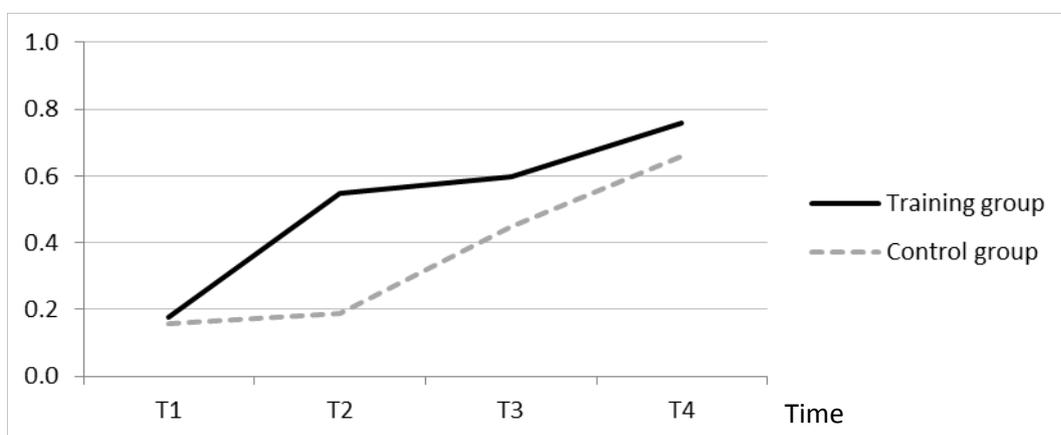
Panel A: Entrepreneurial self-efficacy



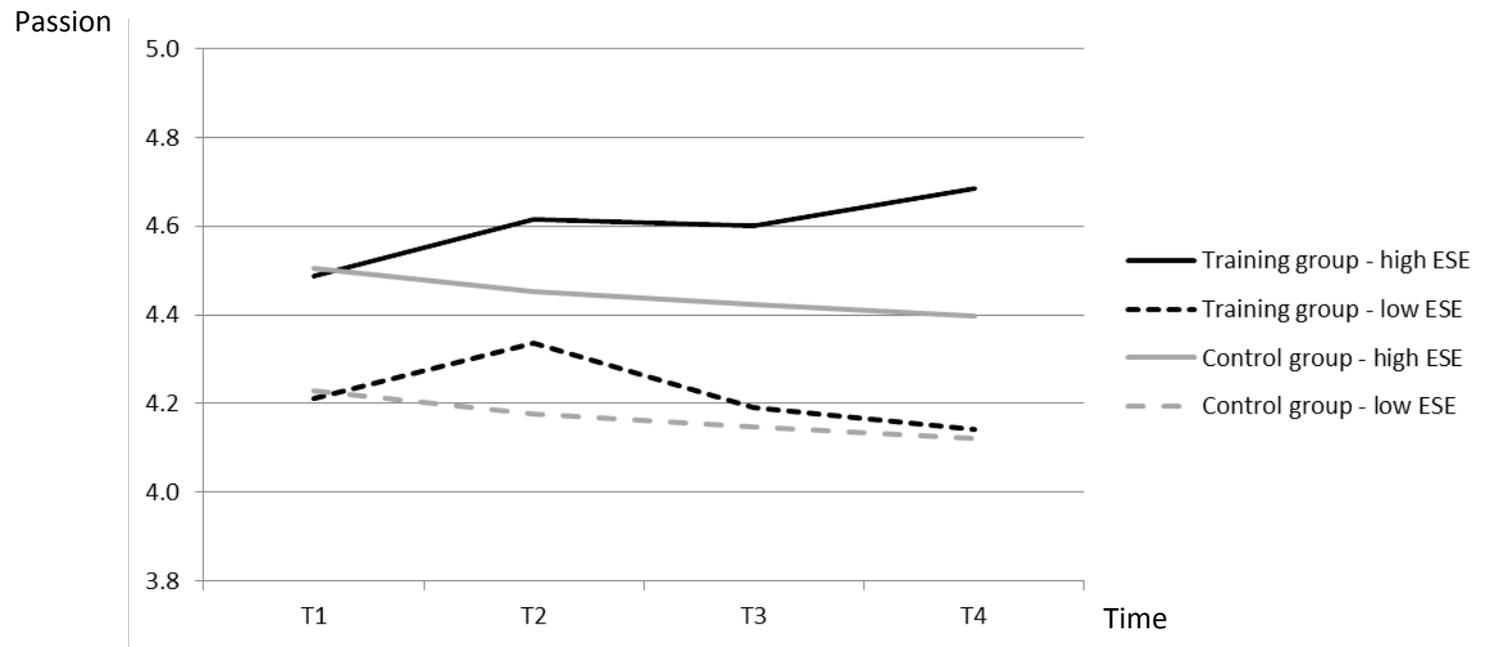
Panel B: Passion



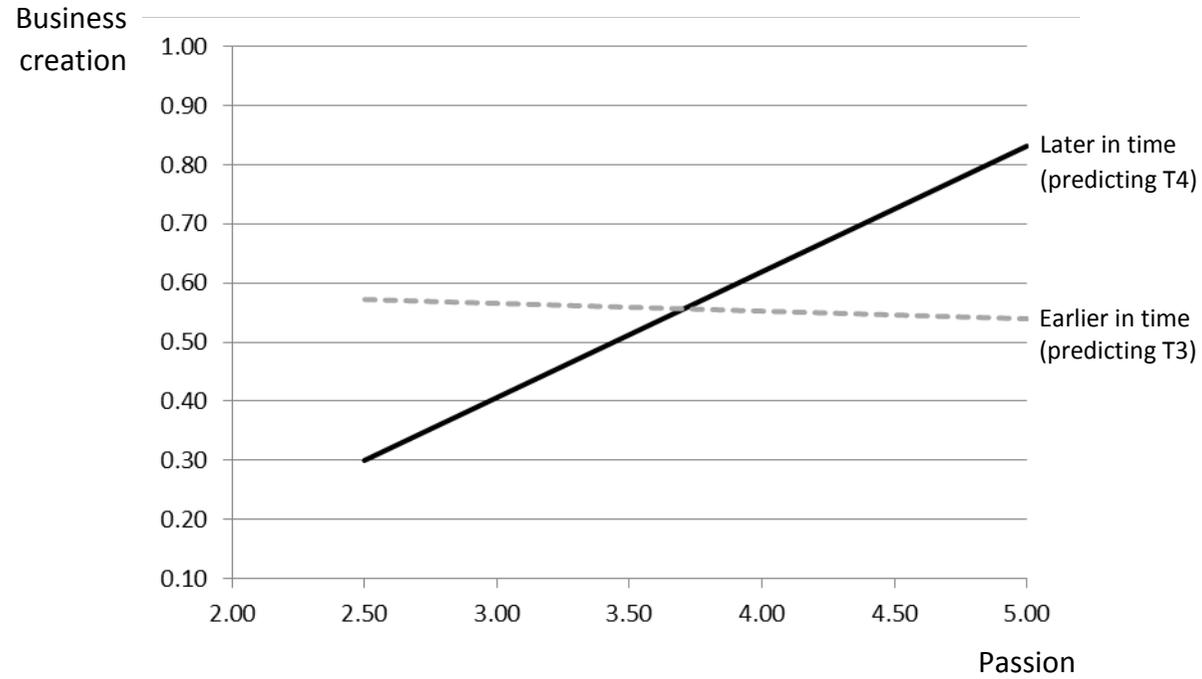
Panel C: Business creation



**Figure 3.** Maintenance curves of the development of passion over time for training group and control group contingent upon entrepreneurial self-efficacy (ESE).



**Figure 4.** The effect of passion on business creation earlier and later in time.



**Table 1.** Coding of entrepreneurship training short- and long-term effects in contrast to control group.

<b>Variables</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>
Entrepreneurship training: short-term effect	0	1	0	0
Entrepreneurship training: long-term effect	0	0	1	2
Control group	0	0	0	0

