

Action and Action-Regulation in Entrepreneurship: Evaluating a Student Training for Promoting Entrepreneurship

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Action plays a central role in entrepreneurship and entrepreneurship education. Based on action regulation theory, we developed an action-based entrepreneurship training. The training put a particular focus on action insofar as the participants learned action principles and engaged in the start-up of a business during the training. We hypothesized that a set of action-regulatory factors mediates the effect of the training on entrepreneurial action. We evaluated the training's impact over a 12-month period using a randomized control group design. As hypothesized, the training had positive effects on

action-regulatory factors (entrepreneurial goal intentions, action planning, action knowledge, and entrepreneurial self-efficacy) and the action-regulatory factors mediated the effect of the training on entrepreneurial action. Furthermore, entrepreneurial action and business opportunity identification mediated the effect of the training on business creation. Our study shows that action-regulatory mechanisms play an important role for action-based entrepreneurship trainings and business creation.

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Entrepreneurship occurs because entrepreneurs take actions to pursue business opportunities (Bird & Schjoedt, 2009; Shane, Locke, & Collins, 2003). Scholars have consistently emphasized that action is a central construct to understand entrepreneurship (Baron, 2007a; McMullen & Shepherd, 2006). Action is important because starting a new business requires continuous actions to gather resources and to set up viable business structures (Gartner, 1985). Entrepreneurs who initiate more start-up activities and who are more active in the process of starting a new business are more likely to successfully launch one (Carter, Gartner, & Reynolds, 1996; Kessler & Frank, 2009; Lichtenstein, Dooley, & Lumpkin, 2006; Newbert, 2005). Given the central role of action in entrepreneurship, an important question discussed in the literature is about the best method to train entrepreneurial action (Edelman, Manolova, & Brush, 2008; Neck & Greene, 2011). We seek to contribute to this discussion in two ways. First, our study presents a training program that combines an action-based and a theory-based training method. Second, and this is our main focus, we present a theoretical model on the short- and long-term effects of the training to explain how the training exerts an influence on starting a new business.

Regarding the training method, scholars have noted that many entrepreneurship trainings put a strong focus on developing a business plan but lack a method that involves active engagement by the participants (Honig, 2004; Pittaway, Missing, Hudson, & Maragh, 2009). *Active engagement* means that the training emphasizes learning by action and involves performing start-up activities

that correspond to the activities performed by entrepreneurs (Edelman et al., 2008; Neck & Greene, 2011). Rasmussen and Sorheim (2006) have called such trainings action-based or action-oriented entrepreneurship trainings. Action-based entrepreneurship trainings (i.e., engaging in start-up activities and starting a business in the training) have become a popular method to train students in entrepreneurship (Asvoll & Jacobsen, 2012; Barr, Baker, & Markham, 2009; Fiet, 2001a; Gorman, Hanlon, & King, 1997; Honig, 2004; Oosterbeek, van Praag, & Ijsselstein, 2010; Pittaway et al., 2009; Rasmussen & Sorheim, 2006). Furthermore, scholars have criticized the fact that many training programs lack a solid theoretical foundation (Fiet, 2001b). A theoretical basis is important because it gives the training participants guidance in what they should do instead of only describing what other entrepreneurs have done (Fiet, 2001b). One way to include theory in trainings is to use action principles. *Action principles* are derived from theory and scientific evidence and provide knowledge about how to do something (Frese, Bausch, Schmidt, Rauch, & Kabst, 2012). Our training acknowledges the importance of both action and theory for training entrepreneurship. Our training is action-based because the participants engage in start-up activities and start a microbusiness in the training. The training is theory-based because the participants learn action principles of how to successfully start and run a business.

Regarding the theoretical model underlying the short- and long-term effects of entrepreneurship trainings, scholars have noted that there are several issues that previous research has not yet addressed in detail (Martin, McNally, & Kay, 2013). First, a recent meta-analysis has concluded that many evaluation studies have no or only an inconsistent theoretical grounding, and more studies that develop a better theoretical understanding of entrepreneurship trainings are needed (Martin et al., 2013). Second, most studies investigating the impact of entrepreneurship education and trainings focus only on short-term outcomes, such as

This paper was supported by Deutscher Akademischer Austausch Dienst (DAAD; ID 50020279 and ID 54391079). Furthermore, the work on this article was (partially) supported by grants from MOE/National University of Singapore (AcRF Tier 1 R-317-000-084-133 and AcRF Tier 1 R-317-000-095-112). We would also like to thank the German Commission for UNESCO for supporting the project. We thank Eike Hedder, Andreas Heese, Rebecca Kernert, Marie-Luise Lackhoff, Kay Turski, Melanie von der Lahr, and Kristina Zyla for their support in collecting the data.

knowledge, attitudes, and intentions, or only on long-term outcomes, such as start-up or survival. The studies seldom integrate short- and long-term outcomes into a general model presenting the causal flow of effects from the training over short- to long-term outcomes (e.g., Cruz, Escudero, Barahona, & Leitao, 2009; Henry, 2004; Ladzani & van Vuuren, 2002; Lee, Chang & Lim, 2005; Saks & Gaglio, 2002; Souitaris, Zerbinati, & Al-Laham, 2007; von Graevenitz, Harhoff, & Weber, 2010). Combining short- and long-term outcomes is important to develop a general theoretical framework explaining why and how trainings work. Last, the studies focusing on short-term outcomes to evaluate the impact of trainings usually argue that short-term outcomes, such as intentions, have positive effects on long-term outcomes, such as entrepreneurial behavior and success (e.g., Peterman & Kennedy, 2003; Souitaris et al., 2007). However, these effects are far from being established (Davidsson & Honig, 2003; Katz, 1990). Pittaway and Cope (2007) concluded from their review that entrepreneurship trainings have an effect on propensity and intentionality but to what extent these effects then translate into effective entrepreneurship is unclear. Therefore, a long-term evaluation is important to understand the lasting effects of trainings and their impact on entrepreneurship.

In our study, we seek to overcome some shortcomings of previous research. We develop a theoretical model based on action regulation theory (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993) to investigate a set of mediators that explains why and how our action-based entrepreneurship training has a positive effect on entrepreneurial action and business creation (see Figure 1). Identifying a set of mediators that explains the underlying mechanisms has important theoretical implications. Davidsson (2007) has noted that in recent years the strongest theoretical contributions to entrepreneurship research have been made by studies investigating action-related mediators that elucidate the causal mechanisms affecting entrepreneurship. We integrate short- and long-term training outcomes to show that four action-regulatory factors (i.e., entrepreneurial goal intentions, action planning, entrepreneurial self-efficacy, and action knowledge) have a mediating function linking the action-based entrepreneurship training with entrepreneurial action. These four factors build the space of action-regulatory factors (Bandura, 1989; Frese & Zapf, 1994). We thus provide a theoretical grounding for the short-

and long-term effects of the training in an integrated model. Furthermore, our 12-month long-term evaluation shows that entrepreneurial action and business opportunity identification mediate the effect of the training on business start-up. We thus show how the training translates into business creation in the long-run.

THEORY AND HYPOTHESES

Effects of the Action-Based Entrepreneurship Training

Scholars have noted that entrepreneurial action is key for business creation (Baron, 2007a; McMullen & Shepherd, 2006) and that action-based entrepreneurship trainings are particularly effective in promoting entrepreneurial action (Barr et al., 2009). In line with Rasmussen and Sorheim's (2006) conceptualization, we developed an action-based entrepreneurship training that involved starting a business in the course of the training. Our didactical approach was based on an action regulation theory perspective on training (Frese & Zapf, 1994). Two important features of this approach are teaching the training content in form of action principles and active learning (learning-by-doing). Empirical evidence shows that trainings designed in accordance with this approach are effective in changing and facilitating action (Bell & Kozlowski, 2008, 2010; Burke, Sarpy, Smith-Crowe, Chan-Serafin, Salvador, & Islam, 2006; Frese, Beime, & Schoenborn, 2003; Keith & Frese, 2008). In our case, the aim of the training was to facilitate performing entrepreneurial actions and starting a new business after the training.

The first training feature—teaching principles of action—means that students do not learn abstract theoretical knowledge but guidelines for dealing with entrepreneurial tasks. Action principles can be considered as “rules of thumb,” providing knowledge that can be easily implemented. Action principles facilitate taking action to accomplish tasks because they provide specific knowledge of what to and how to do something. This knowledge is an important antecedent of taking action (Frese & Zapf, 1994). Research has shown that simple rules are more effective in changing and facilitating action because they are easier to apply (see Drexler, Fischer, & Schoar, 2011; Holcomb, Ireland, Holmes, & Hitt, 2009). It is important to note that action principles are not derived from individual experiences but from theory and scientific evidence about how to be successful in entrepreneur-

ship. Action principles give students direction and show them an optimal approach toward entrepreneurial tasks without the need to learn the full theory (see also Fiet, 2001b). To develop action principles, we identified theories and scientific evidence about factors contributing to success in entrepreneurship and management (see Table 1). We then formulated theory-based action principles. For example, our module on "the psychology of planning and implementing plans" included principles derived from action theory (Frese & Zapf, 1994), such as to formulate action plans in the form of when, where, and how to perform actions to achieve a goal and use the action plan flexibly. This form has been shown to be related to successful initiation of action and performance (Gollwitzer, 1999; Mumford, Schultz, & Van Doorn, 2001).

