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# The Psychology of Entrepreneurship

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## Keywords

business creation, business success, psychological constructs, cognitive, motivational, affective

## Abstract

In this review of the psychology of entrepreneurship, we first present meta-analytic findings showing that personality dimensions, such as (general) self-efficacy and need for achievement, and entrepreneurial orientation are highly associated with entrepreneurship (business creation and business success). We then discuss constructs that were developed within entrepreneurship research, such as entrepreneurial alertness, business planning, financial capital as resources, and entrepreneurial orientation, and how they can be better understood by taking a psychological perspective. Next, we elaborate how traditional psychological constructs have been utilized in entrepreneurship and how this may enhance our knowledge in industrial and organizational psychology (with respect to, for example, knowledge, practical intelligence, cognitive biases, goals and visions, personal initiative, passion, and positive and negative affect). Finally, we provide an overall framework useful for the psychology of entrepreneurship, and implications for future research.

## INTRODUCTION

Entrepreneurship is defined as the identification and exploitation of business opportunities within the individual–opportunity nexus (Shane & Venkataraman 2000). Entrepreneurship is important for the creation of jobs, the economic and societal advancement of nations, and innovations (Van Praag & Versloot 2007). Moreover, large firms are attempting to become more entrepreneurial in their approaches (corporate entrepreneurship). Because of this importance, entrepreneurship has become a dynamic and differentiated research field (e.g., with areas such as family business, small business, social entrepreneurship, international/regional entrepreneurship, developmental entrepreneurship, and entrepreneurship education) with its own university departments, conferences (e.g., the Babson conference series), journals (most important, the *Journal of Business Venturing and Entrepreneurship: Theory and Practice*), and professional divisions (e.g., within the Academy of Management).

The most important drivers of entrepreneurship research came from economics, psychology, and sociology. The scholars credited to be the fathers of the field of entrepreneurship research, Schumpeter (1934) and later McClelland (1967), took a psychological perspective, with individuals being the major objects of entrepreneurship research. This changed in mainstream entrepreneurship research around the years 1980–2005. The approach during this time period was to explain entrepreneurship by using economic and strategy theories (Kirchhoff 1991). More recently, scholars have once again acknowledged the importance of a psychological perspective because “entrepreneurship is fundamentally personal” (Baum et al. 2007).

Entrepreneurship is considered to be a process with (at least) three phases: (a) the prelaunch or opportunity identification phase in which the entrepreneur identifies viable and feasible business opportunities, (b) the launch or development and execution phase in which the entrepreneur assembles the necessary resources for starting a venture, and (c) the postlaunch phase in which the entrepreneur manages the new venture in such a way that it grows and survives (Baron 2007). Psychological concepts play a role in each of these phases, although the individual entrepreneur is probably most important in the first phases, and his or her influence probably becomes weaker as the enterprise grows (although an organization’s leader never becomes unimportant) (Hambrick 2007).

We concentrate on a psychological approach to entrepreneurship in this article. Owing to space restrictions, we have to be selective in our review. We proceed as follows: First, we present established (meta-analytic) knowledge on the impact of psychological or quasi-psychological constructs on entrepreneurship. Second, we present constructs that are based in entrepreneurship research to discuss how a psychological perspective improves these constructs (an inside-out view). Third, we also take the opposite perspective and use constructs traditionally used in psychology to discuss how industrial and organizational (I/O) psychology is improved when it enters the field of entrepreneurship (an outside-in view). And finally, we describe a general model of the psychology of entrepreneurship and its implications for research.

## META-ANALYTIC KNOWLEDGE ON PSYCHOLOGICAL OR QUASI-PSYCHOLOGICAL CONSTRUCTS RELATED TO ENTREPRENEURSHIP

It may be useful to begin with a brief overview of meta-analytic findings of psychological and quasi-psychological constructs in entrepreneurship. **Table 1** presents correlations (all effect sizes were transformed into correlations) of the most relevant constructs with two dependent variables: starting a business and success in the business. There have been a number of meta-analytic studies on personality and entrepreneurship (Brandstatter 2011). Although entrepreneurship research initially falsely assumed that personality research did not offer it anything useful (Aldrich 1999,