**Table 2.** Descriptive statistics and correlations of the study variables.

<b>Variables and Scales</b>	<b>Time</b>	<b>Mean</b>	<b>SD</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
1. Business creation	T1	0.17	0.37												
2. Business creation	T2	0.39	0.49	.43**											
3. Business creation	T3	0.53	0.50	.24**	.30**										
4. Business creation	T4	0.71	0.45	.30**	.22*	.14									
5. Entrepreneurial self-efficacy	T1	4.02	0.58	.08	.02	.08	.10								
6. Entrepreneurial self-efficacy	T2	4.29	0.57	.14*	.23**	.14*	.13	.44**							
7. Entrepreneurial self-efficacy	T3	4.27	0.57	.12	.27**	.25**	.12	.41**	.56**						
8. Entrepreneurial self-efficacy	T4	4.33	0.50	.20*	.34**	.15	.12	.28**	.48**	.50**					
9. Passion	T1	4.36	0.57	.06	.12	.03	-.07	.36**	.33**	.23**	.24**				
10. Passion	T2	4.39	0.56	.16*	.26**	.06	-.01	.35**	.50**	.33**	.36**	.57**			
11. Passion	T3	4.35	0.57	.13*	.26**	.24**	.28**	.31**	.41**	.53**	.25**	.38**	.45**		
12. Passion	T4	4.36	0.55	.20*	.28**	.15	.08	.22*	.32**	.29**	.41**	.16	.49**	.40**	
13. Entrepreneurship training	T1	0.55	0.50	.03	.37**	.15*	.11	-.06	.37**	.25**	.25**	-.02	.18**	.11	.13
14. Gender <sup>a</sup>	T1	0.78	0.42	-.01	.06	.09	.11	.05	.01	.14*	-.04	.12	.01	.12	-.03
15. Year of studies	T1	3.94	0.62	-.09	.03	.04	.00	-.02	.11	.07	.09	-.10	-.10	.01	.06
16. Business education	T1	0.60	0.49	.08	.11	.10	-.11	.10	.02	.08	.05	.19**	.21**	.16*	.03
17. Entrepreneurial identity	T1	4.37	0.66	.12	.08	.06	.05	.31**	.26**	.33**	.10	.56**	.41**	.27**	.09
18. Entrepreneurial identity	T2	4.35	0.67	.02	.21**	.06	.00	.29**	.40**	.27**	.23**	.45**	.61**	.38**	.41**
19. Entrepreneurial identity	T3	4.40	0.77	.12	.19**	.18**	.05	.28**	.29**	.42**	.15	.22**	.33**	.49**	.31**
20. Family business ownership	T1	0.60	0.49	.12	.08	-.13	.04	.06	.06	.02	.10	.07	.07	.09	.03

**Table 2 (cont'd).** Descriptive statistics and correlations of the study variables.

<b>Variables and Scales</b>	<b>Time</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>
13. Entrepreneurship training	T1							
14. Gender <sup>a</sup>	T1	.07						
15. Year of studies	T1	.10	.15*					
16. Business education	T1	-.05	.08	-.10				
17. Entrepreneurial identity	T1	-.04	.04	-.20**	.11			
18. Entrepreneurial identity	T2	.10	.12	.02	.22**	.39**		
19. Entrepreneurial identity	T3	.05	.02	-.05	.13	.22**	.34**	
20. Family business ownership	T1	-.05	-.05	-.06	-.01	.06	.04	.00

*Note.* N ranging between 118 and 227; <sup>a</sup> 0 = female, 1 = male; \* p < .05; \*\* p < .01.

**Table 3.** Discontinuous growth models testing short- and long-term effects of entrepreneurship training on entrepreneurial self-efficacy and business creation.

Variables	Model 1		Model 2	
	Entrepreneurial self-efficacy		Business creation	
	Coeff.	SE	Coeff.	SE
Time	0.05**	(0.02)	0.15**	(0.02)
Gender <sup>a</sup>	0.03	(0.06)	0.05	(0.05)
Year of studies	0.04	(0.04)	0.00	(0.03)
Business education	0.05	(0.05)	0.04	(0.04)
Family business ownership	0.06	(0.05)	0.02	(0.04)
Entrepreneurial identity	0.20**	(0.03)	0.07**	(0.02)
Entrepreneurship training: short-term effect	0.39**	(0.05)	0.23**	(0.04)
Entrepreneurship training: long-term effect	0.18**	(0.04)	0.08*	(0.03)
Deviance (-2LL)	1095.10		933.45	

*Note.* Unstandardized coefficients are shown, standard errors in parentheses; <sup>a</sup> 0 = female, 1 =

male; \*  $p < .05$ , \*\*  $p < .01$ .