The second training feature—active learning or learning-by-doing—means that students are not passive recipients of the training content, but perform actively the target behavior. Active learning promotes entrepreneurial action and business creation for two reasons. The first reason is that through active learning, the action principles are connected with concrete behavior. Thus, more concrete action knowledge is generated with beneficial effects for taking action (Frese & Zapf, 1994). The second reason is that through active learning, the students get real-life feedback, which helps them to better understand what the action principles mean and how to apply them. This refines and improves their action knowledge, and thus, contributes to taking action (Frese & Zapf, 1994). In our training, we requested the students form entrepreneurial teams of four to six students in which they started a microbusiness in the course of the training. The goal was to start and operate this microbusiness such that it makes profit within the training period of 12 weeks under real business conditions. The students were to go through the entire entrepreneurial process from preparing to launching and managing a business. To this end, each team received approximately \$100 US as seed capital that was to be repaid at the end of the 12 weeks. In the course of the training, the students acquired equipment and raw materials, dealt with suppliers, and entered the market to offer their product or service to customers. Examples of businesses started by the entrepreneurial teams in the training were producing fruit juices or salads, offering statistical software trainings, and producing African jewelry.

In conclusion, the features of action principles and active learning facilitate taking entrepreneurial action and eventually business creation. We therefore hypothesize:

Hypothesis 1: The action-based entrepreneurship training has a positive effect on (a) entrepreneurial action and (b) business creation.

Action-Regulatory Factors: Mediators in the Effect of the Training on Action

We seek to develop and investigate a theoretical model that explains why and how an action-based entrepreneurship training has a positive effect on entrepreneurial action and business creation. Based on action regulation theory (Frese, 2009; Frese & Zapf, 1994), we hypothesize that the action-based entrepreneurship training has a direct effect on a set of action-regulatory factors that mediate the effect of the training on entrepreneurial action. More specifically, we hypothesize that the training positively influences students' entrepreneurial goal intentions, action planning, entrepreneurial self-efficacy, and action knowledge. These four action-regulatory factors are short-term outcomes of the training that transmit the effect of the training on the long-term outcome of entrepreneurial action (Bandura, 1989; Frese & Zapf, 1994; Karoly, 1993). Action regulation theories (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993) state that, for actions, it is necessary to have goal intentions, action plans, action knowledge, and self-efficacy. *Goal intentions* capture what people want to achieve, *action plans* are mental simulations of actions outlining how people go about achieving their goals, *action knowledge* refers to people's knowledge about the relevant actions, and *self-efficacy* refers to people's belief in their competences to perform the actions (Bandura, 1989; Frese & Zapf, 1994). Also important to note is that these four factors are rooted in people's cognitions; the four factors are not actions themselves, but they are antecedents that regulate actions.

First, we hypothesize that the action-based entrepreneurship training has a positive effect on entrepreneurial goal intentions. During the training, the students start and operate a business. Thus, the students learn to successfully set up and operate a business and that they can expect positive outcomes from starting a business. Experiencing this has positive effects on their attitudes toward entrepreneurship, which

TABLE 1
Overview of the Training Modules, Samples of Action Principles, and Samples of Scientific Literature on Which the Action Principles Are Based

Module	Module content	Samples of action principles	Samples of scientific literature
Identifying business opportunities	<ul style="list-style-type: none"> • How to be more creative • How to get a business idea • Elevator pitch • Identifying customer needs and wants; customer orientation • Market segmentation and target market • Positioning of product (unique, high quality, etc.) • Pricing, placing/distribution, promotion • Customer retention 	<ul style="list-style-type: none"> • Think outside the box! • Use your personal strengths! • Evaluate your business opportunities! • Analyze market and consumer behavior! • Use the marketing mix! • Care for your customers! 	<ul style="list-style-type: none"> • Ardichvili et al. (2003) • Shane (2000) • Ward (2004) • Heide & John (1992) • Kotler & Armstrong (1996) • Slater & Narver (1994)
Leadership and strategic management	<ul style="list-style-type: none"> • Developing a vision/mission statement for the business • Product/service analysis and industry analysis • Developing a business strategy • Developing plans: when, where, and how to perform • Operations and development plan 	<ul style="list-style-type: none"> • Develop a vision for your business! • Make a strategic analysis of your environment! • Understand your industry! 	<ul style="list-style-type: none"> • Baum & Locke (1998) • Frese et al. (2003) • Porter (1980)
The psychology of planning and implementing plans	<ul style="list-style-type: none"> • Working capital • Management of debtors, payables, and stock • Cash flow and budgeting • Persuasion and negotiation techniques 	<ul style="list-style-type: none"> • Set yourself SMART goals! • Make action plans! • Prepare a development plan! • Manage your debtors! • Manage your creditors! • Manage your cash! • Win the minds and hearts! • Read the other to adapt your persuasion tactics! • Use bargaining tactics and avoid being a victim of them! 	<ul style="list-style-type: none"> • Frese et al. (2007) • Gollwitzer (1999) • Locke & Latham (1990) • Bhattacharya (2001) • Padachi (2006) • Smith & Bertozzi (1998) • Fisher, Ury, & Patton (1991) • Malhotra & Bazerman (2008) • Petty, Cacioppo, Strathman, & Priester (1994)
Financial management	<ul style="list-style-type: none"> • Sources of starting capital • Measuring risk and return of capital 	<ul style="list-style-type: none"> • Exploit bootstrapping possibilities! • Raise funds from the right sources! • Be sure that the money hatches money! 	<ul style="list-style-type: none"> • Gianforte & Gibson (2005) • Pandey (2009) • Van Horne & Wachowicz (2008) • Winborg & Landstrom (2001) • Adler & Kwon (2002) • Hoang & Antoncic (2003) • Zhao, Frese, & Giardini (2010) • Nzomo (2002) • Saleemi (1991) • Wood & Sangster (2005)
Persuasion and negotiation	<ul style="list-style-type: none"> • Development and maintenance of relationships • Superconnectors 	<ul style="list-style-type: none"> • Build a broad social network! • Maintain your social network! 	<ul style="list-style-type: none"> • Van Horne & Wachowicz (2008) • Winborg & Landstrom (2001) • Adler & Kwon (2002) • Hoang & Antoncic (2003) • Zhao, Frese, & Giardini (2010) • Nzomo (2002) • Saleemi (1991) • Wood & Sangster (2005)
Acquiring starting capital	<ul style="list-style-type: none"> • Cash, debtors, and creditors books • Income and expenditure • Profit and loss • Savings • Balance sheet • Costing • Self-starting, proactive, and persistent behavior • Monitoring and emotion management 	<ul style="list-style-type: none"> • Keep four key books! • Compute product price! • Compute profit or loss! 	<ul style="list-style-type: none"> • Frese & Fay (2001) • Frese et al. (1997) • Karoly (1993) • Bygrave & Zacharakis (2008) • Hirsch et al. (2005) • Honig (2004)
Networking	<ul style="list-style-type: none"> • Characteristics of a formal business plan 	<ul style="list-style-type: none"> • Take control and responsibility! (No action principles were given but a template into which the students could paste the exercises completed during the training: the template was then a full business plan for their venture started during the training.) 	<ul style="list-style-type: none"> • Frese & Fay (2001) • Frese et al. (1997) • Karoly (1993) • Bygrave & Zacharakis (2008) • Hirsch et al. (2005) • Honig (2004)
Accounting	<ul style="list-style-type: none"> • Legal and technical issues on starting a business 	<ul style="list-style-type: none"> • Select a name for your business and register it! • Get a legal status for your business! • Pay taxes where applicable! 	<ul style="list-style-type: none"> • Acul-Ocoto (2008) • Bakinga (2001) • Hoerber et al. (1982)
Personal initiative			
Business plan			
Legal and regulatory issues			

translate into stronger entrepreneurial goal intentions (Ajzen, 1991). Second, we hypothesize that the action-based training has a positive effect on students' action planning. The training included a module on "planning and implementing plans" to put a particular focus on action planning. Moreover, during the training the students had to plan and execute the start-up of a real business. This helps the students to develop skills in action planning, which then translates into better action-planning performance outside the training setting. Third, we hypothesize that the action-based training has a positive effect on students' entrepreneurial self-efficacy. As noted above, the students engaged in the start-up process of a real business during the training. This functions as a mastery experience, increasing students' entrepreneurial self-efficacy (Bandura, 1989; Gist & Mitchell, 1992). Finally, we hypothesize that the training has a positive effect on students' action knowledge. The training content provided input for developing action knowledge that contains information about the operational steps to successfully start and operate a new business (what to do and how to do it; Edelman et al., 2008). In addition, because action knowledge is best learned and built by active learning (Frese & Zapf, 1994), engagement in the set-up of the real business contributes to developing correct and sophisticated action knowledge. Therefore, the training increases students' action knowledge about entrepreneurship and business creation.

Hypothesis 2: The action-based entrepreneurship training has positive effects on (a) entrepreneurial goal intentions, (b) action planning, (c) entrepreneurial self-efficacy, and (d) action knowledge.

