

Self-Regulation and Entrepreneurial Learning

Alexander Fust

Dr. research associate
Research Institute of Small Business and Entrepreneurship
University of St. Gallen
Dufourstrasse 40a
9000 St. Gallen
Switzerland
Tel: +41 71 224 71 44
Fax: +41 71 224 71 01
e-mail: alexander.fust@unisg.ch
www.kmu.unisg.ch

Tobias Jenert

Dr., research associate
Institute of Business Education and Educational Management
University of St. Gallen

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Abstract

Research on entrepreneurial learning often stresses the role of experience and previous knowledge. We aim to advance this perspective by pointing out the prerequisites and limitations of experience-based forms of learning and by adapting findings from educational psychology to the entrepreneurial context. Developing a model of self-regulated entrepreneurial learning (SREL) we pursue a more process oriented view of entrepreneurial learning in order to explain how learning unfolds in contexts of uncertainty and novelty when relevant experience and knowledge are scarce. The model comprises a planning, a performance and a review phase in order to support entrepreneurs in their learning process. It is suggested how SREL is related to self-efficacy, emotions and cognitive biases.

Aim of the Paper

Entrepreneurial learning research about opportunity recognition and exploitation has primarily focused on experiential learning (Corbett, 2005, 2007; Kolb, 1984), the role of prior knowledge (e.g. Dimov, 2007) and, more recently, the role of metacognition and cognitive adaptability (Haynie & Shepherd, 2009). Despite these efforts and the importance of entrepreneurial learning we still lack knowledge about how entrepreneurs develop their learning skills and adapt their learning process to achieve appropriate learning results in unfamiliar situations. For example, reasons and statements of why novice entrepreneurs with low prior experience are more successful than others are scarce (Haynie, Shepherd, & Patzelt, 2012). One explanation is that experience might reduce necessary adaption which is intensified in contexts of high uncertainty where experience might be less important. Yet, we still lack more elaborate insights on which learning skills entrepreneurs need when facing new situations and how they can advance such skills systematically.

We aim to address the applicability of concepts of self-regulation to the context of entrepreneurship theory in order to advance our scholarly understanding of learning processes of entrepreneurs dealing with new situations. To this end we are referring to extant research in educational psychology studying how individuals regulate cognitive and metacognitive processes in order to achieve valuable learning outcomes.

We contribute to entrepreneurial learning research by reviewing the literature on self-regulated learning in order to identify challenges and limitations of prevalent concepts of entrepreneurial learning. Additionally, we advance scholarly understanding of learning processes in the context of unexpected events and discontinuous changes, where experience cannot be referred to or might even inhibit effective learning.

Background Literature

Up to now the roles of experience and prior knowledge have been thoroughly investigated in entrepreneurial learning research. Such experience-oriented forms of learning have been conceptualized as “trial-and-error” (e.g. Hsieh, Nickerson, & Zenger, 2007), “learning by doing” (Holcomb, Ireland, Holmes Jr., & Hitt, 2009), or “experiential learning” (e.g. Politis, 2005). The first two concepts put strong emphasis on learning from immediate effects of entrepreneurial action (e.g. venture failure). Experiential learning, which can possibly be regarded the most influential concept for modelling entrepreneurial learning, puts a stronger focus on the alteration between concrete action and conceptual abstraction through reflection. Experiential learning theory (ELT) models learning as a cyclic process with four stages which is shown in figure 1: (1) concrete experience (i.e. entrepreneurial action) which is transformed through (2) reflective observation into (3) abstract conceptualization. Abstract concepts or, in other words, mental models are then re-applied through (4) active experimentation which in turn leads to concrete experience (Kolb & Fry, 1975; Kolb, 1984; Schön, 1983, 1992).

Insert Figure 1 here

Potential limitations of the experiential learning approach

Despite its many assets such as its uncontested descriptive power, ELT also has some limitations concerning the context of entrepreneurial learning. We have identified five limitations which we will discuss in the following section: situation novelty, the ability to critically reflect, cognitive biases, metacognition and a lack of empirical investigation of the learning process.

