

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

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Keywords: entrepreneurship education; action; action-regulation; training; evaluation; field experiment

**ACTION AND ACTION-REGULATION IN ENTREPRENEURSHIP: EVALUATING
A STUDENT TRAINING FOR PROMOTING ENTREPRENEURSHIP**

ABSTRACT

Action plays a central role in entrepreneurship and entrepreneurship education. Based on action regulation theory, we developed an action-based entrepreneurship training. We investigated the question of how the training transmitted its effects on entrepreneurial action and start-up. The training put a particular focus on action insofar as the participants learned action principles and engaged in the start-up of a real business during the training. We evaluated the training's impact over a 12-month period using a randomized control group design in a developing country (Uganda). As hypothesized, the training had positive effects on action-regulatory factors (entrepreneurial goals, action planning, action knowledge, and entrepreneurial self-efficacy) and the action-regulatory factors predicted entrepreneurial action. Entrepreneurial action and business opportunity identification mediated the effect of the training on new business start-up. Our study shows that an action-based entrepreneurship training promotes entrepreneurial action via action-regulatory mechanisms. Thus, action-regulatory mechanisms play an important role in the process that leads to the new business creation.

INTRODUCTION

Entrepreneurship scholars have consistently emphasized that action is a central construct to understand entrepreneurship (Baron, 2007a; McMullen & Shepherd, 2006). Entrepreneurship occurs because entrepreneurs take actions to pursue business opportunities (Bird & Schjoedt, 2009; Shane, Locke, & Collins, 2003). Action is important because starting a new venture requires continuous actions (i.e., start-up activities) by the entrepreneur 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 venture are more likely to successfully launch a business (Carter, Gartner, & Reynolds, 1996; Gatewood, Shaver, & Gartner, 1995; Kessler & Frank, 2009; Lichtenstein, Carter, Dooley, & Gartner, 2007; Lichtenstein, Dooley, & Lumpkin, 2006; Newbert, 2005).

Given that action plays a central role for entrepreneurship, an important question is how to train action and thus to successfully promote entrepreneurship (Edelman, Manolova, & Brush, 2008; Neck & Greene, 2011). Several scholars have proposed that trainings with a focus on action may be particularly effective in promoting entrepreneurship (Barr, Baker, & Markham, 2009; Fiet, 2001a; Gorman, Hanlon, & King, 1997; Honig, 2004; Oosterbeek, van Praag, & Ijsselstein, 2010; Rasmussen & Sorheim, 2006). The course content should correspond to the start-up activities performed by real entrepreneurs (Edelman et al., 2008). Rasmussen and Sorheim (2006) have called such trainings, which put a particular focus on action and learning-by-doing, action-based or action-oriented entrepreneurship trainings. Action-based entrepreneurship trainings and learning-by-doing (e.g., starting a business in the training course) have become the method to engage students more actively and to make entrepreneurship trainings more effective (Edelman et al., 2008; Neck & Greene, 2011).

However, to our knowledge, there is a gap in the literature on why and how such action-based trainings should be particularly effective. Based on action regulation theory (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993), we develop a theoretical model suggesting that

action-regulatory mechanisms are fundamental mediators in the relationship between such trainings and entrepreneurial actions to start a business (see Figure 1). The first contribution to the literature is therefore to develop a theoretical model which explains why entrepreneurship trainings with a focus on action have a positive impact on entrepreneurship. In our study, we use starting a new business as an important outcome of entrepreneurship. Although other outcomes are also valuable, we focus on new business creation because increasing the probability of new start-ups is one of the main objectives of entrepreneurship education (Edelman et al., 2008; Pittaway & Cope, 2007).

The second contribution of our study is to develop a better theoretical understanding of drivers of entrepreneurial action. Our study provides a rigorous test of the question in what way does action-regulation contribute to entrepreneurship. We conduct a field experiment that can answer the question of causal processes with a randomized controlled experiment. Previous research has identified several factors that influence entrepreneurial action. For example, theoretical and empirical studies have investigated the role of entrepreneurs' goals, intentions, and expectations (Cassar, 2010; Koellinger, Minniti, & Schade, 2007; Kolvereid & Isaksen, 2006; Souitaris, Zerbinati, & Al-Laham, 2007; Townsend, Busenitz, & Arthurs, 2010), entrepreneurs' perceptions of themselves, of the opportunity, and of the environment (Edelman & Yli-Renko, 2010; Mitchell & Shepherd, 2010), and the role of uncertainty and successful intelligence for entrepreneurial action (Baum & Bird, 2010; McKelvie, Haynie, & Gustavsson, 2011; McMullen & Shepherd, 2006). This research has provided interesting insights into drivers of entrepreneurial action. However, scholars have recently emphasized that entrepreneurial action is far from being understood and they have called for more research which shines "a spotlight on the actual actions of entrepreneurs" (Venkataraman, Sarasvathy, Dew, & Forster, 2012, p. 29).

Our study follows this call by providing a theoretical model which helps to explain action. We investigate action-regulatory factors as antecedents of entrepreneurial action and

new venture creation. Action is goal-oriented behavior (Latham & Pinder, 2005). Action regulation theories (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993) state that for actions, it is necessary to have goals, action plans, action knowledge, and self-efficacy. Goals specify what people want to do, action plans specify how people go about achieving their goals, action knowledge refers to people's knowledge about potential actions and the environment in which they act, and self-efficacy refers to people's belief in their competences (Bandura, 1989; Frese & Zapf, 1994; Karoly, 1993). These four aspects build the space of action-regulatory processes that lead to actions (see Figure 1). Action regulation theories thus provide a more general framework which integrates factors that have been previously discussed in the literature (e.g., goals and self-efficacy) and factors that have received less attention (action planning and action knowledge). Action regulation theory therefore 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). Setting goals or forming intentions¹ has been the traditional answer in the entrepreneurship literature to the question about antecedents of action; for example, Bird (1988) and Krueger et al. (2000) have suggested that entrepreneurial intentions are the best predictor of entrepreneurial action. Yet, other entrepreneurship scholars have noted that the relationship between intentions and actions is often weak (Davidsson & Honig, 2003; Katz, 1990). There is a gap between intentions and actions (Gollwitzer, 1999). Action regulation theory suggests that intentions are the starting point of actions but other action-regulatory factors are necessary to translate intentions into actions (Frese, 2009; Frese & Zapf, 1994). We theoretically elaborate how action-regulatory factors beyond entrepreneurial goals or intentions influence entrepreneurial action and new venture creation.

THEORY

¹ Goals and intentions correspond to each other insofar as both constructs refer to what somebody wants to achieve (Gollwitzer, 1999; Locke & Latham, 2002).

Promoting Entrepreneurship through an Action Training

In this study, we seek to develop an action-based entrepreneurship training which has a positive effect on entrepreneurial action to examine mediators of this effect. On the didactical level, we take into consideration the target group, the content (“what should be taught”), the process/method (“how should it be taught”) (Kuratko, 2005, p. 581), and the desired outcome (entrepreneurial action and eventually new venture creation). The target group of the training was undergraduate students from all disciplines other than business administration who were in the last semester of their undergraduate studies. We excluded students from business administration because the very idea of the training was to encourage and enable students to become entrepreneurs who have not been previously encouraged for self-employment during their studies. With regard to the content, the literature on entrepreneurship suggests that entrepreneurship is a multi-disciplinary field including topics from the disciplines of entrepreneurship, psychology, and business administration (Baron, 2007b). Given that we developed our training for undergraduates from all academic disciplines except business administration, we decided to include topics from all three disciplines in our training. Furthermore, the content should provide the input for developing action knowledge that contains information about the operational steps to successfully start and operate a new venture (what to do and how to do it) and about the relevant stakeholders in the entrepreneur’s environment (the system) (Edelman et al., 2008). Drawing from the disciplines 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 training thus covers a longer period than it is usually the case for entrepreneurship trainings (Glaub & Frese, 2012). The training also differs from the majority of entrepreneurship education offerings insofar as it emphasizes psychological skills, such as leadership, the psychology of planning, personal initiative, or persuasion and negotiation (cf., Fiet, 2001b; Honig, 2004; Solomon, 2007). We emphasized psychological skills more strongly because entrepreneurship scholars considered the person and the persons' skills to be highly important in entrepreneurship (Baum, Frese, Baron, & Katz, 2007).