We hypothesize that the four action-regulatory factors have an effect on entrepreneurial action. We hypothesize that entrepreneurial goal intentions positively influence entrepreneurial action because goal intentions capture the motivational effort people are willing to invest into a specific action and how hard they are willing to perform the action (Ajzen, 1991). Studies have provided evidence for the positive effect of goal intentions on action and performance (Baum & Locke, 2004; Kolvareid & Isaksen, 2006; Locke & Latham, 2002). However, scholars have also noted that the effect of goal intentions on actions is contingent on action planning (Brandstatter, Heimbeck, Malzacher, & Frese, 2003; Frese & Zapf, 1994; Miller, Galanter, & Pribram, 1960). Gollwitzer (1999) has argued and

shown empirically that a goal intention is translated into an implementation intention once a goal intention is met by an action plan. By developing action plans, people get into an implemental mind-set with an immediate tendency to put the intention into effect (Brandstatter, Lengfelder, & Gollwitzer, 2001). With regard to entrepreneurship, this means that action planning moderates the effect of entrepreneurial goal intentions on entrepreneurial action. Entrepreneurs, who have the goal intentions to start a new business, are more likely to initiate and maintain entrepreneurial action when they complement their goal intentions with action plans (Frese, 2009; Frese & Zapf, 1994). It is important to note that action plans are distinct from business plans. Business plans are written documents that describe the economic viability of a business concept (Honig & Karlsson, 2004). Action plans are mental simulations of actions that specify the substeps (what to do) and the operational details (how to do it) relevant for goal attainment. By specifying the substeps and operational details, action plans control and direct the effort that is captured by goal intentions. Action plans thus help to initiate and maintain goal-directed actions (Frese, 2009; Frese & Zapf, 1994). Furthermore, by specifying the operational sequence of one's goal pursuit, action planning helps to focus the attention on the relevant activities; thus, the effort specified by goal intentions is not wasted. Last, developing action plans helps people to stay on track even when faced with distractions, and they are thus more likely to persistently pursue their goal intentions (Locke & Latham, 2002). In conclusion, we hypothesize that action planning moderates the effect of entrepreneurial goal intentions on entrepreneurial action: the higher action planning, the stronger the effect.

Apart from goal intentions and action planning, action regulation theory (Frese, 2009; Frese & Zapf, 1994) states that action knowledge has an important function in the process that leads to action. Action knowledge is the cognitive basis underlying efficient action, and it is represented in people's cognitive schema (Frese & Zapf, 1994). In the context of entrepreneurship, action knowledge comprises knowledge about relevant entrepreneurial actions. Furthermore, action knowledge comprises information about the principles and causal processes involved, as well as information about anticipated outcomes and consequences of one's actions. Action knowledge influences the efficiency of people's actions: the better and more

sophisticated people's action knowledge, the more efficient their actions (Frese & Zapf, 1994). For example, better knowledge about operational and formal steps necessary to establish a new business leads to more frequent and efficient actions in these areas. We therefore hypothesize that action knowledge has a positive effect on entrepreneurial action.

Last, we investigate entrepreneurial self-efficacy as an antecedent of entrepreneurial action. In general, self-efficacy has a strong impact on action (Bandura, 1989; Stajkovic & Luthans, 1998). Self-efficacy is task specific; we therefore focus on entrepreneurial self-efficacy (Bandura, 1989). *Entrepreneurial self-efficacy* reflects an individual's confidence in his or her capabilities to accomplish the tasks of an entrepreneur (Chen, Greene, & Crick, 1998). We hypothesize that entrepreneurial self-efficacy has a positive effect on entrepreneurial action because it influences people's initial choice of activities, the goal level and goal commitment, and the amount of effort and persistence people invest in pursuing entrepreneurial activities (Boyd & Vozikis, 1994; Gist & Mitchell, 1992). Believing themselves to be capable of successfully performing entrepreneurial activities increases the likelihood that people will make the decision to engage in entrepreneurial actions. Once they have made the decision, they are more likely to show higher commitment, effort, and persistence in performing these actions (Bandura, 1989; Boyd & Vozikis, 1994). Research provides evidence for the positive effect of entrepreneurial self-efficacy on entrepreneurial action (De Clercq & Arenius, 2006; Rauch & Frese, 2007; Townsend, Busenitz, & Arthurs, 2010).

Hypothesis 3: (a) Entrepreneurial goal intentions, (b) entrepreneurial self-efficacy, and (c) action knowledge have positive effects on entrepreneurial action.

Hypothesis 4: The positive effect of entrepreneurial goal intentions on entrepreneurial action is moderated by action planning: the higher action planning, the stronger the effect.

We hypothesize that the four action-regulatory factors (entrepreneurial goal intentions, action planning, entrepreneurial self-efficacy, and action knowledge) form a set of mediators that transmit the effect of the training on entrepreneurial action. We have argued that the training positively affects these four factors (H2). These four factors, in turn, form the space of action-regulatory processes lead-

ing to actions (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993). Therefore, the effect of the action-based training on entrepreneurial action (H1) is indirect through the four action-regulatory factors.

Hypothesis 5: The set of the four action-regulatory factors (entrepreneurial goal intentions, action planning, entrepreneurial self-efficacy, and action knowledge) mediates the effect of the action-based training on entrepreneurial action.

Mediators of the Effect of the Training on Business Creation

We seek to investigate the long-term effects of the action-based training on business creation. While other outcomes are also valuable (see Martin et al., 2013), we focus on increasing the probability of new start-ups because this is a prevalent objective of entrepreneurship education (Edelman et al., 2008; Pittaway & Cope, 2007). We argue that business opportunity identification and entrepreneurial action mediate the effect of the action-based entrepreneurship training on starting a new business. Identifying and acting on opportunities is key for starting a new business (Shane & Venkataraman, 2000).

First, "to have entrepreneurship, you must first have entrepreneurial opportunities" (Shane & Venkataraman, 2000: 220). A *business opportunity* can be defined as the discovery of new means-ends relationships to introduce a new product, service, or process to the market (Shane & Venkataraman, 2000). Also important to note is that not all business opportunities lead to a new business; entrepreneurs have to take action to implement the opportunities (McMullen & Shepherd, 2006). Yet, strong theoretical arguments that opportunity identification is related to business creation exist. Ucbasaran, Westhead, and Wright (2008) have argued that identifying more opportunities is related to identifying an opportunity which is sufficiently innovative for starting a new business. This line of reasoning is based on Simonton (1989), who has argued that the generation of innovative outcomes can be described as a stochastic process; generating more ideas increases the likelihood of generating an exceptionally innovative one. Indeed, research showed that the number of identified opportunities is positively related to the innovativeness of identified opportunities (Gielnik, Krämer, Kappel, & Frese, 2014; Shepherd & DeTienne, 2005).

Entrepreneurs are more likely to exploit an opportunity when it is more innovative because more innovative opportunities promise a higher return (Baron & Ensley, 2006; Choi & Shepherd, 2004; Fiet, 2002). Therefore, higher levels of opportunity identification increase the likelihood of business creation. In our training, we included modules particularly focusing on the identification of business opportunities (e.g., modules on "Business opportunity identification" and "Marketing"). In the module on business opportunity identification, we focused mainly on principles derived from the creativity literature (e.g., Ward, 2004). To some extent, we also developed principles based on the effectuation literature (Sarasvathy, 2001), such as "use your personal strengths (who you are, what you know, whom you know)." In the module on marketing, we discussed (apart from other topics relevant in marketing) principles regarding the importance of identifying customer needs and wants.

Second, starting a new business requires that entrepreneurs perform start-up activities to assemble the necessary resources and develop viable structures (Gartner, 1985). The exact sequence of start-up activities is not determined (Lichtenstein, Carter, Dooley, & Gartner, 2007), but a high rate of initiating and completing start-up activities increases the likelihood of successfully starting a new business (Carter et al., 1996; Gatewood, Shaver, & Gartner, 1995; Kessler & Frank, 2009; Lichtenstein et al., 2006; Newbert, 2005). The United States Panel Study of Entrepreneurial Dynamics lists 27 start-up activities performed by entrepreneurs in the first years of the start-up process (Reynolds, 2007). The list includes activities such as developing and defining a new product or service, organizing the necessary resources (e.g., starting capital, equipment), and fulfilling the legal requirements (e.g., obtaining licenses, registering). Performing these activities helps getting the necessary resources for starting and operating the business. Therefore, entrepreneurs who show higher levels of entrepreneurial action and perform more start-up activities are more likely to successfully start a new business.

In conclusion, we argue that the training influences entrepreneurial action and business opportunity identification which in turn have positive effects on business creation. Thus, the causal flow is from the training to business opportunity identification and entrepreneurial action and finally to business creation. We therefore hypothesize:

Hypothesis 6: The effect of the action-based entrepreneurship training on business creation is mediated by business opportunity identification and entrepreneurial action.

METHODS

The Action-Based Entrepreneurship Training

We have described two important didactical features of our training—action principles and active learning—in the theory section to argue why the training has a positive effect on entrepreneurial action. With regard to the didactical approach, we also took into consideration the target group and the content ("what should be taught") in the development of the training (Kuratko, 2005). The target group of the training was students in the last year of their undergraduate studies from all disciplines except business administration. We excluded that particular group of students because our aim was to enable entrepreneurship among students who have not been previously encouraged to think of self-employment as a career option. With regard to the content, the entrepreneurship literature suggests that the field of entrepreneurship includes topics from the domains of entrepreneurship, psychology, and business administration (Baron, 2007b). We decided to include topics from all three domains in our training to provide our target group with comprehensive skills in entrepreneurship. Drawing from the domains of entrepreneurship, business administration, and psychology, we included 12 different modules in our entrepreneurship training: (1) identifying business opportunities, (2) marketing, (3) leadership and strategic management, (4) the psychology of planning and implementing plans, (5) financial management, (6) persuasion and negotiation, (7) acquiring starting capital, (8) networking, (9) accounting, (10) personal initiative, (11) business plan, and (12) legal and regulatory issues (see Table 1). The modules were chosen on the basis of comprehensive literature reviews of relevant topics and content in entrepreneurship education (Fiet, 2001b; Solomon, 2007; Vesper & Gartner, 1997). The 12 modules were taught on a weekly basis over a period of 12 weeks. The weekly sessions were 3 hrs long.