Frese • Gielnik



Table 1 Overview of relevant meta-analytical findings<sup>a</sup>

Constructs	Effects on business creation	Effects on business performance
<i>Personality</i>		
Self-efficacy	$r_c = .38$ ; $K = 8$ ; $N = 2,250$ (Rauch & Frese 2007)	$r_c = .25$ ; $K = 11$ ; $N = 1,331$ (Rauch & Frese 2007)
Achievement motivation	$r = .21$ ; $K = 41$ ; $N = 5,814$ (Collins et al. 2004) $r_c = .22$ ; $K = 29$ ; $N = 8,698$ (Rauch & Frese 2007) Achievement facet of conscientiousness: $r_c = .28$ ; $K = 17$ ; $N = 3,005$ (Zhao & Seibert 2006)	$r_c = .30$ ; $K = 31$ ; $N = 4,115$ (Rauch & Frese 2007)
Proactive personality	n.a.	$r_c = .27$ ; $K = 5$ ; $N = 678$ (Rauch & Frese 2007)
Risk propensity <sup>b</sup>	Entrepreneurs higher than managers: $r = .11$ ; $K = 18$ ; $N = 3,471$ (Stewart & Roth 2004) $r_c = .10$ ; $K = 18$ ; $N = 8,863$ (Rauch & Frese 2007)	$r_c = .10$ ; $K = 13$ ; $N = 1,744$ (Rauch & Frese 2007) Growth-oriented entrepreneurs higher than income-oriented entrepreneurs: $r_c = .33$ ; $K = 3$ ; $N = 1,093$ (Stewart & Roth 2001)
Innovativeness	$r_c = .24$ ; $K = 15$ ; $N = 4,620$ (Rauch & Frese 2007)	$r_c = .27$ ; $K = 7$ ; $N = 800$ (Rauch & Frese 2007)
Stress tolerance	$r_c = .10$ ; $K = 6$ ; $N = 1,325$ (Rauch & Frese 2007)	$r_c = .20$ ; $K = 11$ ; $N = 1,282$ (Rauch & Frese 2007)
Autonomy	$r_c = .31$ ; $K = 11$ ; $N = 4,256$ (Rauch & Frese 2007)	$r_c = .16$ ; $K = 8$ ; $N = 843$ (Rauch & Frese 2007)
Locus of control	$r_c = .19$ ; $K = 24$ ; $N = 5,648$ (Rauch & Frese 2007)	$r_c = .13$ ; $K = 23$ ; $N = 3,959$ (Rauch & Frese 2007)
Conscientiousness <sup>c</sup>	Entrepreneurs higher than managers: $r_c = .22$ ; $K = 20$ ; $N = 3,480$ (Zhao & Seibert 2006)	$r_c = .19$ ; $K = 24$ ; $N = 3,193$ (H. Zhao et al. 2010)
Neuroticism <sup>c</sup>	Entrepreneurs lower than managers: $r_c = -.18$ ; $K = 14$ ; $N = 2,305$ (Zhao & Seibert 2006)	$r_c = -.18$ ; $K = 29$ ; $N = 4,446$ (H. Zhao et al. 2010)
Openness to experience <sup>c</sup>	Entrepreneurs higher than managers: $r_c = .18$ ; $K = 10$ ; $N = 2,115$ (Zhao & Seibert 2006)	$r_c = .21$ ; $K = 15$ ; $N = 2,461$ (H. Zhao et al. 2010)
Agreeableness <sup>c</sup>	Entrepreneurs lower than managers: $r_c = -.08$ ; $K = 7$ ; $N = 1,350$ (Zhao & Seibert 2006)	Not significant (H. Zhao et al. 2010)
Extraversion <sup>c</sup>	Not significant (Zhao & Seibert 2006)	$r_c = .09$ ; $K = 9$ ; $N = 1,476$ (H. Zhao et al. 2010)
<i>Human and social capital</i>		
Human capital	$r_w = .12$ ; $K = 6$ ; $N = 6,706$ (Martin et al. 2013)	$r_c = .10$ ; $K = 70$ ; $N = 24,733$ (Unger et al. 2011) $r_c = .21$ ; $K = 68$ ; $N = 12,163$ (Crook et al. 2011) <sup>d</sup> $r_w = .17$ ; $K = 9$ ; $N = 5,790$ (Martin et al. 2013)
Social capital	n.a.	$r_c = .21$ ; $K = 61$ ; $N = 13,263$ (Stam et al. 2014)
<i>Strategy</i>		
Strategic planning	n.a.	$r_w = .15$ ; $K = 29$ ; $N = 9,066$ (Boyd 1991) $r = .20$ ; $K = 14$ ; $N = 714$ (Schwenk & Shrader 1993) $r_w = .17$ ; $K = 42$ ; $N = 2,283$ (Miller & Cardinal 1994)
Business planning	n.a.	$r_c = .10$ ; $K = 51$ ; $N = 11,046$ (Brinckmann et al. 2010)

(Continued)

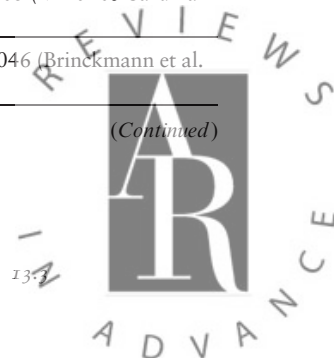


Table 1 (Continued)

Constructs	Effects on business creation	Effects on business performance
Entrepreneurial orientation	n.a.	$r_c = .24$ ; $K = 53$ ; $N = 14,259$ (Rauch et al. 2009) $r_c = .26$ ; $K = 73$ ; $N = 17,935$ (Rosenbusch et al. 2013) <sup>c</sup>
Innovation	n.a.	$r_w = .13$ ; $K = 42$ ; $N = 21,270$ (Rosenbusch et al. 2011)

<sup>a</sup>Abbreviations:  $K$ , number of studies;  $N$ , total number of observations;  $r$ , mean correlation;  $r_c$ , reliability-corrected and sample-size weighted mean correlation;  $r_w$ , sample-size weighted mean correlation.

<sup>b</sup>There was an exchange between Miner & Raju (2004) and Stewart & Roth (2001) that has been resolved by the meta-analysis by Stewart & Roth (2004).

<sup>c</sup>Zhao & Seibert (2006) and H. Zhao et al. (2010) assigned various personality constructs to the Big Five personality dimensions.

<sup>d</sup>The study by Unger et al. (2011) focuses on lead entrepreneurs; the study by Crook et al. (2011) includes all organizational levels: top management, core employees, and the collective organization.

<sup>e</sup>Meta-analytic structural equation modeling shows that entrepreneurial orientation mediates the effect of environment (munificence, dynamism, and complexity) on firm performance.

Gartner 1989), this changed with the advent of meta-analytic studies in entrepreneurship. The most important problem of narrative reviews at the time was they did not pay enough attention to matching the relevant personality variables to the task characteristics of entrepreneurs. Once personality constructs were separated into high and low matches, the results became quite clear: The task-matched personality characteristics correlated  $r_c = .24$  with business success, and the nonmatched factors correlated near zero, with  $r_c = .03$  (Rauch & Frese 2007).

The same reasoning also applies to the Big Five personality dimensions. Entrepreneurship research should not rely on Big Five constructs alone. For example, the subdimensions of conscientiousness should show quite different correlations with entrepreneurship. Dutifulness should be negatively correlated and achievement striving should be positively correlated with entrepreneurship. Therefore, we suggest looking at more specific personality dimensions. For example, self-efficacy, proactive personality, and achievement motivation correlate more highly with business creation and success than do all other factors, including the Big Five or human and social capital. Only entrepreneurial orientation—a concept derived from Schumpeter's work—shows a correlation as high as that of personality. The fact that all the correlations (except one) in Table 1 are below .30 is not surprising given the multidimensional nature of entrepreneurship. It is important to note that nearly all correlations are heterogeneous, suggesting it would be useful and necessary for future research to search for moderators of these relationships.