First, entrepreneurial learning frequently occurs in unprecedented situations involving high degrees of novelty and uncertainty. There established theories or action strategies are not available. This high degree of

uncertainty is caused by the fact that novelty is inevitably linked to unpredictable future outcomes (Amabile, 1997; McMullen & Shepherd, 2006; Mises, 1949; Smith & Di Gregorio, 2002). The entrepreneur has to rely on prior knowledge, experience and established mental models or heuristics, which however, can be misleading in these novel contexts. On the one hand, experienced entrepreneurs might miss necessary strategy adaptation when choosing actions that are closely related to past ones. Thus, learning outcomes of experienced entrepreneurs may be impaired due to path dependency and lock-in effects. Minniti and Bygrave (2001) argue that successful entrepreneurs tend to choose actions that they have applied before. However, this choice might be detrimental when circumstances change. Entrepreneurs facing high uncertainty and environmental dynamism are forced to develop and adapt strategies to respond effectively to new information and feedback from the environment (Haynie et al., 2012; Shepherd, McMullen, & Jennings, 2007). This adaption can positively influence the success of entrepreneurial tasks (Haynie, Shepherd, Mosakowski, & Earley, 2010; Haynie & Shepherd, 2009; Shepherd et al., 2007). In these cases, referring to experience and established mental models that go with it may lead to erroneous conclusions due to mental fixations (Garud, Kumaraswamy, & Karnøe, 2010; Ucbasaran, Westhead, & Wright, 2011). In contrast, novice entrepreneurs often lack mental models to easily assimilate new information or connect distributed pieces of information in order to detect meaningful patterns which experienced entrepreneurs easily recognize (see Baron & Ensley, 2006; Ucbasaran, Westhead, & Wright, 2009). In turn, this means that for novice entrepreneurs with little experience experiential learning may lead to ineffective or even erroneous learning outcomes. However, this does not explain why some novice entrepreneurs with low prior experience are more successful than others (Haynie et al., 2012). Therefore, ELT has limited explanatory power regarding the question how novice and serial entrepreneurs with limited relevant knowledge and little experience in relevant contexts shape their learning processes.

Second, critical reflection is a core activity of ELT, necessary for linking the different stages of the experiential learning cycle. For example, in order to generate abstract concepts from concrete experience, the learner has to step back and think critically about his or her own actions as well as its consequences that have resulted from it (Schön, 1983). This reflective observation of concrete experience (reflecting) yields to abstract concepts (generalizing) which can be used for similar future learning situations by active experimentation (applying) (Kolb, 1984). Generating valuable insights from past experience requires a conscious detachment both cognitively and emotionally from one's own actions. What has been done and what has (not) been achieved has to be evaluated critically and objectively in order to yield learning results. However, critical reflection is very demanding and not all individuals are equally able or willing to reflect critically about themselves. Especially when it comes to experiences with a high degree of personal involvement, it is often hard for people to step back and objectively reflect on their actions. Research on people's capacity to reflect has shown that irrespective of age, people exhibit very different capacities to critically reflect (King & Kitchener, 2004; King, 2000; Kitchener, King, & De Luca, 2006). Therefore, critical reflection can be regarded as a skill which (a) not everybody possesses to the same degree but (b) which can be developed (Mezirow, 1998). Considering that critical reflection is at the centre of ELT, the question what factors influence an entrepreneur's reflective skills (i. e. capabilities as well as willingness to reflect) is of high importance for entrepreneurial learning research. Scholars have investigated what triggers reflection processes and what kinds of reflection lead to effective learning. Ucbasaran et al. (2011) show that entrepreneurs learn from venture failure in very different ways. They found that serial entrepreneurs tend to (sometimes deliberately) avoid reflecting upon failure. Those findings are interesting as they illustrate how (a) reflection is of importance for entrepreneurial learning and that (b) often, entrepreneurs do not reflect sufficiently in order to learn from experience.