Design of the Evaluation Study

To evaluate the training, we conducted a randomized controlled field experiment comparing a treat-

ment group with a nontreatment control group (waiting group). The treatment was the action-based entrepreneurship training. We randomly assigned the students to the training or control group. To take part in the training and to create a certain degree of commitment to participate throughout the training, the students had to pay a deposit of approximately \$10 US which was refunded at the end of the training if all modules were attended. To collect our data, we employed a pretest–posttest design and conducted three measurements waves (T1, T2, & T3). The first measurement wave (T1), took place in the month before the training. The second measurement wave (T2), took place in the month directly after the training. The third measurement wave (T3), took place 12 months after T1. The pretest–posttest design with a randomization of participants controls for problems of maturation, testing, history, and self-selection (Campbell, 1957).

All data were collected with personal interviews and questionnaires. The interviewers received a comprehensive interviewer training including sessions on interview techniques to probe participants' answers, the use of prompts to clarify abstract statements, note taking, and typical interviewer errors (e.g., nonverbal signs of agreement). The interviewers were told to take verbatim notes of participants' responses to open questions. Participants' responses to the interview questionnaires were subsequently rated by two independent raters on the basis of standardized rating guidelines. Calculations of intraclass correlation coefficients (ICC; Shrout & Fleiss, 1979) showed good interrater reliabilities ranging from $ICC = .88$ to $ICC = .97$.

The trainers were lecturers from four universities located in Kampala, Uganda. All lecturers had several years of experience in teaching undergraduates and have been involved in the development of the modules. The lecturers received a train-the-trainers workshop to familiarize them with the didactical approach of the training. Each trainer was responsible for one module. The trainers delivered the sessions, presented the training exercises, guided the students' presentations and discussions of the exercises, and gave feedback on the students' presentations.

Participants

The training was conducted at two Ugandan universities located in Kampala (University A) and

Mukono (University B). The recruitment procedure included the following steps: The deans of the faculties of the universities received a letter informing them of the voluntary entrepreneurship training. Accompanying the letter were application forms to be handed to the students. The deans distributed the application forms through the lecturers and professors, who also collected them from the students. The training was independent of the regular university programs, and it was not part of the curriculum; the participants did not receive any credits or grades for participating in the training. However, they received a certificate at the end of the training. It is important to mention that we emphasized that the training was a voluntary training and that it provided the students with skills for an alternative career option as entrepreneurs. We explicitly told the students that they could also attend the training if they intended to seek employment and if they do not opt to become an entrepreneur after graduation. In total, we received 651 applications (424 from University A and 227 from University B). The total number of training spots was limited to approximately 200. We randomly selected 203 students for the training group. The students could select 1 of 4 classes to have class sizes of approximately 50 students. From the remaining list of applications, we randomly selected 203 students to form the control group. The control group was a waiting control group, which means that they did not receive any treatment during the study. Only after the end of the evaluation study, the students received the same training as the students in the training group. Thirteen students who were assigned to the control group had not participated in the first measurement wave resulting in a total of 190 students in the control group. Nine students from the training group failed to show up for more than seven sessions of the training. We therefore excluded them from the analyses, leaving a total of 194 students in the training group. The total sample at the first measurement wave (T1; the month before the training) was thus 384 (194 in the training group and 190 in the control group). We compared the training group and the control group on all variables. There were no significant differences on any measure, indicating that the randomization was successful and the two groups were equivalent.

For the second measurement wave (T2; the month directly after the training), we were able to trace 337 participants from our initial sample (184

from the training group and 153 from the control group). To test whether nonresponse biased the data in one direction (i.e., in favor of the training group or in favor of the control group), we analyzed whether the nonrespondents of the training group differed significantly from the nonrespondents of the control group (test for differential loss of participants across training and control group). There were no significant differences between the nonrespondents from the training group and those from the control group on any sample characteristic or dependent measure at T1, indicating that the nonrespondents did not bias the data at T2. At the third measurement wave (T3; 12 months after the first measurement wave), we were able to collect data from 304 participants of our initial sample (162 from the training group and 142 from the control group). Again, we compared the nonrespondents from the training group with those from the control group. The analyses revealed no statistical differences between the two groups. The reasons for nonresponse were either lack of time to conduct the interview or lack of motivation to further participate in the study.

Measures

Action Knowledge

We measured action knowledge at T1 and T2. Following Kraiger, Ford, and Salas (1993), we measured action knowledge as skill-based cognitions using a situational interview. The situational interview captures knowledge about how to achieve a desired goal (Latham, Saari, Pursell, & Campion, 1980). During the interview, we presented one of two scenarios in counterbalanced and randomized order across T1 and T2. Scenario A read that the population is constantly growing older in Uganda and that there is the business idea of opening a club or a bar particularly for older people. Scenario B read that a new technology was invented, which can print three-dimensional solid objects from computer drawings, and that there is the business idea to use this technology to produce models for architects (see Shane, 2000). We then asked, "What would be your next steps if you decided the idea might be worth pursuing?" Two independent raters rated the participants' responses on the basis of a list of 35 activities to elaborate a business idea and to start a business. The 35 activities were derived from the entrepreneurship literature (Davidsson & Honig, 2003; Dimov, 2007; Reynolds, 2007) and in-

cluded activities such as "gather information about the market," "buy or rent equipment," or "acquire starting capital." This list thus contains a comprehensive set of preparatory start-up activities useful to start a business. Participants received a score of "1" for an activity if they mentioned that they would perform the activity. They received a score of "2" if they described in detail what they would do and how they would do it. They received a score of "0" for this activity if they did not mention it. The total score over all 35 activities formed the participants' score of action knowledge. Interrater reliabilities for the two raters were good at T1 (ICC = .88) and T2 (ICC = .88). *T* tests showed that the two scenarios did not lead to significant differences in participants' responses.

Entrepreneurial Self-Efficacy

We measured entrepreneurial self-efficacy at T1 and T2 using 12 questionnaire items. We used the items developed by Krauss, Frese, Friedrich, and Unger (2005) on the basis of Bandura's (1989) theoretical conceptions. We used this scale because of its predictive validity in African settings (Frese et al., 2007). The scale corresponds to the scales by Chen and colleagues (1998) and Zhao, Seibert, and Hills (2005) insofar as it asks respondents to indicate how confident they are of performing certain entrepreneurial tasks. Bandura (1989) has argued the need to develop scales for specific contexts. Our items cover different tasks relevant in entrepreneurship. An example item is "How confident are you that you can identify business opportunities well?" The participants answered the items on an 11-point Likert scale ranging from "not at all confident" (0) to "very confident" (10). The mean of the 12 items formed the score for entrepreneurial self-efficacy. The internal consistency of the scale at T1 (Cronbach's alpha = .93) and T2 (Cronbach's alpha = .94) was good.

Entrepreneurial Goal Intentions

We measured entrepreneurial goal intentions at T1 and T2 using five questionnaire items. We developed the five items using the stem "do you intend to" as recommended by Gollwitzer (1999) and Ajzen (1991). All items asked "Within the next six months, do you intend to" followed by specific start-up activities derived from Davidsson and Honig (2003). The five specific start-up activities were "discuss your business idea with business professionals,"

“organize a start-up team or look for partners,” “do market research for your business idea,” “look for equipment or a location for your business,” and “work on a business plan for your business idea.” The participants answered the five items on a 5-point Likert scale ranging from “not at all” to “very much.” The internal consistency of the scale at T1 (Cronbach’s alpha = .83) and T2 (Cronbach’s alpha = .77) was good.

Action Planning

We measured action planning at T1 and T2 during the interview and based our approach on measures by Frese and colleagues (Frese et al., 2007; Frese, van Gelderen, & Ombach, 2000) and Brandstatter and colleagues (2003). We first asked the participants whether they were currently trying to start a business and if they affirmed, we asked the participants to tell us more about the next steps they were planning to take. When the participants stopped, we asked once whether there was anything else they were planning to do. We repeated the same procedure on whether they were intending to start a business in the next 12 months. If the participants were currently trying to start a business, the second question asked whether they were intending to start an additional business in

the next 12 months. Thus, we asked all participants about two potential start-ups. Participants’ responses to the questions of what they were planning to do were rated by two independent raters using the list of 35 start-up activities derived from the literature (see *Action Knowledge* above). We applied the following rating procedure: For each start-up activity, participants received a score of “1” if they had a rough plan of what they wanted to do and how they wanted to do it; they received a score of “2” if they had a detailed plan regarding the start-up activity; and they received a score of “0” if they did not plan to perform the start-up activity. The total score over both questions and over the 35 start-up activities formed the score of action planning. Interreliabilities between the two raters at T1 (ICC = .87) and T2 (ICC = .88) were good.