### ENTREPRENEURSHIP CONCEPTS CAN BE IMPROVED USING A PSYCHOLOGICAL PERSPECTIVE

Specifically, we discuss how entrepreneurial alertness (Kirzner 1979), business planning (Boy 1991, Castrogiovanni 1996), financial capital (Ho & Wong 2007), and entrepreneurial orientation (Lumpkin & Dess 1996) can be improved through the use of a psychological perspective.

#### Entrepreneurial Alertness

Entrepreneurial alertness has been defined by Kirzner (1979) as the ability to notice business opportunities without searching for them. According to Kirzner, markets are in a constant disequilibrium with local discrepancies in prices. These discrepancies are business opportunities for

Frese • Gielnik



realizing entrepreneurial profits. Entrepreneurs are the people in the economy who are alert to these discrepancies; they buy products when prices are low and sell them when prices are high. Through the entrepreneurial discovery of business opportunities, entrepreneurs become equilibrating forces in an economy. Although entrepreneurial alertness is appealing for explaining business opportunity identification, scholars have recently criticized the “fuzziness” of entrepreneurial alertness (Tang et al. 2012). In Kirzner’s (1979) conceptualization, entrepreneurial alertness has no a priori meaning because it can serve only as a post hoc explanation (McMullen & Shepherd 2006): People who identified a business opportunity must have shown entrepreneurial alertness.

A psychological approach focusing more on behavioral and cognitive aspects helps to shed new light on entrepreneurial alertness. With regard to behavioral aspects, Kaish & Gilad (1991) conceptualized entrepreneurial alertness as searching for information related to business opportunities, and they found significant differences between entrepreneurs and managers with respect to entrepreneurial alertness. Although their study has been criticized for its purely behavioral approach and the limited generalizability of its findings (Busenitz 1996), it has provided a new perspective on entrepreneurial alertness, specifying the actions performed by entrepreneurs to be more entrepreneurially alert. With regard to cognitive aspects, Gaglio & Katz (2001) conceptualized entrepreneurial alertness as cognitive schemata that prompt people to think in new and unusual ways. Thinking in new and unusual ways should help people to identify innovative business opportunities.

Other scholars have proposed putting a stronger focus on basic cognitive capacities, such as general mental ability and creativity, as the foundations of entrepreneurial alertness (Baron & Ensley 2006, Shane & Venkataraman 2000). General mental ability and creativity are cognitive capacities that influence how people process information, that is, how people comprehend and make associations between information. Comprehending information and making new associations between information are central processes underlying business opportunity identification (Mitchell et al. 2007, Shane 2000). Empirical research provides support for the hypothesis that creativity (and to a lesser extent also general mental ability) also contributes to opportunity identification (Baron & Tang 2011; DeTienne & Chandler 2004; Gielnik et al. 2012a,b).

More recently, entrepreneurship researchers have suggested that neither behavioral nor cognitive aspects alone are sufficient to understand the concept of entrepreneurial alertness, thus necessitating a more integrated approach (Gielnik et al. 2012b, Tang et al. 2012). Tang et al. (2012) found that search behavior for information and the cognitive aspects of making associations and evaluating ideas were positively related to entrepreneurs’ innovativeness with respect to new products or services. Gielnik et al. (2012b) developed a theoretical model proposing that a joint examination of factors related to information processing (such as general mental ability and creativity) and information acquisition is needed to explain opportunity identification. Indeed, they found that active information search moderated the positive effect of creativity on business opportunity identification and product/service innovations. Creativity had a strong effect in cases of high active information search but no effect in cases of low active information search (Gielnik et al. 2012b). This research helps to elucidate the construct of entrepreneurial alertness by illustrating how a psychological perspective examining the joint effects of cognitive (information processing) and behavioral (information acquisition) aspects results in theoretical models with better predictive validity.

### Business Planning

Business plans are written documents that describe the current state and presupposed future of a business (Honig 2004). They usually cover various areas, such as products/services, customers,

competitors, industry, business strategy, operations, and financial projects, and include forecasts and models of future scenarios, evaluation of risks, and calculations of financial developments (Boyd 1991, Castrogiovanni 1996). Business plans are central to entrepreneurship, as they provide legitimacy and are commonly used by venture capitalists to make funding decisions (Delmar & Shane 2004). Courses focused on developing business plans are therefore often thought to be the most important part of business school curriculums (Honig 2004). However, there is also a debate on the usefulness of writing a business plan (cf. Brinckmann et al. 2010, Gruber 2007). One group of scholars even stated that there is a “dichotomous war between the need to ‘develop a full-blown business and marketing plan’ and the need to ‘just get started’” (Chandler et al. 2011, p. 376).

Advocates of business plans have argued that business plans have three positive functions: symbolism, learning, and efficiency (Castrogiovanni 1996). Business plans have a symbolic (or legitimating) function, as they demonstrate that entrepreneurs are committed to their business ideas because they have invested effort into specifying those ideas. The details of a plan also help to legitimate the new business because they should provide evidence that the concept is feasible and viable. Writing plans also helps entrepreneurs to learn; preparing business plans forces entrepreneurs to gather information about their industries and stakeholders that contributes to both greater knowledge and better understanding of the business environment. Finally, business plans increase the efficiency of the start-up process. They structure the process (through goals and plans), and they provide a framework that allows quick decision making and more efficient management of resources (Delmar & Shane 2003). There is empirical evidence supporting the beneficial effects of business planning on persistence in the entrepreneurial process (Delmar & Shane 2003, Liao & Gartner 2006, Shane & Delmar 2004); there is also meta-analytic evidence of higher entrepreneurial performance with business planning, although the effect size is not very large (Brinckmann et al. 2010).