Third, having stated that entrepreneurs do not always reflect sufficiently on their experience, we want to discuss the reasons for this behaviour. In this regard, research has shown that entrepreneurs exhibit stronger cognitive biases than other individuals (compared to non-entrepreneurs e.g. Busenitz & Barney, 1997; or to non-founders e.g. Forbes, 2005). These biases can positively influence new venture foundation, e.g. due to lowered risk perception and higher confidence in one's chances of success (Simon, Houghton, & Aquino, 2000; Trevelyan, 2008). Yet, such biases can also have negative effects especially in entrepreneurial decision making potentially leading to venture failure due to ventures' limited resources (e.g. Baron, 2004). Those detrimental effects become especially prevalent when regarded from a learning and reflection perspective. To illustrate our point, we exemplarily discuss scholarly findings on three cognitive biases and relate them to entrepreneurial learning processes: overconfidence bias, illusion of control and the belief in the law of small numbers. First, overconfidence bias either refers to optimistic overconfidence such as the belief desired outcomes to occur more frequently than in reality or the misperception of the limits of one's own knowledge (Griffin & Varey, 1996; Oskamp, 1965; Russo & Schoemaker, 1992). Cassar (2010) shows that entrepreneurs overestimate their ventures' turnover assessing their business situation too optimistically. In addition, entrepreneurs are said to continue unsuccessful development efforts for longer time periods than established firms because of their overoptimism (Lowe & Ziedonis, 2006). Additionally, overconfidence reduces the effort to reassess and revise one's actions and thus, hinders reflection and learning (Frese, 2007). Therefore, entrepreneurs tend to ignore new

information that contradicts their initial assumptions. They are unable to identify inaccurate estimates and they believe certain actions to be less risky than they actually are (De Carolis & Saporito, 2006). In addition, it can be detrimental to stick to paths which have been successful in the past especially in contexts of radical environmental changes (Audia, Locke, & Smith, 2000). Furthermore, entrepreneurs overestimating their own abilities could be tempted to resign to use other resources (Hayward, Forster, Sarasvathy, & Fredrickson, 2010). Thus, overconfidence bias (a) hinders effective learning as it prevents critical reflection and (b) it can lead to detrimental entrepreneurial outcomes (e.g. in times of environmental change). Second, illusion of control occurs when individuals overestimate their own influence on situations where their ability has only little impact (Langer, 1975). It can lower the decision quality (Carr & Blettner, 2010) or the perception of risk (Simon et al., 2000). Therefore, entrepreneurs overestimate their influential potential which can have a negative effect on the achievement of desired outcomes as well as on the perceived necessity to reflect. Entrepreneurs overestimating their impact on situations disregard that learning and reflecting is required to solve current and similar future challenges. Finally, the law of small numbers refers to the belief in a small sample of individuals to be representative for decision making (Keh, Foo, & Lim, 2002; Tversky & Kahneman, 1971). Simon et al. (2000) find that the belief in the law of small numbers causes lower risk perception, potentially leading to disadvantageous decision-making and hinders the achievement of planned entrepreneurial outcomes. To conclude, beyond positive effects, cognitive biases can lead to reduced reflection and effective learning (e.g. from past failure) and it may be detrimental to make accurate future entrepreneurial decisions. Contributing to these results, Parker (2009) finds that entrepreneurs tend to attribute poor sales to bad luck and performance to their own abilities. Parker (2006) adds that entrepreneurs frequently fail to adjust their beliefs despite the availability of new information. Thus, learning is inhibited as entrepreneurs might be trapped by contexts of familiarity concentrating on existing knowledge rather than reflecting on the actions and decision-making in unknown situations to develop a potential to improve. Especially contexts of change require entrepreneurial reflection and learning. For example, firm expansion or the need to navigate the firm in times of high dynamism and change demands learning processes and corresponding actions to solve occurrent challenges (e.g. Busenitz & Arthurs, 2007; Trevelyan, 2008). There is a need to revise entrepreneurial assumptions as market conditions change (Trevelyan, 2008). The development of more effective task strategies to overcome cognitive biases can be achieved by reflection techniques such as counterfactual thinking (Baron, 2004). This technique refers to the mental experimentation about potential past outcomes (e.g. what might have been) (Baron, 2000a). However, Baron (2000b) shows that entrepreneurs use less counterfactual thinking than other individuals. This even increases the importance to support entrepreneurs in their learning and reflection processes. Thus, entrepreneurial characteristics can stimulate entrepreneurial action but they can also have negative effects on reflection and learning processes as well as on desired outcomes. Cognitive biases help entrepreneurs to ignore information that might hamper their venture-related efforts. At the same time, however, research indicates that entrepreneurs' biased perception also hinders reflection about past processes and outcomes as well as the reflection about the use of effective learning strategies. Learning can be improved by reflecting on the regulation of cognitive biases in order to achieve desired outcomes or by considering how detrimental effects of cognitive biases on the learning process itself can be mitigated and controlled.