Entrepreneurial Action

In our theoretical model, entrepreneurial action is both a dependent variable and a predictor of business creation (see Figures 1 and 2). We measured entrepreneurial action at T1, T2, and T3 during our interview. We used the T1 measure as control, the measure at T2 to investigate the effect of entrepreneurial action on business creation, and the mea-

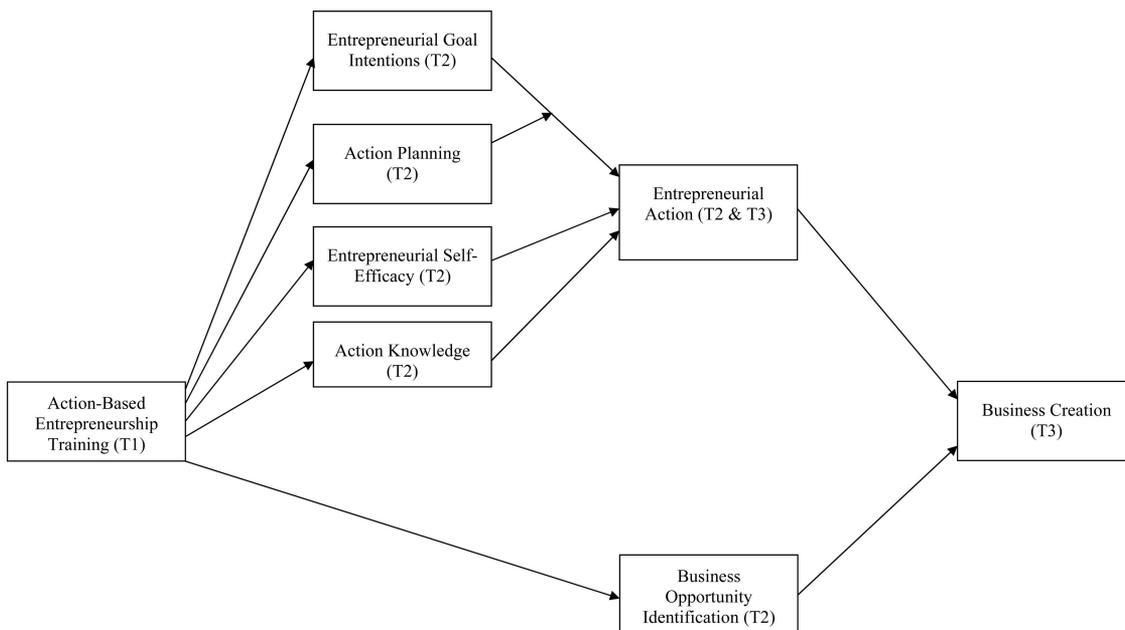


FIGURE 1

The Theoretical Model with the Hypothesized Effects of the Action-Based Entrepreneurship Training on Entrepreneurship (waves of measurement in parentheses)

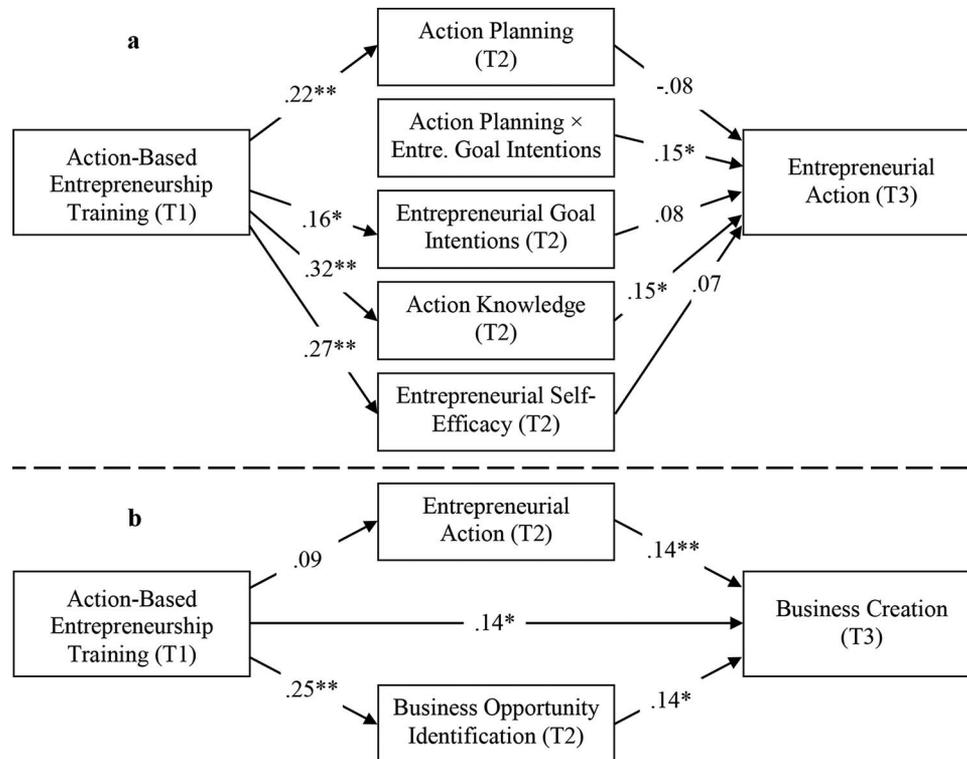


FIGURE 2

Specified Models and Standardized Path Coefficients. *Note.* (a) The model includes the following control variables: university, action planning (T1), entrepreneurial goal intentions (T1), action knowledge (T1), entrepreneurial self-efficacy (T1), and entrepreneurial action (T2); Satorra-Bentler corrected χ^2 (37) = 53.05; RMSEA = .04; SRMR = .05; CFI = 0.95; * $p < .05$; ** $p < .01$. *Note.* (b) The model includes the following control variables: university, entrepreneurial action (T1), business opportunity identification (T1), and business creation (T2); χ^2 (6) = 11.22; RMSEA = .06; SRMR = .03; CFI = 0.97; * $p < .05$; ** $p < .01$.

sure at T3 to investigate entrepreneurial action as an outcome of the action-regulatory factors of entrepreneurial self-efficacy, action knowledge, entrepreneurial goal intentions, and action planning. We asked whether the participants were currently trying to start a business, and if they affirmed we asked: "So far, what did you do to get the business up and running?" If participants stopped explaining this, we asked once whether there was anything else they had done to get the business up and running. We repeated these questions regarding whether they intended to start a business in the next 12 months. If the participants had already affirmed the question of currently trying to start a business, we asked them whether they were intending to start an additional business in the next 12 months. We rated participants' answers using the list of 35 start-up activities derived from the literature (see *Action Knowledge* above). For each of the 35 start-up activities, the participants received a score of "1" if they had put effort into this activity, of "2" if their response showed that they

had put much effort into this activity, of "0" if they had not put any effort into this activity. The total score over both questions and over the 35 start-up activities formed the score of entrepreneurial action. Interreliabilities between the two raters at T1 (ICC = .90), T2 (ICC = .92), and T3 (ICC = .96) were good.

Business Opportunity Identification

We measured business opportunity identification at T1 and T2 during our interview. We adapted questions from Hills, Lumpkin, and Singh (1997) and Ucbasaran and colleagues (2008) and asked three open questions: "How many opportunities for creating a business have you identified (spotted) within the last 3 months," "Out of all those opportunities, how many were in your opinion promising for creating a profitable business," and "How many opportunities for creating a business have you pursued, that is committed time and resources to, within the last 3 months?" In line with Ucbasaran

and colleagues (2008), responses larger than "6" were recoded as "6" to eliminate extreme responses and to bring the distribution of responses in line with a normal distribution. The average score over the three questions formed our measure of business opportunity identification. The internal consistency of the scale at T1 (Cronbach's $\alpha = .67$) and T2 (Cronbach's $\alpha = .70$) was satisfactory for such a short scale (Cortina, 1993). Gielnik and colleagues (2014) have provided evidence for the predictive validity of this measure for innovativeness of product or service innovations.

Business Creation

We measured whether the participants had started a business by asking at T1, T2, and T3 during the interview: "Are you currently the owner of a business." We coded responses as "1" if the answer was "yes" and "0" if the answer was "no." In our analyses, we controlled for being a business owner at the previous measurement wave, which means that our dependent variable reflects change and thus business creation.

Control Variables

We measured the following control variables to test whether our randomization was successful and the training group was equivalent to the control group: We used the digit span test forward and backward, which is a subtest of the Wechsler test, as a rough measure of working memory capacity or general mental ability (Colom, Rebollo, Palacios, Juan-Espinosa, & Kyllonen, 2004). Participants were requested to repeat from memory rows of three to nine numbers read aloud. The four items (two times forward and two times backward) had a good internal consistency (Cronbach's $\alpha = .77$) and were averaged to form a proxy of cognitive ability. We further asked the participants whether anybody in the family owns a business (yes = 1, no = 0) and whether they had taken any business courses prior the training (yes = 1, no = 0) because these variables influence starting a business (Davidsson & Honig, 2003). We measured entrepreneurial experience by asking whether they were currently the owner of a business or whether they had started a business in the past (yes = 1, no = 0). We measured employment experience by asking whether the participants were currently employed or whether they had had any employment in the past (yes = 1, no = 0). Last, we measured age,

gender (female = 0, male = 1), and the university at which the participants studied (University A = 0, University B = 1).