Our entrepreneurship training also differs from the majority of entrepreneurship education offerings with regard to the method of the training. We applied a strictly action training method based on propositions by action regulation theory (Frese & Zapf, 1994). There is empirical evidence suggesting that trainings designed according to the propositions by action regulation theory are effective in changing behavior (Bell & Kozlowski, 2008, 2010; Burke et al., 2006; Frese, Beigel, & Schoenborn, 2003; Keith & Frese, 2008). Such trainings feature the following components: teaching the training content in form of action principles, learning-by-doing, providing positive as well as negative action feedback, and matching training tasks and real-world tasks to increase transfer. Our training thus goes beyond other trainings which focus mainly on learning-by-doing (see Glaub & Frese, 2012; Rasmussen & Sorheim, 2006).

Teaching principles of action means that students do not learn abstract theoretical knowledge but simplified guidelines how to deal with the tasks of an entrepreneur. It is important to note that the action principles are not derived from individual experiences but they are based on scientific knowledge. The theoretical knowledge about how to be successful in entrepreneurship is transferred into action principles. This is also in line with Fiet's (2001b) notions that theory should give students directions and it should help them to learn what they ought to do. Similar to Fiet's (2001b) approach, we used theory to guide students. Our

principles of action in the training were all based on scientific knowledge about factors contributing to success in entrepreneurship and management (see Table 1). For example, our module on “the psychology of planning and implementing plans” included principles derived from action theory (Frese & Zapf, 1994), such as formulate action plans in the form of when, where, and how to perform key steps to achieve a goal (see also Mumford, Schultz, & Van Doorn, 2001). Action principles thus provide practical knowledge that can be easily implemented by the students. Action principles can also be considered “rules of thumb” or simple rules how to go about a specific task without the need to understand the underlying theoretical rationale. Action principles facilitate taking action to accomplish tasks. Research showed that simple rules are more effective because they are easier to apply (Drexler, Fischer, & Schoar, 2011).

Learning-by-doing means that the trainees should not be passive recipients of the training content but they should actively perform the target behavior. In the training, the students were asked to form entrepreneurial teams of four to six students and the teams were requested to start a real business within the course of the training. The goal was to start a business within one or two weeks and operate this business in a way that it makes profit within the training period of 12 weeks. Thus, the students were to go through the entire entrepreneurial process from preparing to launching and managing a real business. To this end, each entrepreneurial team received approximately 100 USD as seed capital that was to be returned at the end of the training. 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. None of these steps in the entrepreneurial process were simulated but they all took place in the real business environment. Examples of real businesses started by the entrepreneurial teams were producing fruit juices or fruit salads, offering statistical software trainings to other students, and producing African jewelry. We note that our action training differs from the concept of action learning and other forms of

informal learning-by-doing (Raelin, 2006) insofar as action training emphasizes the importance of a formal training setting and of scientific material to be taught.

In the training, we provided positive and negative feedback. Positive feedback is information on getting nearer to a goal or achieving a goal. Negative feedback implies that a goal is not achieved and helps the students to understand what they still have to learn and in which areas their actions need improvement. Providing positive and negative feedback should help entrepreneurs shape and modify their behavior and thus, increase the likelihood of success. In the training, the trainers provided feedback during presentations and discussions in class. In case of negative feedback, the trainers also referred back to specific action principles to give the students specific advice how to improve their performance. Furthermore, the trainers emphasized that the students should perceive errors not as detrimental to their business but as an important form of negative feedback they can learn from (Heimbeck, Frese, Sonnentag, & Keith, 2003; Keith & Frese, 2005). Usually, students are punished for errors and told to avoid errors resulting in a negative or avoidant attitude towards errors. Considering errors and failures as a valuable form of feedback changes students' mind towards errors and helps them to integrate information from negative incidents into their knowledge base (Frese & Zapf, 1994; Shepherd, 2003). The feedback provided by the trainers was high in the beginning of the training. In the course of the training, the class was more and more encouraged to give feedback to their fellow students and to themselves. The students thus learned actively to analyze and evaluate the status of their venture along the action principles taught in the training program.

Matching training tasks and real-world tasks to increase transfer means that the students should work on tasks that are similar to the tasks of an entrepreneur (Baldwin & Ford, 1988). One way to achieve this was to request the students to engage in setting-up a real business. Thus, the students performed actions during the training that resembled actions they had to perform if they wanted to become business owners after the training. The high level of

resemblance between training tasks and real entrepreneurial tasks should increase the likelihood that the trainees successfully apply the knowledge and skills gained in the training to subsequent entrepreneurial ventures (Baldwin & Ford, 1988). Furthermore, we developed the training in a way that all exercises were geared to the business the students worked on in the training. For example in the module on “marketing”, we requested the student to conduct a customer and competitor analysis for their business. Furthermore, we designed the exercises (from all the modules) in a way that they added up to a full business plan. Entrepreneurship scholars have noted that business plans often have no practical function in the start-up process but are only an academic exercise (Honig, 2004). Therefore, the training had no formal discussion of a business plan until the end. The students were not aware of the fact that they actually accomplished a business plan for their business while they completed the exercises but we guided the students unwittingly to a business plan. Only in the second to last session we talked about “business plans”, and provided the students with a template. The students were asked to use this template to paste their exercises into it. At that point, all the exercises made up a complete business plan. In this way, they learned that writing a business plan is a manageable task with practical value. Furthermore, students could adapt, modify, and change concept for their business throughout the training. Our approach towards business plans thus corresponds to Honig’s (2004) idea of contingency-based planning to take into account changes that occur in the course of implementing a business opportunity.

We hypothesize that the training has positive effects on entrepreneurial self-efficacy, action knowledge, action planning, and entrepreneurial goals which build the space of action-regulatory processes that lead to entrepreneurial actions (Figure 1). First, engaging in the start-up process of a real business should function as a mastery experience increasing the students’ entrepreneurial self-efficacy (Bandura, 1989; Gist & Mitchell, 1992). Second, the knowledge taught in the training should increase students’ action knowledge. Additionally, as action knowledge is best learned and built by taking action (Frese & Zapf, 1994), engagement

in the set-up of the real business should contribute to developing correct and sophisticated action knowledge. Third, the training content (e.g., the module on “planning and implementing plans”) as well as the request to plan and execute their plans in the start-up process of the real business should help students to develop skills in action planning which should then translate into better action planning performance outside the training setting. Finally, the students experienced during the training that they are able to set-up and operate a business and that they can expect positive outcomes from starting a business. This should lead to developing stronger entrepreneurial goals (Frese & Zapf, 1994).

Hypothesis 1: The entrepreneurship training has a positive effect on (a) entrepreneurial self-efficacy, (b) action knowledge, (c), entrepreneurial goals, and (d) action planning which (e) mediate the effect of the training on entrepreneurial action.