Fourth, the issue of advancing one's personal learning capabilities through metacognition is not tackled by experiential learning theory. Experiential learning involves the reflection on past experience and its use for future situations (Kolb, 1984). However, it does not address critical reflection, control and monitoring of learning processes themselves and the development of personal learning capabilities. The latter requires metacognition which involves the ability to monitor, control, reflect and understand one's learning (Flavell, 1979; Schraw & Sperling Dennison, 1994) or in other words the cognition about cognition (Flavell, 1979). It encompasses the capability to distance oneself emotionally from one's own actions in order to evaluate and monitor the performance of learning processes as unbiased as possible. This higher-order learning is more abstract than cognition. It involves knowledge about cognition such as knowledge about learning strategies, how to use them, when and why to use them, as well as the regulation of this knowledge (Brown, 1987; Flavell, 1979; Jacobs & Paris, 1987; Schraw & Sperling Dennison, 1994). Individuals' metacognitive abilities vary (Allen & Armour-Thomas, 1993). Haynie et al. (2010) found that entrepreneurially inexperienced students characterized by certain metacognitive abilities were more successful in entrepreneurial decision making than other students lacking these abilities. Furthermore, Haynie and Shepherd (2009) outline that metacognition plays a role in entrepreneurial contexts of changing environments. To conclude, although not addressed by experiential learning theory, metacognition is important in entrepreneurial processes in order to advance individual entrepreneurial learning capabilities.

Finally, there is a considerable body of empirical research on entrepreneurial learning. Many studies focus on entrepreneurs' learning-related capabilities, e.g. cognitive and social resources. Concerning the learning process, however, far less empirical evidence is available. Experiential Learning Theory has been translated into

the often-used and modified learning styles inventory (LSI) (Corbett, 2007; Dimov, 2007). While the LSI has been developed on the basis of a process theory of learning (i.e. the experiential learning cycle), the instrument itself does not focus on the learning process but rather on the learner's preferred learning style (Mainemelis, Boyatzis, & Kolb, 2002). In other words, this survey tests which aspects of the model of learning processes best suit the individual learner's characteristics. Furthermore, entrepreneurial learning has primarily been conceptualized as a process of generating knowledge by reflecting on experience (Cope, 2011; Corbett, 2007; Kolb, 1984). As a consequence, scholarly understanding of entrepreneurial learning can be increased by a focus on the learning process itself. Theorists have worked within this framework, uncovering various variables that influence the quality and effectiveness of entrepreneurial learning processes. Our literature review has shown that some of the characteristics that influence venture foundation (i.e. cognitive biases) may have negative effects on learning as they stifle reflection and effective information processing and critical reflection.

Building on these shortcomings we argue that entrepreneurial learning research can benefit from integrating research about the self-regulation of learning. This research concentrates on the procedural factors of entrepreneurial learning such as metacognitive monitoring and regulation of learning. It focuses on how entrepreneurs can act in order to achieve a "good" learning process to avoid detrimental learning effects.

Self-regulated learning and entrepreneurship

In the last three decades self-regulated learning (SRL) has been studied extensively in various contexts (especially school and vocational education), investigating how people learn in situations that lack formal instruction (Alexander, 2008; Puustinen & Pulkkinen, 2001). Rather than regarding learning as a result of instruction, attention shifted towards how learners plan, execute, and monitor their own learning processes, especially in situations where they are not directed by an instructor and/or an educational setting. In this respect, SRL can be regarded as a meta-perspective on learning interested in how learning can be organized best in order to master specific problem situations (Puustinen & Pulkkinen, 2001). And, in contrast to experience-oriented models of learning, a future-oriented perspective is inherent to conceptions of SRL focusing on (cognitive) strategies and resources a learner will need to master unprecedented learning challenges. It is well applicable to the context of entrepreneurial learning due to four reasons.

First, it focuses on learning situations which are new for the learner, i.e. they imply a certain degree of uncertainty and ambiguity evident in entrepreneurship contexts. Second, models of SRL propose a systematic approach as to how learners can plan, monitor, and control their own cognitions and affects while learning. This metacognitive perspective on learning provides a conceptual framework for dealing with the abovementioned cognitive biases often evident in entrepreneurial action. Third, SRL is rooted in the same pragmatist tradition of educational philosophy (Dewey, 1997, 2004) like experiential learning theory (ELT) which can be regarded as the most established learning model in entrepreneurship (see Corbett, 2005; Dimov, 2007). Therefore, the two theoretical approaches to entrepreneurial learning are easily reconcilable. Fourth, entrepreneurs are self-regulated learners for the most part. Learning related to opportunity recognition and exploitation mainly happens outside formalized educational settings (schools, universities, etc.) and often without the aid of an instructor or facilitator. Entrepreneurs have to decide for themselves when, how and what to learn in a given situation in order to recognize and exploit opportunities. This also explains why experience plays such a big role in entrepreneurial learning research – in many situations it simply is the most accessible informational resource.