Opponents of business plans have argued that business planning is detrimental because it is time consuming, hinders flexibility, and is based on insufficient knowledge about future events. According to this camp, instead of planning, entrepreneurs should instead spend their time on organizing activities, such as acquiring capital or equipment (Carter et al. 1996). Plans are often interpreted as fixed and rigid structures and thus reduce adaptability and flexibility even when environmental changes call for changes in the business concept (Gruber 2007, Honig 2004). With regard to insufficient knowledge about the future, scholars have noted that business plans attempt to make predictions about a future that is unknown and uncertain (Sarasvathy 2001).

Given the potential negative effects of business planning, scholars have suggested alternative strategies, such as effectuation (Sarasvathy 2001), bricolage (Baker & Nelson 2005), and improvisation (Baker et al. 2003). In contrast to that in planning (or causation in Sarasvathy’s terminology), the starting point in effectuation is not the goal to be achieved but the means. There are three basic categories of means available to people: the person (who are you), knowledge (what do you know), and other people (whom do you know) (Sarasvathy 2001). Entrepreneurs then select those effects that can be realized with the means available. Efforts to predict an uncertain future will likely fail, according to effectuation theory. Entrepreneurs should instead control the future by being opportunistic (implementing what is possible and reinforced by the environment; Sarasvathy 2001).

Similar to effectuation, bricolage means making do by recombining available resources for new purposes (Baker & Nelson 2005, Baker et al. 2003). Several studies have provided evidence for the usefulness of bricolage in resource-constrained and adverse business environments for making progress in the new-venture creation process (Baker & Nelson 2005, Baker et al. 2003, Desa 2012, Edelman & Yli-Renko 2010).

Another strategy is improvisation. With improvisation, design and execution of actions happen at the same point or very close to each other (Baker et al. 2003). People do not plan their activities

beforehand but generate ideas about what to do and how to do things on the spot. According to Baker et al. (2003), improvising entrepreneurs usually start with a rough idea, and the final business concept develops and unfolds over time in ongoing interactions with customers, suppliers, or other stakeholders. Instead of planning, improvising entrepreneurs start by taking action and design their actions along the process of creating the new venture (Baker et al. 2003).

A psychological perspective on planning, effectuation, and bricolage/improvisation may make it possible to discuss these three concepts within a common framework and to develop a new approach that takes into account the advantages and disadvantages of planning. Much of the critique of business planning focuses on the strategic function of planning. The strategic function implies a written and formal business plan often accompanied by specific calculations, for example, break-even points. These strategic plans often rely on unclear data, thereby producing pseudo-exact calculations that turn out to be wrong given future uncertainties. By contrast, the action-regulating function of business plans are less criticized. Action plans are mental simulations of actions that are not necessarily written down and that have some degree of flexibility (Frese 2009, Frese & Zapf 1994). From a psychological perspective, the action-regulating function of business plans helps initiate and maintain action (Frese & Zapf 1994, Gollwitzer 1999).

Action plans specify the when, where, and how of action and the sequence of operational steps leading to goal achievement. They help to adjust the actions to the situation. Once an if-then action plan is formed, the situational parameters trigger the execution of the planned action (Gollwitzer & Sheeran 2006). Furthermore, by specifying the substeps, action plans structure the process and direct efforts to key activities important for goal achievement. This helps a person to return to an action path after a distraction. Thus, action plans increase persistent goal pursuit. Finally, action plans with specific substeps allow people to get feedback about where they stand and to monitor their progress and make necessary corrections. In summary, action plans help people to initiate, maintain, and evaluate the actions necessary for goal accomplishment (Frese 2009).

Research has provided evidence for the beneficial effect of action planning in the entrepreneurial process. For example, action planning is positively related to business performance (Frese et al. 2007). Furthermore, action planning enhances the positive effects of goal intentions in the new-venture creation process (Gielnik & Frese 2013). In two separate samples, Gielnik et al. (2013a,b) showed positive effects of entrepreneurial goal intentions on entrepreneurial actions and new-venture creation in cases of high action planning but not in cases of low action planning.

The psychological discussion of business planning allows a fine-grained analysis of the functions of plans in entrepreneurship. Both advocates and opponents agree that business plans have a legitimating function (Honig & Karlsson 2004). There is disagreement, however, about whether business plans either help to initiate action and induce persistence in the new-venture creation process or are a waste of time, constraining entrepreneurs' flexibility. A psychological perspective helps to resolve this issue. If business plans are formulated and developed in a way that facilitates and regulates action, they should promote success in the entrepreneurial process (Delmar & Shane 2003, Liao & Gartner 2006, Shane & Delmar 2004). If business plans lack these aspects, their function may be limited to only legitimating the new venture (Honig & Samuelsson 2012). Thus, it is important to consider the action-regulating or action-facilitating function of business plans to better understand their role in the entrepreneurial process. For example, there are detailed templates for business plan development, and sometimes parts or even the full business plan may be done by outside consultants. In these cases, the regulatory function of the business plan is negligent (e.g., very little learning; very little impact on helping to initiate, direct, and keep on track in one's actions), and the primary function is giving potential investors or banks a sleek business plan (legitimating function).

In addition, a psychological approach allows discussing the inherent relationships between planning and the strategies of effectuating, bricolage, and improvising. Obviously there are different

forms of planning. Frese et al. (2000) differentiated “complete planning,” “critical point planning,” “opportunistic strategy,” and “reactive approach”: Complete planning implies a comprehensive mental representation of tasks, a long time frame, a large inventory of signals and knowledge of the task environment, anticipation of error situations, and a proactive approach. Critical point planning is oriented toward the most important point (localized plan). It includes an iterative planning process that leaves things unplanned until action is needed. Much of what is discussed under bricolage and effectuation is in reality critical point planning and opportunistic strategy. There is a partial overlap between opportunistic strategy and both effectuation and bricolage. An opportunistic strategy starts with some form of rudimentary planning for potential opportunities, and it is proactive. This means that entrepreneurs experiment with and develop opportunities whenever it seems to be possible. It would be useful to differentiate between effectuation as critical point planning and as opportunistic strategy. In contrast to the three forms of planning just discussed, a reactive approach is not proactive. It is driven by immediate demands and emulation. A reactive approach comes closest to a Skinnerian shaping process in which the environment shapes the behavior without active input (Skinner 1953).