Action-Regulatory Antecedents of Entrepreneurial Action

Based on action regulation theories (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993), we hypothesize that entrepreneurial goals, action planning, action knowledge, and entrepreneurial self-efficacy are action-regulatory processes leading to entrepreneurial actions. It is important to note that these four factors are rooted in entrepreneurs’ cognitions; the four factors are not actions themselves but they are action-regulatory antecedents of actions. We start with discussing the joint effect of entrepreneurial goals and action planning on entrepreneurial action. Several studies have provided evidence for the positive effect of goal setting (Baum & Locke, 2004; Locke & Latham, 2002). However, scholars have also noted that goals must be combined with plans to bridge the gap between goals and actions (Miller, Galanter, & Pribram, 1960). Action regulation theory suggests that action planning moderates the effect of entrepreneurial goals on entrepreneurial action. Entrepreneurs, who have the goal to start a new venture, are more likely to initiate and maintain entrepreneurial action when they complement their goals with action plans (Frese, 2009; Frese & Zapf, 1994). Action plans are mental simulations of actions that specify the sub-steps (what to do) and the

operational details (how to do it) leading to goal attainment. People, who do not form action plans, should not achieve their goals because their goals will not be turned into actions. By specifying the sub-steps and operational details, action plans pre-decide which actions will be performed in a given situation. Pre-deciding what actions to perform creates a link between a future situation and the intended action. People are thus more likely to initiate the pre-determined action once the specified situation is encountered (Brandstaetter, Lengfelder, & Gollwitzer, 2001; Gollwitzer & Brandstaetter, 1997). Furthermore, action plans do not only help getting started but they also control and direct effort thus helping to maintain the goal-directed actions (Frese, 2009; Frese & Zapf, 1994). By specifying the operational sequence of people's goal pursuit, action planning facilitates focusing the attention on the relevant activities and staying on track even when people get distracted; action plans thus increase people's persistence in their goal pursuit (Locke & Latham, 2002).

Hypothesis 2: The effect of entrepreneurial goals on entrepreneurial action is moderated by action planning. In case of high levels of action planning, there is a strong effect of entrepreneurial goals on entrepreneurial action. In case of low levels of action planning, the effect is weaker.

Apart from goals 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 schemata (Frese & Zapf, 1994). In the context of entrepreneurship, action knowledge comprises knowledge about relevant entrepreneurial actions. Furthermore, action knowledge comprises information about the relevant environment in which actions are performed. This information includes details about parameters and signals of the environment, the principles and causal processes involved, and information about anticipated outcomes and consequences of one's actions. Action knowledge influences the efficiency of people's goal-oriented behavior: the better and 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 venture should lead to more frequent and efficient actions in these areas.

Hypothesis 3: Action knowledge has a positive effect on entrepreneurial action.

We further investigate entrepreneurial self-efficacy as an antecedent of entrepreneurial action. In general, self-efficacy has been shown to have a strong impact on human action in general (Bandura, 1989; Stajkovic & Luthans, 1998). Self-efficacy is task specific and 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 should influence people's initial choice of activities, the goal level and commitment, and the amount of effort and persistence people are willing to invest in pursuing the entrepreneurial activities (Boyd & Vozikis, 1994; Gist & Mitchell, 1992). Believing 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 provided evidence for the positive effect of entrepreneurial self-efficacy on entrepreneurial action (De Clercq & Arenius, 2006; Rauch & Frese, 2007; Townsend et al., 2010).

Hypothesis 4: Entrepreneurial self-efficacy has a positive effect on entrepreneurial action.

Entrepreneurial Action as a Predictor of New Business Start-Up

Entrepreneurial actions lead to success in the first phase of entrepreneurship – starting a business (Baron, 2007a; Frese, 2009; McMullen & Shepherd, 2006). Creating a new business requires that the entrepreneur performs several start-up activities to assemble the necessary

resources and to develop viable structures (Gartner, 1985). The exact sequence of start-up activities is not determined (Lichtenstein et al., 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 et al., 1995; Kessler & Frank, 2009; Lichtenstein et al., 2006; Newbert, 2005). The US 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, employees), and fulfilling the legal requirements (e.g., obtaining licenses, registering). Performing these activities should help 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, should be more likely to successfully start a new business.

Hypothesis 5: Entrepreneurial action has a positive effect on starting a business.

Business Opportunity Identification as a Predictor of New Business Start-Up

In addition to entrepreneurial action, identifying a business opportunity is a prerequisite for starting a new business: “To have entrepreneurship, you must first have entrepreneurial opportunities” (Shane & Venkataraman, 2000, p. 220). A business opportunity can be defined as the discovery of new means-ends relationships to introduce a new product, service, raw material, or organizing method to the market (Shane & Venkataraman, 2000). It is important to note that not all business opportunities automatically lead to a new business; entrepreneurs have to take action to implement the opportunities (McMullen & Shepherd, 2006). As outlined above, the content and method of our training was designed to promote entrepreneurial self-efficacy, action knowledge, action planning, and entrepreneurial goals. Moreover, we included modules particularly focusing on the identification of business opportunities to take into account the importance of business opportunities for entrepreneurship (e.g., the modules “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 a smaller 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.

Although there is as yet not enough empirical evidence that opportunity identification is related to new venture creation (Ucbasaran, Westhead, & Wright, 2008), there are strong theoretical arguments for this relationship. Ucbasaran et al. (2008) have argued that identifying more opportunities should be related to identifying an opportunity which entrepreneurs consider to be sufficiently innovative for starting a new venture. 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, Kappelt, & Frese, in press; (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 should increase the likelihood of starting a business.

Hypothesis 6: The entrepreneurship training has a positive effect on (a) business opportunity identification and (b) business opportunity identification has a positive effect on starting a new business.

METHOD

Design

To evaluate the effectiveness of the training and to accumulate new knowledge about causal mechanisms in entrepreneurship, we conducted a randomized controlled field experiment comparing a treatment group with a non-treatment control group (waiting group). The treatment was the entrepreneurship training that consisted of 12 sessions over a period of 12 weeks. The sessions were delivered on a weekly basis and each session lasted three hours. To achieve a good economy of scale, the class size per course was approximately 50. We used a randomized controlled experiment – the “gold standard” in evaluation research (Reay, Berta, & Kohn, 2009) – assigning students randomly to the training group or to the control group. To take part in the training and to create a certain degree of commitment to participating throughout the training, the students had to pay a deposit of approximately 10 USD which was refunded at the end of the training if all modules were attended. To collect our data, we employed a pre-test/post-test design and conducted three measurements waves (T1, T2, and 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 pre-test/post-test design with a randomization of participants controls for problems of maturation, testing, history, and self-selection (Campbell, 1957). These are persistent problems that undermine the validity of much of the training research. Maturation means that participants develop naturally during the course of the time (in our case, in the 12 months during and after the training). Testing means that participants improve from the pre-test to the post-test because the pre-test was a learning experience that improves performance in the identical post-test. History means changes in the students from the pre-test to the post-test are due to historical changes and events (e.g., state of the economy of the country). Including a non-treatment control group controls for these effects because participants in this group experience the same maturation, the same history, and they also complete both measurements. Self-selection means that participants can choose whether or not they take part in the training which implies that students

with higher motivation may be more prevalent in the training group than in a non-equivalent control group. Randomization of participants controls for these effects because the participants in the training group are equivalent to those in the control group.

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., non-verbal signs of agreement). The interviewers should 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 inter-rater reliabilities ranging from $ICC = .88$ to $ICC = .97$.

Participants

The training was conducted at Makerere University (University A) and Uganda Christian University (University B). The trainers were lecturers from the two universities and from the Makerere University Business School and Kyambogo University (all universities are located in Kampala, Uganda). Each trainer was responsible for one module. All trainers had several years of experience in teaching undergraduates. The trainers were involved in the development of the modules.

Before the recruitment procedure of the students started, the deans of the faculties of the university A and B received a letter informing them about 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 which might also be useful in their job search. 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 entrepreneur. We explicitly told the students that they could also attend the training if they 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. From the remaining list, 203 students were randomly selected 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. 13 students from the control group did not participate 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 sample 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). Table 3 gives an overview of the characteristics of the training group and 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 that the two groups were equivalent.

At 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 the non-respondents 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 non-respondents of the training group differed significantly from the non-respondents of the control group (test for differential loss of participants across training and control group). There were no significant differences between the non-respondents from the training group and the non-respondents from the control group on any sample characteristic or dependent

measure at T1 indicating that the non-respondents 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 non-respondents from the training group with the non-respondents from the control group. The analyses revealed no statistical differences between the two groups indicating that there was no non-response bias. The reasons for non-response 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 et al. (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 (cf., Shane, 2000). T-tests showed that the two different scenarios did not lead to significant differences in the participants' responses at T1 and T2. Based on the scenario, we asked the students what their next steps would be if they decided to pursue the idea and once they stopped we asked whether they could think about anything else they would do to set-up and to start a business. 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 included 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” for this activity 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 the activity at all. The total score over all 35 activities formed the participants’ score of action knowledge. Inter-reliabilities between the two raters at T1 (ICC = .88) and T2 (ICC = .88) were good.