**Table 4.** Discontinuous growth models testing short- and long-term effects of entrepreneurship training on passion.

Variables	Model 1		Model 2		Model 3	
	Passion		Passion		Passion	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Time	-0.04*	(0.02)	-0.05**	(0.02)	-0.05**	(0.02)
Gender <sup>a</sup>	0.06	(0.05)	0.05	(0.05)	0.05	(0.05)
Year of studies	-0.01	(0.04)	-0.02	(0.03)	-0.03	(0.03)
Business education	0.11*	(0.04)	0.09*	(0.04)	0.09*	(0.04)
Family business ownership	0.07	(0.04)	0.05	(0.04)	0.05	(0.04)
Entrepreneurial identity	0.35**	(0.02)	0.30**	(0.02)	0.29**	(0.02)
Entrepreneurship training: short-term effect	0.15**	(0.04)	0.05	(0.04)	0.06	(0.05)
Entrepreneurship training: long-term effect	0.09**	(0.04)	0.04	(0.04)	0.02	(0.04)
Entrepreneurial self-efficacy			0.26**	(0.03)	0.28**	(0.03)
Entrepreneurship training: long-term effect × Entrepreneurial self-efficacy					0.12*	(0.06)
Deviance (-2LL)		1017.69		961.17		961.15

*Note.* Unstandardized coefficients are shown, standard errors in parentheses; <sup>a</sup> 0 = female, 1 = male; \*  $p < .05$ , \*\*  $p < .01$ .

**Table 5.** Joint lagged effects models predicting business creation after the training.

Variables	Model 1		Model 2		Model 3		Model 4	
	Business creation (lagged)		Business creation (lagged)		Business creation (lagged)		Business creation (lagged)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Time	0.20**	(0.05)	0.20**	(0.05)	0.16**	(0.06)	0.16**	(0.06)
Gender <sup>a</sup>	0.09	(0.07)	0.10	(0.07)	0.09	(0.06)	0.08	(0.06)
Year of studies	0.01	(0.04)	0.01	(0.04)	0.01	(0.04)	0.00	(0.04)
Business education	0.02	(0.06)	0.00	(0.06)	-0.03	(0.05)	-0.03	(0.05)
Family business ownership	-0.07	(0.06)	-0.07	(0.06)	-0.07	(0.05)	-0.07	(0.05)
Entrepreneurial identity	0.02	(0.04)	-0.02	(0.04)	-0.03	(0.04)	-0.03	(0.04)
Entrepreneurship training	0.12*	(0.06)	0.10†	(0.06)	0.03	(0.05)	0.03	(0.05)
Passion			0.12*	(0.06)	0.08	(0.05)	0.06	(0.05)
Business creation					0.29**	(0.05)	0.31**	(0.05)
Passion × Time							0.23*	(0.10)
Deviance (-2LL)	461.66		461.19		450.97		448.86	

*Note.* Unstandardized coefficients are shown, standard errors in parentheses; <sup>a</sup> 0 = female, 1 = male; † p < .10, \* p < .05, \*\* p < .01.

**Table 6.** Joint lagged effects models predicting entrepreneurial self-efficacy and passion after the training.

Variables	Model 1		Model 2	
	Entrepreneurial self-efficacy (lagged)		Passion (lagged)	
	Coeff.	SE	Coeff.	SE
Time	0.04	(0.06)	-0.01	(0.06)
Gender <sup>a</sup>	0.07	(0.07)	0.06	(0.07)
Year of studies	0.00	(0.04)	0.01	(0.05)
Business education	0.06	(0.05)	0.05	(0.06)
Family business ownership	0.02	(0.05)	0.02	(0.06)
Entrepreneurial identity	-0.01	(0.04)	0.10*	(0.05)
Entrepreneurship training	0.07	(0.06)	-0.04	(0.06)
Entrepreneurial self-efficacy	0.47**	(0.06)	0.17**	(0.06)
Passion	0.02	(0.06)	0.25**	(0.06)
Business creation	0.11*	(0.05)	0.13*	(0.06)
Deviance (-2LL)	449.46		499.75	

*Note.* Unstandardized coefficients are shown, standard errors in parentheses; <sup>a</sup> 0 = female, 1 = male; \* p < .05, \*\* p < .01.