Empirical studies show consistently that the reactive approach is highly negatively related to success, whereas complete planning and critical point planning are positively related to success (e.g., Frese 2000, Frese et al. 2007, Hiemstra et al. 2006, Van Gelderen et al. 2000). We have done less work on opportunistic planning, but unpublished data suggest that its correlation with success depends upon environmental conditions. At first glance, some of Sarasvathy’s (2001) theoretical writing implies that by effectuation, she means the reactive approach. But this is not really true when one looks at the empirical studies more closely. For example, expert entrepreneurs using an effectuation approach nevertheless plan how to sell their products to various segments (Dew et al. 2009). Similarly, Sarasvathy (2003, p. 207) gives the example of Gillette when describing effectuation, stating that the founder “had to develop a cheap, effective removable-blade razor, generate an adequate initial market [ . . . ] always modifying his plans as he gained new knowledge.” These examples illustrate that within the strategic approach of effectuation, entrepreneurs develop and flexibly modify action plans to implement their ideas.

An action-regulating approach toward planning does not view action plans as rigid instruments but rather sees them as dependent on changes in the business environment; people should stick to their goals and flexibly change their plans to achieve their goals (Frese 2009). Thus, planning is not necessarily antithetical to effectuation; action planning and effectuation can jointly lead to goal accomplishment (V. Cha, A.Y. Ruan & M. Frese, unpublished manuscript). Similarly, in bricolage and improvisation, entrepreneurs improvise or make do with existing resources. This means that they may lack long-term, strategic orientations, but they initiate and maintain actions to pursue opportunities and solve problems (Baker & Nelson 2005). Initiating and maintaining action are facilitated by developing action plans (Frese 2009). Also, forming plans when using the strategic approaches of bricolage or improvisation should contribute to success in the entrepreneurial process. And differentiating between critical point planning and opportunistic approaches may help to predict whether there are direct positive relationships with success (critical point planning) and whether situations moderate the fruitfulness of an opportunistic strategy.

The more central issue is probably whether or not there can be a no-planning approach that is proactive. We assume this is not so, and psychological research seems to support our conclusion (Gielnik et al. 2013c). Any effectuation needs to have some small plan of action to actually push people into action; improvisation implies that planning and acting are overlapping, but again there needs to be some kind of plan, as acknowledged by Baker et al. (2003). There can be little effectuation, bricolage, or improvisation without some degree of action planning, because without any goal and at least minimal planning, there would be no action.

Frese • Gielnik





## Financial Capital

A central concept to explain success in entrepreneurship from an economic perspective is the availability of financial capital to start a new business. Financial capital is important for acquiring the necessary assets in terms of equipment and raw materials, avoiding liquidity problems, and thus ensuring ongoing operations. Several studies have argued that financial constraints are a major factor limiting entrepreneurship (Ho & Wong 2007) and that access to capital promotes entrepreneurship (De Mel et al. 2008). However, lack of financial capital is sometimes used as an excuse to blame institutions or other external causes for one's own failures (Naude et al. 2008). The median starting capital provided by founders in the United States was \$22,700 (1987 data in 1996 dollars) (Hurst & Lusardi 2004), and most entrepreneurs start their businesses with even less capital (Winborg & Landstrom 2001). Furthermore, research based on a nationwide representative panel study in the United States showed that neither the objective existence nor the perception of resources affected entrepreneurs' entrepreneurial efforts (Edelman & Yli-Renko 2010). These findings suggest that a purely economic perspective focusing on financial resources does not fully explain entrepreneurship.

We argue that a psychological perspective with a particular focus on entrepreneurs' actions complements the economic perspective with its focus on the necessity of financial capital. Research has shown that entrepreneurs can take actions to overcome financial constraints by using financial bootstrapping (Grichnik et al. 2013, Winborg & Landstrom 2001). Financial bootstrapping involves actions to acquire resources without relying on formal debt from banks or equity financing from investors. It is used by 80–95% of entrepreneurs to finance their operations (Ebben & Johnson 2006). Financial bootstrapping can take different forms, such as owner financing (e.g., withholding own salary, employing relatives), minimization of accounts receivable (e.g., speeding up invoicing, charging interest on overdue payment), joint utilization (e.g., owners share and borrow resources from each other), delayed payments (e.g., delaying payments to suppliers and leasing equipment), minimization of capital invested in stock (e.g., optimizing stock, minimizing inventory), and obtaining subsidies (e.g., from government or public organizations) (Winborg & Landstrom 2001). Empirically, using financial bootstrapping is an effective way to overcome capital constraints and to achieve higher venture growth (Patel et al. 2011). Focusing on mental models, Bischoff et al. (2013) examined how differences in nascent entrepreneurs' mental models moderated the effect of capital constraints on new-venture creation. They found that capital constraints did not affect new-venture creation when nascent entrepreneurs had mental models similar to those of experienced entrepreneurs; there was a negative effect of capital constraints on new-venture creation only when nascent entrepreneurs' mental models corresponded to those of novice entrepreneurs. Bischoff et al. (2013) also showed how these expert mental models could be taught. These findings suggest that entrepreneurs can take actions and develop mental models to overcome financial constraints.