Entrepreneurial self-efficacy. We measured entrepreneurial self-efficacy at T1 and T2 using 12 questionnaire items. We used the items developed by Frese et al. (2007) on the basis of Bandura’s (1989) theoretical conceptions. We used the scale by Frese et al. (2007) because of its predictive validity in African settings (Frese et al., 2007). Self-efficacy is task specific and therefore, the 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 goals. We measured entrepreneurial goals at T1 and T2 using five questionnaire items. We developed the five items on the basis of Gollwitzer’s (1999) and Ajzen’s (1991) conceptualization of goal intentions. 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 to 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. We based our approach on measures by Frese et al. (Frese et al., 2007; Frese, van Gelderen, & Ombach, 2000) and Brandstaetter et al. (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 description of measurement of action knowledge). We applied the following rating procedure: For each start-up activity, participants received a score of “1” if they had a rough plan on 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. Inter-reliabilities 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 starting a new business (see Figure 1). 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 starting a new business, and the measure at T3 to investigate entrepreneurial action as an outcome of the action-regulatory factors of entrepreneurial self-efficacy, action knowledge, entrepreneurial

goals, 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 what they had done so far we asked once whether there was anything else they had done to get the business up and running. We then asked the same questions on whether they intended to start a business in the next 12 months. If the participants had already affirmed the question whether they were currently trying to start a business, we asked them whether they were intending to start an additional business in the next 12 months. Thus, we extended where applicable the question to a second potential start-up. We rated participants’ answers using the list of 35 start-up activities derived from the literature (see description of measurement of action knowledge). This list contains start-up activities the entrepreneurship literature identified as important to start a business (Davidsson & Honig, 2003; Reynolds, 2007). For each of the 35 start-up activities, the participants received a score of “1” if they had put effort into this activity. They received a score of “2” if their response showed that they had put much effort into this activity. They received a score 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. Inter-reliabilities 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 et al. (1997) and Ucbasaran et al. (2008) and asked three open questions “*How many opportunities for creating a business have you identified (“spotted”) within the last three 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 three months*”. In line with Ucbasaran et al. (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 et al. (in press) have provided evidence for the predictive validity of this measure for innovativeness of product/service innovations.

Business owner. We measured whether the participant was currently a business owner 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".

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 forwards and two times backwards) 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 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 asking whether the participants were currently employed or whether they had had any employment in the past (yes = 1, no = 0). Finally, 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 test whether 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. As we sampled students from two different universities, we tested whether the students from the two universities 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 goals (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.

Test of Hypotheses

The analyses of co-variance (ANCOVAs) with university as control examined the hypotheses regarding the effects of the training. We first tested whether the training had a positive effect on the action-regulatory factors of entrepreneurial self-efficacy (Hypothesis 1a), action knowledge (Hypothesis 1b), entrepreneurial goals (Hypothesis 1c), and action planning (Hypothesis 1d). The ANCOVAs showed significant group x time interactions for entrepreneurial self-efficacy ($F = 10.44$, $p < .01$, $\text{Eta}^2 = .03$), action knowledge ($F = 17.65$, $p < .01$, $\text{Eta}^2 = .05$), and action planning ($F = 5.53$, $p < .05$, $\text{Eta}^2 = .02$). Additionally, we found a marginally significant group x time interaction for entrepreneurial goals ($F = 2.88$, $p < .10$, $\text{Eta}^2 = .01$). The means (see Table 3) showed that the significant interactions were due to an increase of the dependent variables in the training group compared to the control group. Thus, Hypothesis 1a, 1b, and 1d were supported and Hypothesis 1c was marginally supported.

Next, we tested the hypothesized effects of the action-regulatory factors on entrepreneurial action. We tested whether action planning moderates the effect of entrepreneurial goals on entrepreneurial action (Hypothesis 2) and whether action knowledge (Hypothesis 3) and entrepreneurial self-efficacy (Hypothesis 4) have main effects on

entrepreneurial knowledge. We conducted linear regression analyses with entrepreneurial action at T3 as dependent variable (see Table 4). In the first model, we entered the control variables of university and entrepreneurial action at T2, in the second model we entered the main effects, and in the third model we entered the interaction term of the mean centered variables of entrepreneurial goals and action planning (Aiken & West, 1991). The results showed that entrepreneurial action at T2 had a significant effect on entrepreneurial action at T3 ($\beta = 0.26$; $p < .01$). Including the variables of action knowledge, entrepreneurial self-efficacy, entrepreneurial goals, and action planning in model 2 showed that action knowledge had a significant and positive effect on entrepreneurial action ($\beta = 0.13$; $p < .05$). This finding supports Hypothesis 3 which stated that action knowledge has a positive effect on entrepreneurial action. The other coefficients were not significant which means that Hypothesis 4 (entrepreneurial self-efficacy has a positive effect on entrepreneurial action) was not supported. In the final model, we included the interaction term of entrepreneurial goals and action planning. The coefficient was positive and significant ($\beta = 0.12$; $p < .05$). We followed Aiken and West (1991) to plot the interaction and calculated the values of entrepreneurial action for one standard deviation above and below the means of entrepreneurial goals and action planning. The plot in Figure 2 supported Hypothesis 2 that there is a positive effect of entrepreneurial goals on entrepreneurial action in case of high levels of action planning but not in case of low levels of action planning.

To test whether the four action-regulatory factors mediated the effect of the training on entrepreneurial action (Hypothesis 1e), we first tested whether the training had a significant effect on entrepreneurial action. The ANCOVA showed a significant group x time interaction when entrepreneurial action was the dependent variable ($F = 3.97$, $p < .05$, $\eta^2 = .01$). The means in Table 3 show that the training significantly increased entrepreneurial action in the training group compared to the control group. We used the bootstrapping approach (Preacher & Hayes, 2008) to test the hypotheses that action planning, entrepreneurial self-efficacy,

entrepreneurial goals, and action planning mediate the effect of the training on entrepreneurial action. The results showed a significant indirect effect of the training on entrepreneurial action through action knowledge (indirect effect: .11; lower level: .017, upper level: .262) but not through any other measure. Thus, Hypothesis 1e was supported for action knowledge but not for entrepreneurial self-efficacy. We conducted a moderated mediation analysis to test whether the training had a conditional indirect effect on entrepreneurial action through entrepreneurial goals dependent on action planning (Preacher, Rucker, & Hayes, 2007). This analysis is indicated by the significant interaction effect of entrepreneurial goals and action planning on entrepreneurial action. The results showed that the indirect effect was not significant for any value of action planning indicating that there was no conditional indirect effect of the training on entrepreneurial action through entrepreneurial goals.

Next, we tested whether the training had a positive effect on business opportunity identification (Hypothesis 6a). The ANCOVA showed a significant effect ($F = 7.70, p < .01, \text{Eta}^2 = .02$). The means in Table 3 show that the significant effect was due to an increase in the training group compared to the control group supporting Hypothesis 6a. To test the Hypotheses 5 and 6b that entrepreneurial action and business opportunity identification have positive effects on starting a business we conducted logistic regression analyses with being a business owner at T3 as dependent variable. We entered business owner at the time of the training (T2) as a control variable. This means that our analyses examine the start-up of new businesses. We also entered university as a control variable. We entered the variables of business opportunity identification at T2 and entrepreneurial action at T2 in the second model (see Table 5). The analyses showed that prior business ownership at T2 significantly predicted the likelihood of business ownership at T3 ($B = 1.44, p < .01$). Including business opportunity identification and entrepreneurial action in model 2 significantly increased the predictive value of the model (change in deviance: $\chi^2 = 15.00, p < .01$). The coefficients of business opportunity identification and entrepreneurial action were positive and significant (business

opportunity identification: $B = 0.35, p < .05$; entrepreneurial action: $B = 0.27, p < .01$). These findings provide support for Hypothesis 5 and 6b.