RESULTS

Table 2 presents the descriptive statistics and correlations of the study variables. We conducted *t* tests to find if there were significant differences between the training group and the control group on any variable at T1. None of the *t* tests were significant, which indicates that the randomization was successful and the groups were equivalent. Because we sampled students from two different universities, we tested whether they differed on any measure. We found significant differences for business courses taken (University A: $M = 0.12$ vs. University B: $M = 0.05$, $p < .05$); employment experience (University A: $M = 0.57$ vs. University B: $M = 0.42$, $p < .05$); cognitive ability (University A: $M = 3.06$ vs. University B: $M = 2.60$, $p < .01$); action knowledge (University A: $M = 2.67$ vs. University B: $M = 3.45$, $p < .01$); and entrepreneurial goal intentions (University A: $M = 4.13$ vs. University B: $M = 4.33$, $p < .05$). Although we used a randomized sampling approach, we included university as a covariate in our analyses to be able to combine the two universities.

Test of Hypotheses

We tested our hypotheses using structural equation modeling, which allowed us to simultaneously test our hypotheses regarding the direct and mediating effects. We had to specify two models because we had two measures for entrepreneurial action. We used the measure of entrepreneurial action at T3 as an outcome of the action-regulatory factors measured at T2 (action planning, entrepreneurial goal intentions, action knowledge, and entrepreneurial self-efficacy). We used the measure of entrepreneurial action at T2 as a mediator in the relationship between the training and business creation at T3. By using two different measures, we tested all hypotheses in a longitudinal design.

First, we specified the model to test our hypotheses regarding the effects of the action-based training on entrepreneurial action (H1a) and on the action-regulatory factors (H2a–2d) as well as the effects of the action-regulatory factors on entrepreneurial action (H3a–3c and 4) and the mediating effect of the action-regulatory factors in the relationship between the training and entrepreneurial

TABLE 2
Intercorrelations and Descriptive Statistics of the Study Variables

Variable	Time	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1. Training group (0 = control, 1 = training)	T1	0.51	0.50																									
2. Action knowledge	T1	2.84	1.59	.01																								
3. Action knowledge	T2	3.96	1.87	.29**	.05																							
4. Entre. self-efficacy	T1	7.83	1.19	.02	.00	-.01																						
5. Entre. self-efficacy	T2	8.09	1.13	.21**	.00	.05	.62**																					
6. Entre. goal intentions	T1	4.17	0.76	.01	-.03	.06	.38**	.20**																				
7. Entre. goal intentions	T2	4.19	0.69	.14**	.03	.09	.35**	.45**	.32**																			
8. Action planning	T1	2.38	1.56	.06	.35**	.13*	.11*	.05	.13*	.10																		
9. Action planning	T2	3.04	1.71	.23**	.08	.42**	.10	.13*	.09	.19**	.07																	
10. Business opportunity identification	T1	1.62	0.78	.02	.05	.00	.13*	.11*	.14**	.10	.11*	.08																
11. Business opportunity identification	T2	1.64	0.79	.20**	-.05	.03	.16**	.18**	.06	.14**	-.01	.10	.37**															
12. Entre. action	T1	1.04	1.22	.02	.23**	.06	.16**	.10	.15**	.00	.33**	.09	.27**	.13*														
13. Entre. action	T2	1.30	1.42	.14**	.12*	.22**	.09	.13*	.10	.05	.04	.32**	.21**	.17**	.27**													
14. Entre. action	T3	2.05	1.70	.12*	.11*	.17**	.09	.11	.11	.04	.05	.07	.16**	-.01	.07	.26**												
15. Business creation	T1	0.20	0.40	-.06	.01	-.02	.03	.05	.02	-.01	-.14**	-.06	.22**	.12*	.06	.09	.06											
16. Business creation	T2	0.24	0.43	-.07	.05	-.01	.09	.10	.08	.05	-.05	-.08	.16**	.18**	.01	.06	.09	.44**										
17. Business creation	T3	0.43	0.50	.18**	.07	-.02	.04	.12*	-.03	-.01	.00	.06	.19**	.21**	.17**	.20**	.05	.15*	.29**									
18. Age	T1	24.60	4.15	-.02	-.10*	-.06	-.01	-.08	-.04	.06	.01	-.08	.13**	.08	.01	-.04	-.02	.14**	.19**	.10								
19. Gender (0 = female, 1 = male)	T1	0.60	0.49	.03	-.02	.08	.07	.01	.10	.03	.01	.09	.19**	.09	.07	.07	.10	.04	.02	.11	.19**							
20. Cognitive ability	T1	2.92	0.89	.01	.08	-.05	.04	-.04	.06	-.06	.00	-.12*	-.03	-.14**	.01	.02	.03	.01	.01	-.09	-.09	-.03						
21. University (0 = A, 1 = B)	T1	0.28	0.45	-.09	.18**	-.12*	.01	-.01	.07	-.02	.11*	-.06	.02	.04	.11*	.04	.03	-.02	.03	.02	.07	.06	-.20**					
22. Relatives in business ^a	T1	0.54	0.50	.00	.06	.07	.06	.02	.02	.03	-.03	-.09	.17**	.02	.09	.01	.09	.17**	.19**	.16**	-.08	-.02	-.02	.03				
23. Business courses taken ^a	T1	0.11	0.31	-.01	.02	.00	.10	.04	.06	.05	.06	.03	.06	.03	.14**	.00	.02	.14**	.13**	.08	.00	-.03	.05	-.06	.11*			
24. Entre. experience ^a	T1	0.53	0.50	.03	.07	.05	.07	.09	.09	.01	-.07	.03	.26**	.12*	.21**	.11*	.11	.47**	.37**	.21**	.15**	.11*	-.03	.03	.14**	.07		
25. Employment experience ^a	T1	0.53	0.50	-.03	.05	-.02	.01	-.05	.06	.01	.01	.02	.10*	.04	.08	.02	.04	.12*	.14**	.00	.21**	-.01	.11*	-.12*	.13**	.07	.12**	

Note. Entre. = entrepreneurial; T1 = before the training (N = 384); T2 = directly after the training (N = 337); T3 = 12 month after T1 (N = 304); ^a 0 = no, 1 = yes.
* p < .05; ** p < .01.

action (H5). In the model, we controlled for university and for the action-regulatory factors at T1 and entrepreneurial action at T2 to have a true prediction model. The model included an interaction effect between action planning and entrepreneurial goal intentions. To account for the fact that we included an interaction effect in a structural equation model, we followed the recommendations by Cortina, Chen, and Dunlap (2001) and Williams, Edwards, and Vandenberg (2003). We computed aggregate measures of our variables as described in the section on the study measures. We then computed the interaction term for action planning and entrepreneurial goal intentions by multiplying the respective centered aggregate measures. We determined the factor loadings and measurement errors for our aggregate measures and for our interaction terms to fix the respective values in our model. The factor loadings are set equal to the square roots of the measures' reliabilities, and the measurement errors are set equal to the measures' variance multiplied by one minus their reliabilities. We calculated the reliability of the interaction terms according to the approach developed by Bohrnstedt and Marwell (1978) and used the reliabilities to determine the factor loadings and measurement errors for the interaction terms. To test the fit of our model, we used the Satorra and Bentler (1994) correction which adjusts standard errors and χ^2 statistics according to the degree of non-normality in case an interaction term is included in the model. We evaluated the fit of our overall model with the root mean square error of approximation (RMSEA), the squared root mean residual (SRMR), and the comparative fit index (CFI). According to recommendations by Hu and Bentler (1999) an RMSEA smaller than .06, an SRMR smaller than .08, and CFI larger than .95 indicate good model fit.

The results for the model showed a good fit (Satorra & Bentler corrected $\chi^2(37) = 53.05$; RMSEA = .04; SRMR = .05; CFI = 0.95). We examined the path coefficients to test our hypotheses (see Figure 2a). We found significant effects of the training on all four action-regulatory factors, supporting H2a–2d. Specifically, we found positive effects on action planning ($\beta = .22, p < .01$); entrepreneurial goal intentions ($\beta = .16, p < .05$); action knowledge ($\beta = .32, p < .01$); and entrepreneurial self-efficacy ($\beta = .27, p < .01$). With regard to the effects of the action-regulatory factors on entrepreneurial action, we found a positive and significant path from action knowledge to entrepreneurial action sup-

porting H3c ($\beta = .15, p < .05$). We did not find support for H3a, which stated that entrepreneurial goal intentions has a positive effect on entrepreneurial action ($\beta = .08, ns.$) or for H3b, stating that entrepreneurial self-efficacy has a positive effect on entrepreneurial action ($\beta = .07, ns.$). The findings supported H4, that action planning moderates the effect of entrepreneurial goal intentions on entrepreneurial action. The path coefficient of the interaction term between action planning and entrepreneurial goal intentions on entrepreneurial action was positive and significant ($\beta = .15, p < .05$). To interpret the interaction, we created a plot (see Figure 3) by adapting the procedure described by Aiken and West (1991). Figure 3 shows a positive relationship between entrepreneurial goal intentions and entrepreneurial action in cases of high action planning but not in cases of low action planning.