## Entrepreneurial Orientation

Entrepreneurial orientation is characterized by autonomy, innovativeness, risk taking, competitive aggressiveness, and proactivity (Lumpkin & Dess 1996). The strategy literature construes entrepreneurial orientation at the firm level: A top manager, most commonly the CEO or general director, describes the strategic stance of the firm. Firms with high entrepreneurial orientation outperform other firms because autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness help firms to seek and exploit new opportunities for growth (Lumpkin & Dess 1996). Indeed, research has provided meta-analytic evidence that entrepreneurial orientation and its subcomponents are highly correlated with firm performance (Rauch et al. 2009, Rosenbusch et al. 2013).

Entrepreneurial orientation is a curious concept: In essence, the concept is derived from Schumpeter's individualistic model of entrepreneurship. Moreover, the measurement is based on managers' perceptions of their firms' strategic stances. It assumes first that these perceptions are veridical to some extent, second that these managerial perceptions matter for the firm, and third that they are not just after-the-fact attributions to explain success or the lack of it. Thus, it makes sense to examine this concept within a psychological approach (Robinson et al. 1991). Krauss et al. (2005) developed a theoretical model of entrepreneurial orientation on the level of the entrepreneur showing that entrepreneurs' individual characteristics—in particular, autonomy orientation, innovativeness, risk taking, proactive personality, and competitive aggressiveness, formed an individual-level factor of entrepreneurial orientation. This factor was indeed related to firm performance (Krauss et al. 2005). We believe that there are number of important psychological issues related to the concept of orientation itself (is it an attitude, an action characteristic, or a personality factor?), to the question of which intervening variables play a role (moderators, mediators?) for starting a firm and making it successful, and to the causal question (does orientation lead to success, or does it follow from success?).

### PSYCHOLOGICAL CONSTRUCTS AND RESEARCH IN THE FIELD OF ENTREPRENEURSHIP

It helps I/O psychology to study entrepreneurship. First, entrepreneurship research provides new and important (and often highly objective-dependent) variables, such as first sales, starting an organization, and organizational success. Second, the situation of entrepreneurs is often unique in its unpredictability, complexity, and changing demands in the course of the entrepreneurial process. This shows, for example, in the case of optimism. On one hand, optimism is required for entrepreneurs to believe in the feasibility and success of an idea. On the other hand, optimism may have negative consequences because it can lead to overextension and flawed forecasts, particularly in an unpredictable and highly complex situation. Third, an important function of organizations is to set standards for how employees behave (there is an inherent tendency toward alignment, uniformity, and fit). This is not the case, however, in the very beginning of an organization—in its founding months and years. In these early stages, there are few prescriptions for how things should be done, and this is therefore an interesting situation for I/O psychology with many new opportunities (and often this is, of course, a source of innovation). Finally, I/O psychology researchers need to be interested in how the very organizations they study come into existence—in a broad sense, any genesis of an organization comes about through entrepreneurial acts.

In the following sections, we do not cover all important constructs that have been studied; rather, we focus on those traditional psychological constructs that can be studied easily within the domain of entrepreneurship because they are related to the tasks of entrepreneurs. Entrepreneurship, particularly in its beginning phases, is characterized by enormous uncertainty and a high degree of complexity in task demands (Markman 2007, McMullen & Shepherd 2006). Entrepreneurs need to act as inventors, investors, accountants, facilitators, organizational change specialists, leaders, technologists, marketing specialists, and top salespeople. Therefore, the more knowledge and skills the entrepreneur is able to bring to the table, the better. Moreover, there are many areas that require action on the basis of insufficient knowledge. Additionally, the chances of success are often overestimated, because otherwise the daunting lack of knowledge and skills would stop entrepreneurs from pursuing the start-up of firms. Therefore, we focus on knowledge, practical intelligence, and biases and heuristics (overconfidence/overoptimism). These are all cognitive factors. We also discuss motivational/emotional approaches that help entrepreneurs deal with their unique task situation. Specifically, we discuss goals and visions, personal initiative, passion, and affect.

Frese • Gielnik



## Cognitive Factors

**Knowledge.** Knowledge provides the cognitive and mental structures that determine how people perceive and integrate new information (Fiske & Taylor 1984). Mental structures provide a framework to interpret and comprehend (give meaning to) new information. In entrepreneurship, several scholars have argued that interpretation and comprehension of new information are central to discovering new business opportunities (Mitchell et al. 2007). Shane (2000) has provided evidence that people's prior knowledge creates mental corridors that influence the way new information is interpreted. Entrepreneurs interpreted the same information (i.e., a new technological invention) in different ways based on their prior knowledge; the different interpretations then led to the discovery of different types of business opportunities (Shane 2000). This would not be surprising, were it not for the fact that economics (with its assumption of equilibriums) assumes that knowledge differentials are not so important for pursuing opportunities.

Entrepreneurship has been a good area in which to study the effects of knowledge and experience, as well as of expertise, on opportunity identification and on success. By and large, general education is important in developing countries because there is wide variance in the schooling entrepreneurs have received, ranging from no/little schooling to college education; findings also suggest that it is less important in developed countries (Unger et al. 2011). Furthermore, specific knowledge of areas related to entrepreneurial tasks (e.g., industry and managerial experience) is more important for entrepreneurial success than general knowledge is (Unger et al. 2011). Of particular importance is expertise, in the sense that Ericsson & Lehmann (1996) described it, as it leads to superior performance in entrepreneurship (Baron & Ensley 2006, Unger et al. 2009).

However, in line with other research on knowledge and experience, there may also be disadvantages of experience. For example, Ucbasaran et al. (2009) have argued that being experienced may lead to liabilities, such as relying too much on heuristics and decision-making shortcuts that have worked in the past. Being highly experienced may lead to inferring too much from little information, and a tendency to become constrained by the familiar such that people are less able to think beyond what is known (Westhead et al. 2009). Similarly, Gielnik et al. (2012b) argue that experience may lead to a cognitive fixedness impeding the integration of new information and thus hindering business opportunity identification. Knowledge provides mental models to interpret information (Fiske & Taylor 1984), which also means that experienced entrepreneurs can fall into "mental ruts" (Shepherd & DeTienne 2005) with negative consequences, such as cognitive entrenchment, stereotyped thinking, and discounting of new information. Experienced entrepreneurs discount new information that is not consistent with their preconceptions, and they rely on their past experiences even when circumstances are changing (Parker 2006). As a result, experienced entrepreneurs may refrain from using and combining new information, with detrimental effects on business opportunity identification. Ucbasaran et al. (2009) provide evidence for an inflection point after which the effect of experience on business opportunity identification becomes negative. Similarly, Gielnik et al. (2012b) showed that experienced entrepreneurs benefited less from active information search than did their less experienced counterparts, supporting the argument that seasoned entrepreneurs use new information to identify business opportunities to a lesser extent than do inexperienced ones.