We tested whether the training had a significant effect on starting a new business. The ANCOVA showed a significant group x time interaction on being a business owner at T3 ($F = 14.72, p < .01, \text{Eta}^2 = .05$). The means (see Figure 3) showed that the increase from T1 to T3 in business owners was higher in the training group than in the control group. This finding suggests that the training is an effective intervention program to promote starting a new business. Compared to the control group, the training increased the likelihood of starting a business by 50% and compared to the initial status in the training group, the training increased the likelihood of starting a business by 219%. Finally, we tested whether entrepreneurial action and business opportunity identification mediated the effect of the training on starting a new business. For the mediation tests, we conducted bootstrapping analyses (Preacher & Hayes, 2008). The bootstrapping results showed that the training had significant indirect effects on starting a business through business opportunity identification (indirect effect: .12; lower level: .002, upper level: .280) and entrepreneurial action (indirect effect: .07; lower level: .001, upper level: .209) indicating that entrepreneurial action and business opportunity identification are mediators of the effect of the training on starting a new business.

DISCUSSION

The aim of the study was to investigate how an action-based entrepreneurship training transmits its effects on entrepreneurial action and start-up. We postulated that the training works through action-regulatory mechanisms and thus, action-regulatory mechanisms play an important role in the process leading to new venture creation. Specifically, based on action regulation theory (Frese, 2009; Frese & Zapf, 1994; Karoly, 1993), we hypothesized that the training affects the action-regulatory factors of entrepreneurial goals, action planning, action knowledge, and entrepreneurial self-efficacy. We further hypothesized that these action-regulatory factors influence entrepreneurial action. Entrepreneurial action, in turn, should

predict starting a new business. To test our hypotheses, 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. We trained students who were in the last year of their undergraduate studies and compared them to an equivalent group of students who did not receive the training. Our 12-month evaluation study showed that the training had a significant impact on new business start-ups: 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, we could also show that the training had significant effects on students' action knowledge, entrepreneurial self-efficacy, action planning, and to a smaller extent on entrepreneurial goals. Action knowledge and the interaction between entrepreneurial goals and action planning were significant predictors of entrepreneurial action. Action knowledge was also a significant mediator of the effect of the training on entrepreneurial action. Furthermore, our entrepreneurship training had positive effects on students' business opportunity identification and entrepreneurial action. These factors mediated the effect of the training on starting a new business. We think that our findings have several theoretical and practical implications.

Theoretical Implications

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 new venture creation. Our study shows that action-regulatory mechanisms contribute to our understanding of how and why action-based trainings have a positive effect on entrepreneurship. While several scholars have emphasized that entrepreneurship trainings should be action-based with a focus on action as part of the training content (Barr et al., 2009; Fiet, 2001a; Gorman et al., 1997; Honig, 2004; Oosterbeek et al., 2010; Rasmussen & Sorheim, 2006), the theoretical question of why and how such trainings exert an effect has not been investigated. We showed that action knowledge mediated the

effect of the training on entrepreneurial action. This suggests that the training worked through action knowledge and that action knowledge is a central factor that promotes initiating and maintaining entrepreneurial activity.

Furthermore, we found that the training increased entrepreneurial goals and action planning and the interaction between these two factors predicted entrepreneurial action. The fact that the interaction effect was significant and not the main effects extends current perspectives in the entrepreneurship literature that ascribe a central importance to goals (or intentions) in predicting behavior (e.g., Bird, 1988; Krueger, Reilly, & Carsrud, 2000). We found that entrepreneurial goals (“I intend to achieve X”) alone had only a weak effect on entrepreneurial action. This is in contrast to theories assuming that entrepreneurial goals are by themselves important predictors of entrepreneurial actions (Bird, 1988; Krueger et al., 2000). Instead, the significant interaction between entrepreneurial goals and action planning suggests that entrepreneurial goals must be complemented with action plans to lead to entrepreneurial actions.

Our findings also suggest that entrepreneurial goals in combination with action planning are two action-regulatory factors important for entrepreneurial action. 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. Effectuation means that entrepreneurs do not specify a goal and then look for the means they need to achieve the goal, but they start with the means available to them and then set out to test what effects they can create with those means. Similarly, Baker et al. (2005; 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. However, we do not think that action planning on the one hand and effectuation and bricolage on the other hand are two opposing approaches. In effectuation, entrepreneurs must have at least a rough idea of what they want to achieve with

their available means and combining resources to create an effect requires a certain degree of action planning 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. Thus, entrepreneurial goals and action planning have an important function for entrepreneurial action but the detailedness and timeframe may depend on contextual factors. Depending on the degree of uncertainty and contingencies, a more flexible and opportunistic approach towards planning following the principles of effectuation or bricolage may be more beneficial for entrepreneurial action and successful start-up (Baker & Nelson, 2005; Frese et al., 2000; Rauch, Frese, & Sonnentag, 2000; Sarasvathy, 2001).

Our finding that entrepreneurial action was a significant predictor of the likelihood of starting a new business supports theoretical frameworks that ascribe central importance to action in entrepreneurship (McMullen & Shepherd, 2006). Starting a new business requires a multitude of preparatory steps to acquire the resources to establish a business structure and operational procedures. These steps have to be initiated and accomplished by the entrepreneur. Furthermore, our results show that students who identify more business opportunities are more likely to start a new business. This finding supports theoretical notions that identifying business opportunities is an essential part of entrepreneurship (Shane & Venkataraman, 2000). This finding also suggests that having a pool of several business opportunities available is beneficial for starting a new business. Not all business opportunities that people identify may prompt them to engage in entrepreneurial activity. McMullen and Shepherd (2006) suggested that each business opportunity elicits an internal response in people and in case the internal response is strong enough people will start exploiting the opportunity. Our finding indicates that identifying more business opportunities should increase the likelihood that there is at least one opportunity which is above the internal

threshold for opportunity exploitation and which represents a favorable starting point for creating a new business.

Finally, we think that the context of our study also contributes to the entrepreneurship literature. We purposely conducted our study in a developing country. Entrepreneurship may play a more important role for economic development and wealth creation in developing countries than in more developed countries (Mead & Liedholm, 1998). Developing countries, which are characterized by fewer medium and large companies, need to establish a sound basis of small enterprises to create a sufficient number of job opportunities and to boost the economic development (Nelson & Johnson, 1997). People who live in developing countries form the majority of the world (Arnett, 2008). Scholars noted that entrepreneurship research has so far almost exclusively focused on North America and Europe (Bruton, Ahlstrom, & Obloj, 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 among the key points on many policy agendas in both, developing and developed countries (Nelson & Johnson, 1997; Nkirina, 2010). This is not surprising given the positive effects of entrepreneurship on economic growth and wealth creation. 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 initiated a multitude of regulatory reforms and increased entrepreneurship education offerings to promote entrepreneurship; but the question is which of these interventions are really effective? We evaluated our entrepreneurship training over a period of 12 months and provided evidence that the training is effective in promoting entrepreneurship. Our analyses revealed that the training produced more entrepreneurs. The training put a particular focus on action. Our training method based on action regulation theory (Frese &

Zapf, 1994) was particularly helpful in changing students' behavior and in prompting them to become entrepreneurs after the training course. During the training, the students got to know the financial and social conditions of the real business world and they experienced that they can become successful agents in this world. The 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-oriented entrepreneurship trainings may provide the necessary skills and knowledge to start an own business and to pursue the career option of an entrepreneur.

It is important to note, however, that action-oriented 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 course requesting students to go back and forth in the entrepreneurial process to start a real business; starting a new venture is an idiosyncratic process which requires flexibility and it may thus 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 who are about to finish their studies.