Last, we calculated the indirect effect of the training on entrepreneurial action through the action-regulatory factors. The indirect effect was positive and significant (indirect effect: .27, $p < .05$), supporting H1a that the training has an (indirect) effect on entrepreneurial action. A significant indirect effect indicates a mediation effect (Preacher & Hayes, 2004). To further examine the mediation effect, we included a path from the training to entrepreneurial action. The additional path did not lead to a significant improvement in model fit (Satorra-Bentler corrected $\chi^2(36) = 52.78$; corrected χ^2 -difference (1) = 0.27, *ns.*) and the path

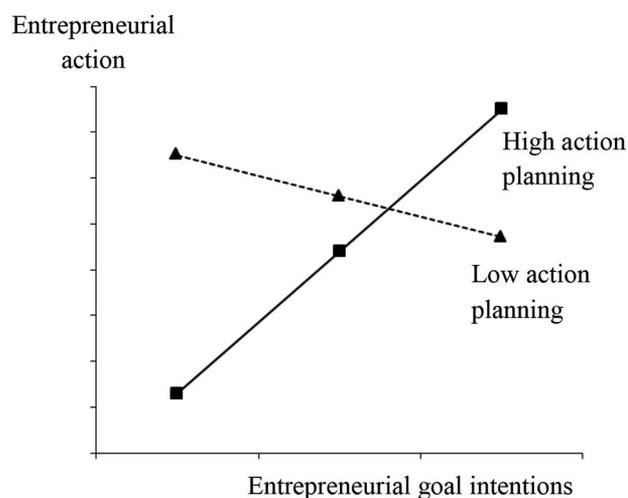


FIGURE 3
The Moderating Effect of Action Planning on the Effect of Entrepreneurial Goal Intentions on Entrepreneurial Action

was not significant ($\beta = .02, ns.$). Our findings thus suggest that the action-regulatory factors fully mediate the effect of the training on entrepreneurial action, supporting H5.

We specified a second model to test our hypotheses regarding the effects of the action-based training on business creation (H1b) and the mediating function of business opportunity identification and entrepreneurial action in this relationship (H6). In the second model, the dependent variable was business creation at T3. We controlled for university, for entrepreneurial action, and for business opportunity identification at T1, and for business creation at T2 to have a true prediction model. The initial model did not result in a satisfactory model fit ($\chi^2(7) = 16.93$; RMSEA = .07; SRMR = .03; CFI = 0.94). Including a direct path from the training to business creation significantly improved the model fit (χ^2 difference (1) = 5.17, $p < .05$). The modified model showed a good fit ($\chi^2(6) = 11.22$; RMSEA = .06; SRMR = .03; CFI = 0.97). We examined the path coefficients of the modified model to test our hypotheses (see Figure 2b). The direct effect of the training on business creation was positive and significant ($\beta = .14, p < .05$) supporting Hypothesis 1b. Furthermore, we found significant paths from entrepreneurial action ($\beta = .14, p < .01$) and from opportunity identification ($\beta = .14, p < .05$) to business creation. We also found a significant effect of the training on business opportunity identification ($\beta = .25, p < .01$). The direct effect of the training on entrepreneurial action was not significant ($\beta = .09, ns.$); this corresponds to our findings that there is no direct effect but an indirect effect of the training on entrepreneurial action through the action-regulatory factors. Furthermore, we found a significant indirect effect of the training on business creation through entrepreneurial action and business opportunity identification (indirect effect = .05, $p < .05$). Given that the model with a path from the training to business creation showed a better model fit and that the path was significant, the findings suggests that entrepreneurial action and business opportunity identification partially mediate the effect of the training on business creation (Preacher & Hayes, 2008). Thus, H6 was partially supported.

DISCUSSION

Our aim here was to investigate how an action-based entrepreneurship training transmits its effects on entrepreneurial action and business cre-

ation. We developed a general model integrating short- and long-term training outcomes (i.e., action-regulatory factors, entrepreneurial action, business opportunity identification, and business creation). We postulated that the training has an effect on entrepreneurial action through action-regulatory mechanisms and thus, that action-regulatory mechanisms play an important role in the process leading to business creation. We developed an action-based entrepreneurship training following guidelines by action regulation theory (Frese & Zapf, 1994). We evaluated the training in a randomized controlled field experiment. Our 12-month evaluation study showed that the training had a significant impact on business creation: Students in the training group were significantly more likely to start a new business than students in the control group. In line with our hypotheses, the training had significant effects on entrepreneurial goal intentions, action planning, action knowledge, and entrepreneurial self-efficacy. Action knowledge and the interaction between entrepreneurial goal intentions and action planning were significant predictors of entrepreneurial action. The action-regulatory factors fully mediated the effect of the training on entrepreneurial action. Furthermore, the training had positive effects on business opportunity identification; business opportunity identification and entrepreneurial action partially mediated the effect of the training on starting a new business. We think that our findings have several theoretical and practical implications.

Theoretical Implications

Several scholars have emphasized that entrepreneurship trainings should be action-based to promote entrepreneurial action and business creation (Barr et al., 2009; Fiet, 2001a; Gorman et al., 1997; Honig, 2004; Oosterbeek et al., 2010; Rasmussen & Sorheim, 2006). In general, entrepreneurship trainings have a positive effect (Martin et al., 2013); however, the theoretical questions of why and how such trainings exert an effect have not been investigated. We showed that action-regulatory factors mediated the effect of the training on entrepreneurial action. To our knowledge, we present the first study that investigates a comprehensive set of mediators linking an action-based entrepreneurship training and entrepreneurial action. The study thus contributes to developing a theory of action-based entrepreneurship trainings that explain why and how these trainings work. Our find-

ings suggest that action-regulatory factors are important mechanisms underlying the relationship between action-based entrepreneurship trainings and entrepreneurial action. We thus provide an action-regulatory explanation for the positive effects of such trainings.

Our study also adds to the extant literature on drivers of entrepreneurial action. Scholars have recently emphasized that entrepreneurial action is far from being understood, and they have called for more research shining a spotlight on it (Venkataraman, Sarasvathy, Dew, & Forster, 2012). Previous studies on drivers of entrepreneurial action have more or less explicitly referred to expectancy-value models to explain entrepreneurial action. For example, theoretical and empirical studies have investigated the role of uncertainty by suggesting that assessments of feasibility and desirability influence entrepreneurial action (McKelvie, Haynie, & Gustavsson, 2011; McMullen & Shepherd, 2006). Similarly, scholars have examined value and expectations in the form of images (Mitchell & Shepherd, 2010); perceptions (Edelman & Yli-Renko, 2010); or outcome and ability expectations (Cassar, 2010; Koellinger, Minniti, & Schade, 2007; Townsend et al., 2010). The line of reasoning underlying this research is that more positive values and expectations translate into stronger entrepreneurial goal intentions and eventually lead to entrepreneurial actions (Ajzen, 1991; Bird, 1988; Kolvereid & Isaksen, 2006; Krueger, Reilly, & Carsrud, 2000).

However, scholars have questioned the strength of the relationship between intentions and actions, calling for a broader view on predictors of entrepreneurial action (Davidsson & Honig, 2003; Katz, 1990; Souitaris et al., 2007). Scholars have argued that intentions are the starting point of entrepreneurial actions, but other action-regulatory factors are necessary to translate intentions into actions (Frese, 2009; Gollwitzer, 1999). We elaborated how action-regulatory factors beyond entrepreneurial goal intentions influence entrepreneurial action. Our theoretical model thus adds to the literature by providing a more comprehensive framework on direct antecedents of entrepreneurial action. The theoretical model goes beyond other theories that seek to explain action, such as goal-setting theory (Locke & Latham, 2002) or the theory of planned behavior (Ajzen, 1991) because these theories do not discuss the importance of action planning or action knowledge as explicitly as does action regulation theory.

Specifically, the significant finding of the interaction between entrepreneurial goal intentions and action planning contributes to the extant literature, which assumed a direct effect of goal intentions on action (e.g., Bird, 1988; Krueger et al., 2000). We found that entrepreneurial goal intentions alone had only a weak (nonsignificant) effect on entrepreneurial action. Our finding suggests that entrepreneurial goal intentions must be complemented with action plans to lead to entrepreneurial actions. This finding is in line with research demonstrating how implementation intentions reduce the gap between goal intentions and actions (Ajzen, Czasch, & Flood, 2009; Gollwitzer, 1999). Implementation intentions are related to action plans as they are formed through specifying the when, where, and how of actions (Gollwitzer, 1999). Consequently, theoretical models predicting entrepreneurial action increase their validity by considering the combined effects of goal intentions and action planning. Furthermore, the significant finding of action knowledge adds to research that has studied the importance of critical know-how for entrepreneurial action (Baum & Bird, 2010; Edelman et al., 2008). Action knowledge is an important action-regulatory factor that provides the cognitive basis for smooth and efficient actions.

With regard to our findings that entrepreneurial goal intentions in combination with action planning are two factors important for entrepreneurial action, we note that other entrepreneurship scholars have suggested that approaches focusing less on goals and planning might be more effective. For example, Sarasvathy (2001) has suggested that effectuation is a promising approach for entrepreneurs to take action because it helps to deal with uncertainties and contingencies. *Effectuation* means that entrepreneurs do not specify a goal and then look for the means they need to achieve the goal, but start with the means available to them and then set out to test what effects they can create with those means. Similarly, Baker and colleagues (Baker & Nelson, 2005; Baker, Miner, & Easley, 2003) have described the usefulness of bricolage for entrepreneurship. *Bricolage* emphasizes the importance of not planning in detail but improvising and making do by recombining the resources at hand. We do not think that action planning on the one hand and effectuation and bricolage on the other are two opposing approaches. In effectuation, entrepreneurs must have at least a rough idea of what they want to achieve with their available means. This requires a certain

degree of action planning about how to employ the resources. Also in bricolage, entrepreneurs' actions are not random or based on trial and error; rather, planning and execution of action converge, which means that entrepreneurs do some short-term planning that is particularly responsive to environmental demands. This means that action planning has an important function also in effectuation and bricolage.