**Practical intelligence.** The construct of practical intelligence has recently gained attention (Baum & Bird 2010, Baum et al. 2011). Practical intelligence encompasses knowing and doing; it reflects entrepreneurs' experience-based skills and tacit knowledge as well as their abilities to apply these skills and knowledge to accomplish entrepreneurial tasks. This construct can be thought of as "street smarts" (Baum & Bird 2010). Baum and colleagues (Baum & Bird 2010, Baum et al. 2011) have argued that practical intelligence has positive effects on venture growth through entrepreneurial

actions. Practical intelligence helps entrepreneurs to make fast and accurate decisions because it encompasses knowledge about ideas, processes, and operational paths that have been proved to be successful. Furthermore, practical intelligence provides the skills and knowledge to take swift actions ahead of rivals to exploit unexpected opportunities or to adopt new technologies. It also helps entrepreneurs to constantly perform actions to improve business in terms of process and product/service innovations. Practical intelligence promotes repeated experimenting, testing, and revising of the business concept to continuously improve it (Baum & Bird 2010, Baum et al. 2011). Practical intelligence is thus an important predictor of taking fast and flexible actions to respond to changes in the market and to achieve higher venture growth rates. Supporting these arguments, research shows that practical intelligence both has direct effects on new-venture growth and predicts multiple improvement activities and their swift performance (Baum & Bird 2010, Baum et al. 2011).

**Cognitive bias of overconfidence/overoptimism.** Several scholars have argued that cognitive biases are a factor that distinguishes between entrepreneurs and nonentrepreneurs or managers (Baron 2004, Busenitz & Barney 1997). Cognitive biases are cognitive mechanisms that assist people in fast decision making (Busenitz & Barney 1997). Cognitive biases have a positive function, as they help entrepreneurs to make decisions without putting too much strain on their time and cognitive resources and thus to stay actionable in spite of high cognitive demands on new learning and complex situations. However, cognitive biases may also lead to errors because people make less rational decisions and discount available information (Simon & Houghton 2002). In entrepreneurship, the cognitive bias of overconfidence/overoptimism has received wide attention. Overconfidence refers to entrepreneurs' overestimation of their abilities, in particular with regard to making accurate forecasts, having higher abilities relative to others, and becoming successful (Koellinger et al. 2007). Overoptimism (or optimistic bias) is a similar construct referring to entrepreneurs' tendency to expect positive outcomes or to perceive heightened chances of success (Baron et al. 2012, Cooper et al. 1988).

The interesting aspect of overconfidence/overoptimism is its controversial role in the entrepreneurial process. On one hand, scholars have noted that overconfidence/overoptimism is necessary to initiate entrepreneurial action given the uncertainty entrepreneurs are facing (Cassar 2010, Simon & Shrader 2012). On the other hand, scholars have argued that overconfidence/overoptimism has detrimental effects because entrepreneurs make strategic mistakes or take on too many tasks, resulting in overextension (Hmieleski & Baron 2009). Both perspectives have theoretical foundations. Motivational theories assert that higher outcome and ability expectations are positively related to performance (Van Eerde & Thierry 1996). Accordingly, it is possible that overconfidence/overoptimism increases entrepreneurs' motivation to initiate action and to persist even in the presence of high failure rates and low expected returns (Cassar 2010, Simon & Shrader 2012). Furthermore, entrepreneurs face many setbacks and obstacles in the entrepreneurial process, and overconfidence/overoptimism may increase their emotional and cognitive resilience, helping them to deal with the challenges (Hayward et al. 2010, Hmieleski & Baron 2009). By contrast, prospect theory (Kahneman & Tversky 1979) suggests that cognitive biases may lead to flawed decisions and suboptimal performance. In the entrepreneurship domain, scholars have argued that the cognitive bias of overconfidence/overoptimism may lower entrepreneurs' perceptions of the risk associated with a strategy, such that they set unrealistic goals, make nonoptimal decisions, or interpret ambiguous information as promising opportunities (Hmieleski & Baron 2008, Simon & Houghton 2002). This may result in overentry into new markets, overinvestment in and escalation of commitment to new projects (throwing good money after bad), or failure to preserve resources (cf. Hayward et al. 2010). Moreover, overconfidence/overoptimism may bias entrepreneurs in their forecasts such that they underestimate the competitive response or overestimate the demand for their products and services (Simon & Houghton 2002).

Frese • Gielnik



The empirical evidence reflects the theoretical controversy on overconfidence/overoptimism. Several studies show that entrepreneurs have high levels of overconfidence/overoptimism in that they overestimate the probability of succeeding in an operating venture (Cassar 2010, Koellinger et al. 2007). For example, Cooper et al. (1988) examined 2,994 entrepreneurs and showed that a third of the entrepreneurs believed that their odds of success were 100%. This overconfidence/overoptimism is related to actually initiating the necessary activities to launch a venture (Koellinger et al. 2007) and to the successful introduction of more pioneering or radically innovative products and services (Simon & Houghton 2003, Simon & Shrader 2012). Thus, research suggests that unrealistic expectations in the form of overconfidence/overoptimism may be an important prerequisite to entering the entrepreneurial process, particularly when the new product or service is pioneering or radically new.