Our study has also practical implications for future studies evaluating the effectiveness of entrepreneurship trainings. Entrepreneurial goals alone may have a positive effect on action; however this effect is not so strong. In line with an action regulation theory of entrepreneurship (Frese, 2009), we found that entrepreneurial goals are necessary but not sufficient predictors of action; only when entrepreneurs specify what they will do and how they will do it, do entrepreneurial goals instigate actions. This finding implies that intervention programs focusing only on increasing the strength of entrepreneurial goals/intentions without increasing the level of action planning do not have a positive impact on entrepreneurship as strong as intervention programs focusing on entrepreneurial goals *and* action planning together.

Strengths, Limitations, and Implications for Future Research

We note that the context of our study might be a potential limitation. We conducted our study in Uganda which is among the top countries in entrepreneurial activity (Walter et al., 2005) and which is a poor developing country ranking 193rd in gross national income (460 USD per capita) (The World Bank, 2010). An important question is whether our findings are generalizable. The higher propensity in Uganda to engage in entrepreneurial activity may facilitate students to start a real venture. Students in Uganda should be more inclined to engage in entrepreneurial activity than in other parts of the world. In fact, we observed during the training that the students quickly responded to our request to engage in real entrepreneurial activities outside the classroom. However, research showed that in other settings students also have a positive attitude towards becoming involved in the start-up process of a real business during a training course (Barr et al., 2009; Oosterbeek et al., 2010; Rasmussen & Sorheim, 2006). This suggests that the general concept of the training should be applicable in different contexts.

We would also like to 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 than in cultures with low uncertainty-avoidance (Rauch et al., 2000). Also, in countries with a highly regulatory business environment (e.g., Singapore) action knowledge 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 also note that there might be dynamic relationships between the action-regulatory factors (Lord, Diefendorff, Schmidt, & Hall, 2010). For example, action knowledge may lead to 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 US or Europe, to determine the effectiveness of intervention programs. We also note that all students applied for the training which means that they have been generally interested in entrepreneurship. This might contribute to the fast implementation of new businesses. Furthermore, it might be possible that our training is particularly effective in combination with students who are inclined towards entrepreneurship. Although discussions with the students revealed that some students did not consider entrepreneurship to be an option for their career, it is important to replicate our study with students of a more general population. With regard to our student sample, we would also like to note that students, who are involved in the process of creating a new venture, fall in the group of nascent entrepreneurs (Reynolds et al., 2005). This means that our theoretical model and hypotheses should hold for undergraduates as well as for nascent entrepreneurs in general.

It is important to also consider some measurement issues. Our measure of entrepreneurial goals may be cleaner than some other measures of goals or intentions and thus it may be more conservative. Some measures of goals or 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 the action planning, because action planning may convince somebody that it is indeed, highly probable that one will start a business.

With regard to our findings, we also note that the effects of the training may have been partly caused by heightened attention or increased expectations towards the trainees by the trainers (cf., 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, the means of the training group and the control group (Table 3) indicate 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). A general objective of entrepreneurship education is 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 (e.g., shopkeepers or small crafts) 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 necessity-motivated (van Stel, Storey, & Thurik, 2007). Similarly, higher education has a positive effect on transforming informal businesses into formal ones

(Sonobe, Akoten, & Otsuka, 2011). Thus, increasing the number of start-ups among undergraduates should promote entrepreneurship which creates economic and social value.

We consider the design of the evaluation to be a strength of our study. We employed a longitudinal design with a randomized control group examining the participants before the training and two times after the training. The design allowed us to make causal conclusions regarding the effectiveness 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 of the methodological problems of previous research evaluating entrepreneurship education, such as lack of basic controls in the form of pre-post-testing, lack of longitudinal designs, lack of randomized control groups to compare the intervention to a non-treatment control group, or an over-reliance 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, Harhoff, & Weber, 2010).

Conclusion

Our study tested hypotheses on the importance of action-regulatory factors in entrepreneurship and entrepreneurship trainings. Our study showed that action-regulatory mechanisms are of central importance in entrepreneurship and they help to explain why and how action-based entrepreneurship trainings have a positive impact on entrepreneurship. Promoting entrepreneurship is possible if it takes into consideration action-regulatory mechanisms important for entrepreneurial action.

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Figure 1. The theoretical model with the hypothesized effects of the entrepreneurship training on entrepreneurship (waves of measurement in parentheses).

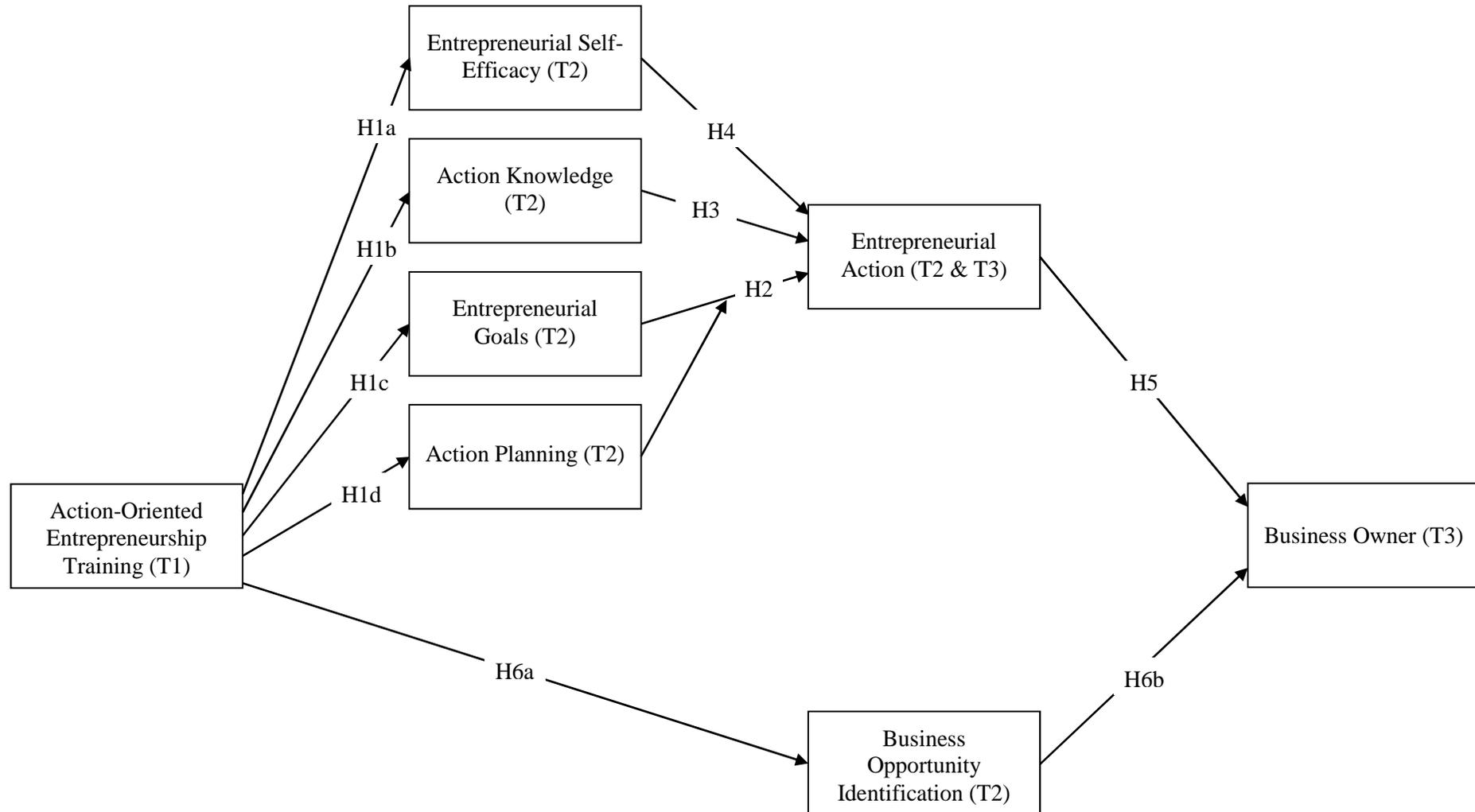


Figure 2. The moderating effect of action planning on the effect of entrepreneurial goals on entrepreneurial action at T3.