As a consequence self-directed processes (self-reflection, self-monitoring, self-control) play a major role for entrepreneurial learning. Therefore, almost three decades of research on SRL in the field of educational psychology provide valuable insights to get a more differentiated understanding of how entrepreneurs learn. This may indicate how entrepreneurs can systematically develop their capacities in order to adapt more easily and act more effectively in future learning situations where the benefit of prior experience is limited.

Self-regulated learning is defined as "the process whereby [learners] activate and sustain cognitions, behaviours, and affects, which are systematically oriented toward attainment of their goals" (Schunk & Zimmerman, 1994: 309). This definition already hints at the components of a typical plan-do-review model which all major SRL models have in common (Puustinen & Pulkkinen, 2001). A phase of task analysis, goal setting and preparation is followed by the performance and adaptation of learning tasks and, finally, by an appraisal phase in which the learning process is evaluated and conclusions are drawn for future learning behaviour.

Self-regulated entrepreneurial learning

In the following section we adapt the phases of SRL to the context of entrepreneurial learning in order to develop a model of self-regulated entrepreneurial learning (SREL) and to discuss its effects on important entrepreneurial factors.

Planning

First, entrepreneurs perform a task-directed analysis of the learning situation. They reflect on how they define success (personal success factors) and what they want to achieve in order to define intended learning outcomes. This task analysis focuses on the properties of the situation that has to be dealt with. Therefore, task analysis can be characterized as the externally-directed part of the planning phase as it deals with aspects that lie outside the self of the learner (cf. Boekaerts & Niemivirta, 2000). In this context, entrepreneurs can recognize that they lack skills and knowledge about technology, market or venture management which has to be acquired in order to continue venture development. For example entrepreneurs have to find ways to serve customers by delivering the right offerings in the right way (price, promotion, product, place) (e.g. Keh, Nguyen, & Ng, 2007). By systematically analysing the problem situation entrepreneurs realize knowledge deficits relevant for entrepreneurial actions. This is the basis for setting adequate learning goals, defining which knowledge to acquire or which skills and abilities to improve. In a second step, self-regulated entrepreneurial learners perform a self-directed analysis of the learning situation. This means to evaluate their affective position with regard to the learning task in order to control self-directed aspects such as emotion, motivation, and volition. Scholars have analysed the influence of emotions on the recognition, evaluation and exploitation of entrepreneurial opportunities. Welpe et al. (2012) demonstrate that fear reduces exploitation and joy while anger increases it. Thus, emotions can impact on goal achievement making it relevant to reflect on the desired state of these emotions. In addition, emotions have also been proven to exercise immediate influence on entrepreneurial learning processes. To learn from venture failure, entrepreneurs have to overcome emotional barriers in order to be willing and motivated to reflect on past failure (Cope, 2011; Singh, Corner, & Pavlovich, 2007). Other scholars theorize that negative and positive emotions may influence how entrepreneurs process information and thus, how the opportunity recognition and exploitation process is affected (Shepherd, 2011). In this regard, a large number of empirical studies show that anxiety exerts negative effects on any kind of learning processes (Payne, Youngcourt, & Beaubien, 2007). Therefore, it is of high importance for entrepreneurs to regulate their emotions in learning situations in order to learn more effectively and to minimize the potential detrimental effects of emotions on the entrepreneurial process. Successful self-regulated learners are capable of explicitly activating and controlling their affects towards the learning process (Kitsantas & Zimmerman, 2006). To develop a positive attitude towards a venture-related learning process, an entrepreneur should be able to actualize his or her self-efficacy towards the learning task, to be resilient concerning potential barriers, and access motivational sources such as expected outcomes. As a result of the planning phase the entrepreneur defines goals and selects learning activities that seem adequate to achieve these goals. Again, these goals encompass task-directed as well as self-directed aspects. Task-directed learning goals address the knowledge and skills to be acquired in order to advance the venture. Self-directed learning goals address the entrepreneur's personal learning behaviour, e.g. to actively avoid cognitive biases or to be motivated in order to put sufficient effort into the learning activities. This goal setting, finally, leads to selecting specific learning activities to be performed in order to meet the intended learning goals. This includes defining appropriate resources (e.g. databases, social networks) and concrete tasks (e.g. information search strategies).