The significant effects of entrepreneurial action and business opportunity identification on business creation support theories ascribing a central role to business opportunity identification and exploitation (entrepreneurial action) for entrepreneurship (Shane & Venkataraman, 2000). Furthermore, our findings showed that these two factors only partially mediated the effect of the training on starting a new business. There was still a significant direct effect of the training. This means that the training affected additional factors relevant for starting a business. For example, it may be the case that the groups formed in the training provided social capital that lasted even beyond the training, which then helped to successfully start a business (Davidsson & Honig, 2003).

Last, we think that the context of our study also contributes to the entrepreneurship literature. We conducted our study in a developing country, where entrepreneurship plays an important role for economic development and wealth creation (Mead & Liedholm, 1998). Developing countries need to establish a sound base of small enterprises to create a sufficient number of job opportunities and to boost their economic development (Nelson & Johnson, 1997). Scholars note that entrepreneurship research has so far almost exclusively focused on North America and Europe (Bruton, Ahlstrom, & Obloj, 2008); however, people living in developing countries form the majority of the world (Arnett, 2008). Therefore, developing and testing theoretical models that explain successful entrepreneurship in developing countries is an important scholarly task. Our study is a step in this direction.

Practical Implications

Promoting entrepreneurship is a key issue on many policy agendas in both developing and developed countries (Nelson & Johnson, 1997; Nkirina, 2010). Entrepreneurial firms contribute to the creation of new jobs, growth in productivity, and to national GDP growth (Carree & Thurik, 2003, 2008;

Van Praag & Versloot, 2007). Governments have introduced regulatory reforms and more entrepreneurship courses to promote entrepreneurship, but the question is which of these interventions are really effective? We evaluated our training over a period of 12 months and provided evidence that the training is effective in promoting entrepreneurship. The training increased the number of entrepreneurs. The training put a particular focus on action. Based on action regulation theory (Frese & Zapf, 1994) our training method was particularly helpful in changing students' behavior and in prompting them to become entrepreneurs after the training course. This training may offer an option for governments and development or aid agencies that seek to further establish entrepreneurship education. Particularly in countries such as Uganda, where the unemployment rate is very high, action-based entrepreneurship trainings may provide the necessary skills and knowledge to start a business and to pursue the career option of an entrepreneur.

It is important to note, however, that action-based courses may be in conflict with the requirements of academic courses. Courses that are graded as part of the credit system have to meet academic standards, which may be difficult to combine with the more open setting of a training that requires students to go back and forth in the entrepreneurial process; starting a new business is an idiosyncratic process that requires flexibility. It may be difficult to put such a course into standardized grading schemas (Rasmussen & Sorheim, 2006; Solomon, 2007). We suggest to offer add-on, practical courses for students about to finish their studies.

Our study has also practical implications for future studies evaluating the effectiveness of entrepreneurship trainings. Entrepreneurial goal intentions alone may have a positive effect on action; however, this effect is not so strong. We found that entrepreneurial goal intentions are necessary but not sufficient predictors of action; entrepreneurial goal intentions instigate actions only when entrepreneurs specify what they will do and how they will do it. This finding implies that intervention programs focusing only on increasing the strength of entrepreneurial goal intentions without increasing the level of action planning do not have a positive impact on entrepreneurship. In addition, entrepreneurial goal intentions and action planning must be part of the evaluation to assess the effectiveness of training interventions.

Strengths, Limitations, and Implications for Future Research

We think that the methodology of our study is a contribution to the literature. By conducting a randomized field experiment with a control group, we provide a rigorous test of the hypothesis that action-regulatory factors have an important function for entrepreneurial action and starting a business. Martin and colleagues (2013) have noted that more evaluation studies are needed that use a pre-posttest design with a randomized control group. We employed a longitudinal design with a randomized control group examining the participants before the training and two times after the training. This design allowed us to make causal conclusions regarding the impact of the training. Our study thus contributes to the growing body of entrepreneurship education research in higher (tertiary) education (Bechard & Gregoire, 2005; Kabongo & Okpara, 2010; Katz, 2003; Klandt, 2004; Solomon, 2007) and overcomes some methodological problems of previous research evaluating entrepreneurship education, such as lack of basic controls in the form of pretesting, lack of longitudinal designs, lack of randomized control groups to compare the intervention to a nontreatment control group, or an overreliance on subjective measures instead of objective performance measures to assess the impact of the intervention (Glaub & Frese, 2012; Henry, 2004; Honig, 2004; McMullan, Chrisman, & Vesper, 2001; Souitaris et al., 2007; Von Graevenitz et al., 2010).

We note that the context of our study might be a potential limitation. We conducted it in Uganda, which is among the top countries in entrepreneurial activity (Namatovu, Balunywa, Kyejjusa, & Dawa, 2011) and ranks 193rd in gross national income (US \$460 per capita; World Bank, 2010). An important question is whether our findings are generalizable and whether they also hold in more-developed countries. The higher propensity in Uganda to engage in entrepreneurial activity may facilitate starting a real venture. Students in Uganda are probably more inclined toward entrepreneurship than those in other parts of the world. In fact, we observed in the training that the students quickly responded to our request to engage in real entrepreneurial activities outside the classroom. However, research shows that in other settings, students also have a positive attitude toward becoming involved in the start-up process of a real business during a training course (Barr et

al., 2009; Oosterbeek et al., 2010; Rae, 2009; Rasmussen & Sorheim, 2006). This suggests that the general concept of the training is applicable in different contexts.

We also note that depending on the context, different aspects of the four action-regulatory factors might be more or less important. For example, action planning might be more important in cultures with high uncertainty-avoidance (Rauch, Frese, & Sonnentag, 2000). Also, in countries with a highly regulatory business environment, action knowledge about how to deal with legal and regulatory issues might be more important than in countries where the regulatory framework is less pronounced (e.g., Uganda). In the latter countries, action knowledge about more informal procedures might be more important, for example, how to protect business concepts independent of legal regulations. Furthermore, we note that there might be dynamic relationships between the action-regulatory factors (Lord, Diefendorff, Schmidt, & Hall, 2010). For example, there may be recursive effects between action knowledge, entrepreneurial goals, and action planning. Future research investigating these relationships would contribute to our understanding of how action-regulatory factors dynamically influence entrepreneurial action.

Related to the question of the generalizability of our findings is the fact that we were able to observe an increase in business owners within a period of 12 months. We think that the generally high level of entrepreneurial activity and the economic conditions of a developing country foster an accelerated accomplishment of the entrepreneurial process. Thus, we expect that in other contexts, it may take longer for the training to show its positive impact on entrepreneurship. This calls for longer evaluation periods in more developed contexts, such as the United States or Europe. We also note that all students applied for the training, meaning that they were generally interested in entrepreneurship. This might contribute to their fast implementation of new businesses. Furthermore, it might be possible that our training is particularly effective in combination with students who are inclined toward entrepreneurship. Although discussions with the students revealed that some had not considered entrepreneurship to be a career option before the training, it is important to replicate our study with students of a more general population.

Also important is to consider some measurement issues. Our measure of entrepreneurial goal inten-

tions may be cleaner than some other measures, and thus, it may be more conservative. Some measures of goal intentions include a prediction, such as "It is likely that I will personally own a small business in the relatively near future" (Crant, 1996) or "How likely are you to be working full-time for the new business in one year from now?" (Kolvereid & Isaksen, 2006). Such a prediction probably includes not only the intention, but also action planning, which means that these measures may cover aspects of both constructs.

With regard to our findings, we note that the effects may have been partly caused by trainers' heightened attention toward or expectations of the students (see Eden, 1990; Rosenthal, 1994). Research has shown that these effects may increase subjects' performance on a given task. It is important to note that in the research on attention and expectation effects, the subjects show higher performance on tasks they are regularly working on. Starting a new business, however, is a life-changing event with implications for one's entire future career. We therefore think that attention or expectation effects play only a minor role in our study. It is also possible to argue that the significant effects are due to demoralization or discouragement in the control group, as they did not receive the training. However, examining the means of the training group and the control group indicates that the significant effects are driven by an increase in the training group rather than a decrease in the control group.

With regard to the general objective of our training to increase the start-up rate, we have to note that some scholars have questioned the approach of generally increasing the number of start-ups (Shane, 2009). Instead, a general objective of entrepreneurship education should be to generate more economic and social value (Neck & Greene, 2011). We conducted our study in a developing country, and our training participants were undergraduates. In developing countries, entrepreneurship is an important alternative because of unfavorable job market conditions (Mead & Liedholm, 1998). However, a major problem in developing countries is that a large part of entrepreneurship is necessity-motivated or marginal businesses with little potential for creating wealth (Van Stel, Carree, & Thurik, 2005). Research has shown that enrollment in tertiary education has a positive effect on entrepreneurship that is not motivated by necessity (Van Stel, Storey, & Thurik, 2007). Similarly, higher education has a positive effect on trans-

forming informal businesses into formal ones (Sonobe, Akoten, & Otsuka, 2011). Thus, increasing the number of start-ups among undergraduates should promote the type of entrepreneurship that creates economic and social value.

CONCLUSIONS

Our study showed that action-regulatory mechanisms are of central importance in entrepreneurship, and they help to explain how action-based entrepreneurship trainings have a positive impact on entrepreneurship. Promoting entrepreneurship is possible if during trainings, trainers take into consideration action-regulatory mechanisms important for entrepreneurial action.

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