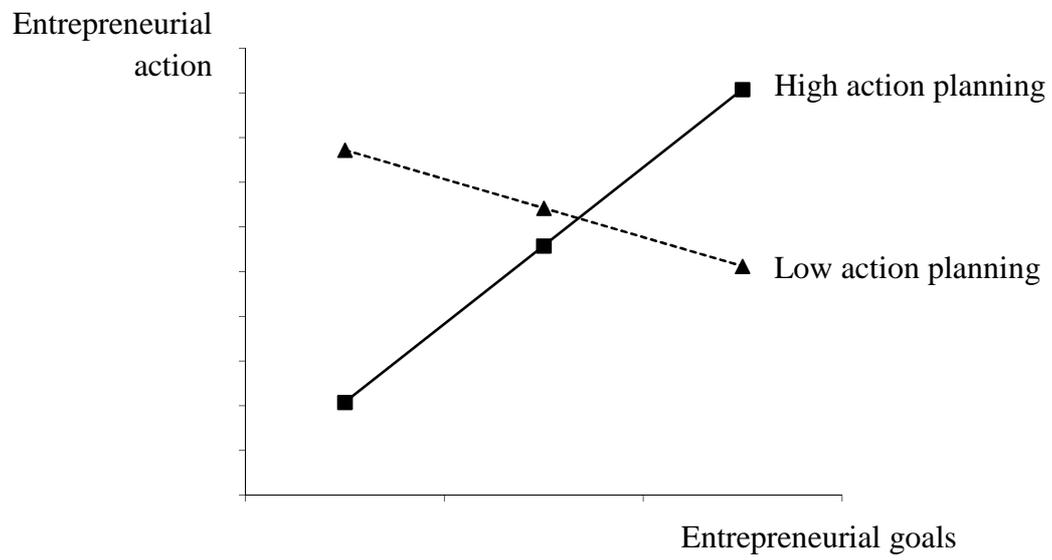


Figure 3. Number of business owners in the training and control group before and after the action-oriented entrepreneurship training.

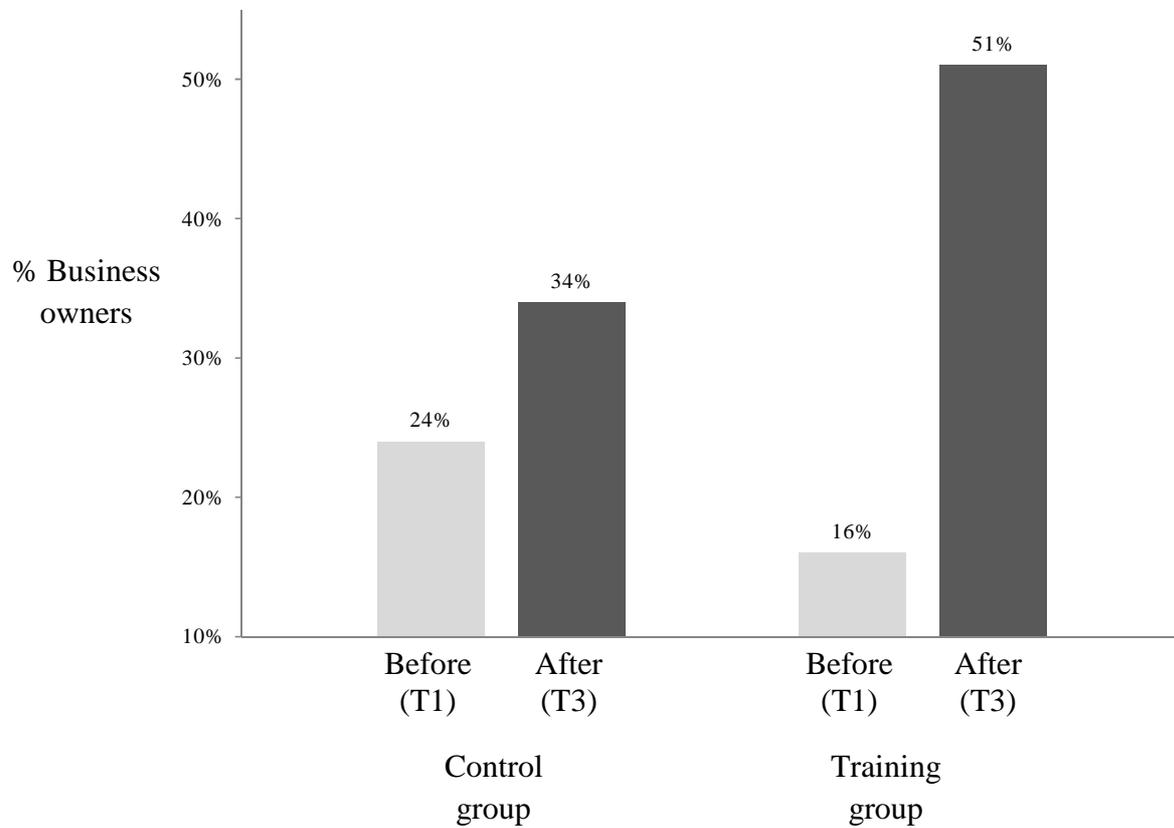


Table 1. Overview of the training modules, samples of action principles, and samples of scientific literature on which the action principles are based.

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 	<ul style="list-style-type: none"> • Think outside the box! • Use your personal strengths! • Evaluate your business opportunities! 	<ul style="list-style-type: none"> • Ardichvili et al. (2003) • Shane (2000) • Ward (2004)
Marketing	<ul style="list-style-type: none"> • 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"> • Analyze market and consumer behavior! • Use the marketing mix! • Care for your customers! 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Develop a vision for your business! • Make a strategic analysis of your environment! • Understand you 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"> • Developing plans: when, where, and how to perform • Operations and Development Plan 	<ul style="list-style-type: none"> • Set yourself SMART goals! • Make action plans! • Prepare a development plan! 	<ul style="list-style-type: none"> • Frese et al. (2007) • Gollwitzer (1999) • Locke & Latham (1990)
Financial management	<ul style="list-style-type: none"> • Working capital • Management of Debtors, Payables, and Stock • Cash flow and Budgeting 	<ul style="list-style-type: none"> • Manage your debtors! • Manage your creditors! • Manage your cash! 	<ul style="list-style-type: none"> • Bhattacharya (2001) • Padachi (2006) • Smith & Bertozzi (1998)
Persuasion and negotiation	<ul style="list-style-type: none"> • Persuasion and negotiation techniques 	<ul style="list-style-type: none"> • Win the minds and hearts! • Read the other to adapt your persuasion tactics! • Use bargaining tactics & avoid being a victim of them! 	<ul style="list-style-type: none"> • Fisher, Ury, & Patton (1991) • Malhotra & Bazerman (2008) • Petty, Cacioppo, Strathman, & Priester (1994)

Table 1. *continued.*

Acquiring starting capital	<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)
Networking	<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"> • Adler & Kwon (2002) • Hoang & Antoncic (2003) • Zhao et al. (2010)
Accounting	<ul style="list-style-type: none"> • Cash book, Debtors book, and Creditors book • Income and Expenditure • Profit and Loss • Savings • Balance sheet • Costing 	<ul style="list-style-type: none"> • Keep four separate key books! • Compute product price! • Compute profit or loss! 	<ul style="list-style-type: none"> • Nzomo (2002) • Saleemi (1991) • Wood & Sangster (2009)
Personal initiative	<ul style="list-style-type: none"> • Self-starting, proactive, and persistent behavior • Monitoring and Emotion management 	<ul style="list-style-type: none"> • Be self-starting! • Be pro-active! • Take control and responsibility! 	<ul style="list-style-type: none"> • Frese & Fay (2001) • Frese et al. (1997) • Karoly (1993)
Business plan	<ul style="list-style-type: none"> • Characteristics of a good business plan 	<p><i>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.</i></p>	<ul style="list-style-type: none"> • Bygrave & Zacharakis (2008) • Hisrich et al. (2005) • Honig (2004)
Legal and regulatory issues	<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-Ocoro (2008) • Bakibinga (2001) • Hoerber et al. (1982)