Performance

The performance phase concerns the actual execution of the planned learning activities plus their monitoring and control. The learner applies various learning strategies (e.g. techniques for information acquisition and evaluation, time management, or self-motivation), and uses resources in order to achieve the previously set goals in the performance phase. Performance also includes self-monitoring and self-control of one's own learning strategy use. This means that learners do not acquire knowledge in a trial and error kind of way, but constantly try to monitor if specific learning efforts (e.g. using various informational resources) meet the expectations formulated during the planning phase. The performance phase again combines an externally directed and a self-directed component. The externally directed aspect of performance monitoring is concerned with the adequacy of the learning activities that are performed. Entrepreneurial self-regulated learners constantly observe their learning activities, recording and monitoring whether those activities yield expected results. For example, searching a specific database for necessary information may turn out to be less relevant than expected during the planning phase. The self-directed aspect of performance monitoring is concerned with the entrepreneurial learner's personal behaviour. For example, by monitoring one's learning effort, an entrepreneurial learner may realize that he or she invests less time for learning than planned or that he or she tends to reject information countering his or her initial assumptions.

As a result from this monitoring, the entrepreneur adjusts the learning activities he or she engages in (performance control). Again, this regulatory process addresses the (external) learning activities as well as the self of the learner. In this context, the control of cognitive biases plays a crucial role to achieve effective learning processes. Fallacies such as preference for affirmative information (De Carolis & Saporito, 2006), or generalization from findings of a small amount of individuals (the law of small numbers) (Busenitz & Barney, 1997)

are typical examples of cognitive biases which impair learning performance. By systematically monitoring learning activities as proposed by the SREL model, entrepreneurs could significantly reduce the occurrence (and potentially the negative effects) of suboptimal learning as a result of biased information acquisition and usage.

Constant self-monitoring and control is an important feature of SRL. By monitoring their own learning activities effective self-regulated learners are able to modify and adapt their learning performance based on their observations. This regulation takes place on a so-called metacognitive level as it does not directly address the entrepreneurial problem, but is concerned with the execution of the learning process (Alexander, 2008). Learning as a cognitive activity refers to entrepreneurs resource stocks of “combinative capability” (Kogut & Zander, 1992) as they are able to apply their insights to other future situations. The metacognitive level refers to the way of learning itself and enables entrepreneurs to systematically monitor and further develop their learning capabilities (Alexander, 2008).

Review phase

Finally the review phase covers a summative evaluation at the end of the learning process. In contrast to monitoring and control during the performance phase, this phase addresses the whole learning process and aims at improving the entrepreneur’s learning capabilities as a whole. The review phase consists of three stages: self-judgement, causal attribution, and reaction. Applying self-judgment the entrepreneur evaluates to which degree the learning process has been successful, referring to the goals set in the planning phase. Such evaluation leads to a differentiated appraisal of the individual aspects of the learning process. For example, the entrepreneurial learner may find that the task has been misevaluated or unattainable goals have been set. Concerning the performance phase, the review may lead to the insight that learning performance monitoring and control have not been conducted sufficiently (e.g. leading to suboptimal information usage). In a second step the learner reflects on the causes for the successful and less successful aspects of the learning process (causal attribution). This step is crucial as it identifies what aspects of the entrepreneur’s learning behaviour need reviewing. Causes may lie outside (e.g. lack of resources) or within the person of the learner (e.g. lack of motivation, failure to control cognitive biases) (Schunk & Gunn, 1986; Weiner, Cook, Heckhausen, & Meyer, 1972).

Causal attribution is the basis for the final reaction to the outcomes of the process. Initially, the degree of goal achievement will leave the learner more or less satisfied about the learning process, causing affective reactions such as anger or joy. Causal attribution helps to make sense of the learning outcomes, and to overcome these immediate affects by systematically identifying the reasons of success or failure. As a consequence of this reflection on the learning process individuals may defend or adapt the learning strategies they have used. Thus, if the entrepreneur is satisfied with the outcome of the learning process, learning strategies are kept or adjusted only slightly compared to non-satisfactory outcomes, where a major reconsideration of one’s learning should take place. Cope (2011) shows that entrepreneurs reflect on reasons about venture failure and challenge their mental models for venture success (Argyris & Schön, 1978). Correspondingly, this reflection can be expanded, covering the entrepreneurial learning process as well. When learning strategies prove to dissatisfy previously formulated expectations, they are adjusted for similar situations in the future.

Development of propositions

We highlight three aspects of entrepreneurial learning, emotions, self-efficacy and cognitive biases. First, research shows that emotions influence entrepreneurial outcomes (e.g. Welp et al., 2012), information processing (Shepherd, 2011) as well as learning resulting from failure (Cope, 2011). In this regard, a large number of empirical studies have shown that anxiety exerts negative effects on any kind of learning processes (Payne et al., 2007). Successful self-regulated learners are capable of explicitly activating and controlling their affects towards the learning process (Kitsantas & Zimmerman, 2006). By reflecting on the nature of their own emotions and their desired level, self-regulation can reduce negative effects of these emotions. At the same time entrepreneurs with high self-regulation become aware of emotional barriers that have cropped up during the learning process. In such instances, entrepreneurs may access their social network for support, critical reflection and confirmation to increase confidence to overcome doubts appearing in uncertain situations (e.g. McMullen & Shepherd, 2006). Thus, we propose that entrepreneurs using self-regulation reduce negative effects of their emotions on entrepreneurial learning processes by planning, performing and reviewing their learning processes.

P1: Entrepreneurs with high self-regulation skills are able to avert negative effects of emotions on entrepreneurial learning.

Second, self-efficacy is defined as the degree to which an entrepreneur perceives him or herself capable of mastering a specific task and uses his knowledge and skills successfully (Baron & Markman, 2003; Chen & Greene, 1998; Wood & Bandura, 1989). Research has found entrepreneurs to value high on self-efficacy (Chen & Greene, 1998). While self-efficacy is mostly associated with positive effects (Krueger & Dickson, 1994), it can also

become detrimental causing premature decision-making and negation of own failures (see Wood & Bandura, 1989). Self-regulated learners consciously reflect on their capabilities in order to achieve an adequate level of self-efficacy for learning outcomes and processes reflecting their own strengths and weaknesses. Thus, by reflecting continuously about their own strengths and weaknesses during learning processes entrepreneurs have a more objective image of themselves. We propose that self-regulation leads to a more realistic evaluation of self-efficacy.

P2: Entrepreneurs with high self-regulation skills are able to more realistically evaluate their self-efficacy concerning specific challenges.

Finally, as cognitive biases such as one's overconfidence can hinder effective learning as well as potentially cause entrepreneurs falling short of expected outcomes (e.g. Frese, 2007), it is relevant to reflect on these detrimental effects and how they can be overcome. Hence, effective planning for learning should take into account the possibility of biased information processing. Entrepreneurs address the effects of cognitive biases on opportunity recognition, evaluation and exploitation by adapting their learning goals in order to reduce biased information intake and evaluation. For example, overconfidence bias can be reduced by interacting with critics who may act as *advocati diaboli*. Furthermore, entrepreneurs who are effective self-regulated learners are more aware of their cognitive biases and consider them when reviewing their learning process. Thus, we propose that self-regulation leads to a reduction of cognitive biases.

P3: Entrepreneurs with high self-regulation skills show better abilities in recognizing and controlling potential cognitive biases.