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
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. Entrepreneurial self-efficacy	T1	7.83	1.19	.02	.00	-.01								
5. Entrepreneurial self-efficacy	T2	8.09	1.13	.21**	.00	.05	.62**							
6. Entrepreneurial goals	T1	4.17	0.76	.01	-.03	.06	.38**	.20**						
7. Entrepreneurial goals	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. Entrepreneurial action	T1	1.04	1.22	.02	.23**	.06	.16**	.10	.15**	.00	.33**	.09	.27**	.13*
13. Entrepreneurial action	T2	1.30	1.42	.14**	.12*	.22**	.09	.13*	.10	.05	.04	.32**	.21**	.17**
14. Entrepreneurial action	T3	2.05	1.70	.12*	.11*	.17**	.09	.11	.11	.04	.05	.07	.16**	-.01
15. Business owner	T1	0.20	0.40	-.06	.01	-.02	.03	.05	.02	-.01	-.14**	-.06	.22**	.12*
16. Business owner	T2	0.24	0.43	-.07	.05	-.01	.09	.10	.08	.05	-.05	-.08	.16**	.18**
17. Business owner	T3	0.43	0.50	.18**	.07	-.02	.04	.12*	-.03	-.01	.00	.06	.19**	.21**
18. Age	T1	24.60	4.15	-.02	-.10*	-.06	-.01	-.08	.04	.06	.01	-.08	.13**	.08
19. Gender (0=female, 1=male)	T1	0.60	0.49	.03	-.02	.08	.07	.01	.10	.03	.01	.09	.19**	.09
20. Cognitive ability	T1	2.92	0.89	.01	.08	-.05	.04	-.04	.06	-.06	.00	-.12*	-.03	-.14**
21. University (0=Mak, 1=UCU)	T1	0.28	0.45	-.09	.18**	-.12*	.01	-.01	.07	-.02	.11*	-.06	.02	.04
22. Relatives in business ^a	T1	0.54	0.50	.00	.06	.07	.06	.02	.02	.03	-.03	-.09	.17**	.02
23. Business courses taken ^a	T1	0.11	0.31	-.01	.02	.00	.10	.04	.06	.05	.06	.03	.06	.03
24. Entrepreneurial experience ^a	T1	0.53	0.50	.03	.07	.05	.07	.09	.09	.01	-.07	.03	.26**	.12*
25. Employment experience ^a	T1	0.53	0.50	-.03	.05	-.02	.01	-.05	.06	.01	.01	.02	.10*	.04

Note: 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.

Table 2. *continued.*

Variable	Time	12	13	14	15	16	17	18	19	20	21	22	23	24
13. Entrepreneurial action	T2	.27**												
14. Entrepreneurial action	T3	.07	.26**											
15. Business owner	T1	.06	.09	.06										
16. Business owner	T2	.01	.06	.09	.44**									
17. Business owner	T3	.17**	.20**	.05	.15*	.29**								
18. Age	T1	.01	-.04	-.02	.14**	.19**	.10							
19. Gender (0=female, 1=male)	T1	.07	.07	.10	.04	.02	.11	.19**						
20. Cognitive ability	T1	.01	.02	.03	.01	.01	-.09	-.09	-.03					
21. University (0=Mak, 1=UCU)	T1	.11*	.04	.03	-.02	.03	.02	.07	.06	-.20**				
22. Relatives in business ^a	T1	.09	.01	.09	.17**	.19**	.16**	-.08	-.02	-.02	.03			
23. Business courses taken ^a	T1	.14**	.00	.02	.14**	.13**	.08	.00	-.03	.05	-.06	.11*		
24. Entrepreneurial experience ^a	T1	.21**	.11*	.11	.47**	.37**	.21**	.15**	.11*	-.03	.03	.14**	.07	
25. Employment experience ^a	T1	.08	.02	.04	.12*	.14**	.00	.21**	-.01	.11*	-.12*	.13**	.07	.12**

Note: 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.

Table 3. Results of the ANCOVAs testing the effect of the training on entrepreneurship at T2 and T3 (holding university constant).

Measure			Before Training		After Training		df	F	p	Effect Size		
			N	M	SD	M				SD	Inter-action effect Eta ²	Group effect after training d
Effect of the training at T2												
Action knowledge	T1-T2	TG	184	2.86	1.56	4.45	2.05	1	17.65	< .01	.05	0.61
		CG	153	2.88	1.67	3.38	1.42					
Entrepreneurial self-efficacy	T1-T2	TG	178	7.87	1.24	8.29	1.09	1	10.44	< .01	.03	0.44
		CG	118	7.79	1.13	7.82	1.05					
Entrepreneurial goals	T1-T2	TG	178	4.19	0.73	4.26	0.61	1	2.88	< .10	.01	0.31
		CG	118	4.17	0.78	4.07	0.63					
Action planning	T1-T2	TG	184	2.45	1.54	3.39	1.80	1	5.53	< .05	.02	0.47
		CG	153	2.24	1.51	2.61	1.50					
Business opportunity identification	T1-T2	TG	184	1.65	0.76	1.78	0.83	1	7.70	< .01	.02	0.42
		CG	153	1.60	0.84	1.46	0.70					
Entrepreneurial actions	T1-T2	TG	184	1.07	1.30	1.48	1.53	1	3.97	< .05	.01	0.28
		CG	153	1.03	1.08	1.09	1.25					
Effect of the training at T3												
Business owner	T1-T3	TG	162	0.16	0.37	0.51	0.50	1	14.72	< .01	.05	0.35
		CG	142	0.24	0.43	0.34	0.47					

Note: TG = Training group, CG = Control group; Effect size d was calculated with the formula $d = M_{TG} - M_{CG} / \sqrt{[(SD_{TG}^2 + SD_{CG}^2) / 2]}$ using means and standard deviations after the training.

Table 4. Linear regression analyses testing action knowledge, entrepreneurial self-efficacy, entrepreneurial goals, and action planning as predictors of entrepreneurial action.

	Entrepreneurial action at T3								
	Model 1			Model 2			Model 3		
	Unstandardized Coefficient	SE	β	Unstandardized Coefficient	SE	β	Unstandardized Coefficient	SE	β
Intercept	1.65	0.14		0.19	0.86		0.14	0.86	
University	0.20	0.26	0.04	0.25	0.26	0.05	0.21	0.26	
Entrepreneurial action at T2	0.31**	0.07	0.26	0.30**	0.07	0.24	0.32**	0.07	0.26
Action knowledge				0.12*	0.06	0.13	0.12*	0.06	0.13
Entrepreneurial self-efficacy				0.12	0.10	0.08	0.12	0.10	0.08
Entrepreneurial goals				0.04	0.19	0.01	0.05	0.19	0.02
Action planning				-0.07	0.07	-0.06	-0.07	0.07	-0.07
Entrepreneurial goals x Action planning							0.18*	0.09	0.12
R ²	.07			.09			.11		
F	10.33			4.73			4.66		

Note: * $p < .05$; ** $p < .01$.

Table 5. Logistic regression analyses testing business opportunity identification and entrepreneurial action as predictors of starting a business.

	Business Owner at T3			
	Model 1		Model 2	
	Unstandardized Coefficient	SE	Unstandardized Coefficient	SE
Intercept	-0.64	0.15	-1.54	0.33
University	0.22	0.32	0.20	0.33
Business owner at T2	1.45**	0.30	1.32**	0.31
Business opportunity identification at T2			0.35*	0.17
Entrepreneurial action at T2			0.27**	0.09
Nagelkerke's R ²	0.23		0.34	
Hit rate	66%		69%	
Deviance	367.33		352.33	
Change in Deviance (χ^2)	25.75		15.00	

Note: * p < .05; ** p < .01.