Results and Implications

This new angle to entrepreneurial learning research can help to overcome some of the limitations and challenges we have identified in experience-oriented concepts of experiential learning. We advance this perspective by adding a more process-oriented view looking into the characteristics of effective learning processes and contributing findings from educational psychology. Especially when entrepreneurs face new situations or discontinuous change self-regulated learning can better explain learning processes. Self-regulated learning provides strategies for learning in situations of high novelty where no previous experience exists, helping novice or serial entrepreneurs in new contexts. Second, self-regulated learning enables more detailed insights about how entrepreneurs can avoid detrimental effects caused by their distinct personal characteristics such as different forms of cognitive biases. We hypothesize that successful entrepreneurs exhibit better control mechanisms during their learning, e.g. being more able to reflect on their cognitive biases and to overcome them. Third, relating to research about cognitive adaptability by inexperienced entrepreneurs in context of environmental dynamism, novelty and uncertainty (e.g. Haynie & Shepherd, 2009) we advance their focus on metacognition by outlining a process view of self-regulated learning. Self-regulated learning goes beyond metacognition as it includes interactive processes including behavioral, social and motivational aspects (Efklides, 2011; Zimmerman, 1995). In addition, SRL theory is refined by being applied to the special context of entrepreneurship. This context is an especially promising application of SRL theory, as novelty, uncertainty and risk, as well as distinct characteristics of entrepreneurs (e.g. their cognitive biases) play a significant role. Thus, this specific context is able to advance SRL theory due to its distinct characteristics.

Implications for practice

Self-regulated learning helps entrepreneurs to systematically reflect on their learning processes. As emotional, motivational and cognitive aspects influence entrepreneurial actions (e.g. L W Busenitz & Barney, 1997; Cardon, Zietsma, Saporito, Matherne, & Davis, 2005; Foo, 2011), the learning process can be planned according to different dimensions. Means, resources and activities to achieve learning goals are defined, executed, and periodically assessed concerning their effectiveness. Controlling the match between learning goals and their outcomes can either lead to an adjustment of the goals or to an adjustment of learning strategies, ultimately changing the way to learn.

Additionally, entrepreneurship education can benefit from recognizing prior research findings in the context of SRL. Educators can develop further learning environments giving (future) entrepreneurs the possibility to learn more about their own learning processes and reflection abilities in order to use them more strategically in entrepreneurial processes, especially when it comes to their emotions and their consequences on outcomes. As learning capabilities such as metacognition can be advanced by training (Mevarech 1999; Schmidt & Ford, 2003) we suggest entrepreneurship educators practicing such learning processes with their students. Therefore, entrepreneurship educators could support entrepreneurs in their learning process in the context of opportunity recognition and exploitation.

Suggestions for further research

We believe that the proposed conceptual considerations provide a basis for future empirical research as self-regulated learning theories have been tested empirically in various contexts, such as primary and secondary schools, higher education, and technology-enhanced learning environments (Schunk, 2005; Torenbeek, Jansen, & Suhre, 2012; Velayutham, Aldridge, & Fraser, 2011). It has been shown that differences in learners' capabilities to execute the various tasks necessary for planning, monitoring and regulating the learning process influence how well learning outcomes are achieved in open learning environments (i.e. with little formal instruction). Further research could adapt existing instruments to develop reliable measurements for entrepreneurial contexts building on well-established scales of self-regulated learning (e.g. MSLQ, Pintrich, Smith, Garcia, & McKeachie, 1993; SRLIS, Zimmerman & Martinez-Pons, 1988).

For further research we suggest analysing the dynamic nature of self-regulated entrepreneurial learning especially in contexts of high uncertainty and complexity. Hsieh et al. (2007) argue that, depending on the type of problem to be solved, experience-based modes of learning may entail high costs. Complex problems might be better solved applying cognitive search strategies than by trial and error learning approaches. SREL provides an excellent basis to investigate this relation between the type of learning problem and the right learning approach to be applied. Thus, we encourage scholars to analyse the results of entrepreneurial learning and to find answers for example to the following question: Are entrepreneurs applying self-regulated learning more successful in the long run than entrepreneurs not reflecting about their learning processes (in terms of financial gains and learning outcomes)?

Additionally, the concept of SREL could be used conducting research on opportunity recognition and exploitation. Previous findings on the effects of metacognition suggest that self-regulated entrepreneurs should be more successful decision makers in dynamic contexts (Haynie et al., 2012). Referring to studies about learning in the context of opportunity recognition and exploitation (e.g. Baron & Ensley, 2006; Corbett, 2005; Nambisan & Baron, in press) it would be useful to analyse whether self-regulated entrepreneurs start more successful ventures than entrepreneurs not relying on self-regulation.

Furthermore, effectuation processes (Sarasvathy, 2001), could be analysed by focusing on the dynamic nature of adjusting learning goals to new situations (e.g. reflection on consequences of entrepreneurial actions on the development of market and technological competences) and the self-regulation of one's motivation and emotions in this process.

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FIGURE 1
Experiential learning cycle (Kolb, 1984)