However, there is also empirical evidence suggesting that overconfidence/overoptimism has negative effects. Koellinger et al.'s study (2007) suggests that entrepreneurs who are highly confident have a lower likelihood of survival. Hmieleski & Baron (2009) showed that entrepreneurs' optimism had a negative effect on their venture growth over a period of two years. Similarly, Simon & Shrader's (2012) study revealed that overconfidence had a curvilinear relationship with subjective firm performance, suggesting that overconfidence has a negative effect on performance after an inflection point. Finally, Lowe & Ziedonis (2006) provide evidence that overoptimistic entrepreneurs are more likely to continue unsuccessful ventures for longer periods of time, thus wasting valuable resources.

In conclusion, theories and research suggest that overconfidence/overoptimism may have positive and negative effects on entrepreneurship. Particularly at the beginning of the entrepreneurial process, a certain extent of overconfidence/overoptimism may be necessary to make the decision to pursue a business opportunity (e.g., Cassar 2010). However, in later phases, overconfidence/overoptimism may be detrimental to performance, reducing the likelihood of survival and venture growth and leading to unjustified commitments to unsuccessful ventures (Hmieleski & Baron 2009, Koellinger et al. 2007). Thus, across different phases of the entrepreneurial process, overconfidence/overoptimism may have different effects.

### Motivational/Affective Factors

Motivational/affective factors have recently attracted a lot of research in the entrepreneurship literature (cf. Cardon et al. 2012). Several theoretical frameworks in this area suggest that motivational/affective factors are important antecedents of entrepreneurial action (Baron 2008, Frese 2009). In this review, we put a particular focus on growth goals/visions, personal initiative, entrepreneurial passion, and positive and negative affect.

**Growth goals/visions.** Although goals and visions are conceptually different, we jointly discuss growth goals and growth visions because both refer to a future state (a desired end) that people seek to achieve (Kirkpatrick & Locke 1996). Goals are the objects or aims of an action, that is, intentions to achieve a certain standard within a specified time frame (Locke & Latham 2002). Goal-setting theory proved (Locke & Latham 2002) that goals have important action-regulating functions. Setting specific and challenging goals leads to greater effort and persistence and ultimately to higher performance than setting nonchallenging or unspecific goals does. Indeed, entrepreneurs who set specific and challenging growth goals for their ventures (e.g., regarding sales and employment for the next two years) achieved higher growth rates over a period of two and six years (Baum & Locke 2004, Baum et al. 2001).

Visions have a goal function but also go beyond goals, as they are ideal and unique projected mental images of the future referring to strong values or an idea laden with emotion (cf. Kirkpatrick & Locke 1996). Visions improve performance because they arouse people's needs and values, they challenge people to attain the depicted future, and they direct people's attention toward desired outcomes and thus focus people's efforts (Kirkpatrick & Locke 1996). Baum et al. (1998) found that entrepreneurs' short and emotionally arousing visions that included growth aspirations for their companies affected venture growth over a two-year period. The authors further showed that entrepreneurs' communication of their visions was an important mediator in the relationship. These findings suggest that entrepreneurs' visions exert a positive effect on venture growth through the employees.

**Personal initiative.** Personal initiative plays a role in all phases of the entrepreneurial process. It relates to active performance characterized by self-starting, proactive, and persistent behavior (Frese et al. 1996). Self-starting means that the impetus for action comes from the entrepreneur him- or herself; the entrepreneur's actions are less driven by other people or immediate external demands. Self-starting is the driver of initiating changes in the status quo or doing something new. Thus, self-starting leads to creating something new and is therefore an essential mechanism in effective entrepreneurship (Frese 2009). Ineffective business is often characterized by simply copying existing products or services without any innovative changes to these ideas. Self-starting entrepreneurs are better able to differentiate their businesses from other businesses and to create competitive advantages that should result in higher performance (Rosenbusch et al. 2011).

Being proactive implies having a long-term orientation, which helps entrepreneurs to anticipate and prepare for potential opportunities and threats. If such opportunities or threats actually occur, proactive entrepreneurs are better prepared and less likely to miss promising opportunities. Being proactive is key for entrepreneurship because entrepreneurs have to identify and exploit new business opportunities (Shane & Venkataraman 2000). Furthermore, anticipating and preparing for potential threats in the process of developing, launching, and managing a new venture allow an entrepreneur to form contingency plans with positive effects for performance (Boyd 1991).

Finally, being persistent means being resilient and overcoming barriers that occur in goal pursuit. Persistent entrepreneurs do not give up in the face of difficulties but rather solve their problems or find alternative routes to accomplish their goals. Because entrepreneurship takes place in a difficult and unpredictable environment, persistence is needed to overcome setbacks and to correct one's mistakes in the development of a product, service, or organization (Markman et al. 2005).

There is empirical evidence that personal initiative has positive effects on entrepreneurship, supporting the claim that active actions (showing a higher degree of active performance) are a central determinant of successful entrepreneurship. Koop et al. (2000) and Krauss et al. (2005) showed that small business owners' personal initiative was positively related to business performance. Focusing on personal initiative in the context of social networking, X.Y. Zhao et al. (2010) provided evidence that being proactive and persistent in developing social networks was associated with higher business success. One group also developed a training intervention to promote entrepreneurs' personal initiative (M. Glaub, M. Frese, S. Fischer & M. Hoppe, unpublished manuscript). Their randomized controlled experiment showed that changes in personal initiative led to higher business success over a period of one year.

**Entrepreneurial passion.** Entrepreneurial passion is defined as an intense positive feeling toward entrepreneurial tasks and activities that are relevant to the entrepreneur's self-identity (Cardon et al. 2009). Other scholars have conceptualized entrepreneurial passion as love of the entrepreneurial work (Baum & Locke 2004). Passion implies strong feelings and high motivation. Most

Frese • Gielnik



entrepreneurs attribute their persistence, particularly in the beginning phase of starting a firm, to their great passion. Thus, entrepreneurial passion should be a driver and source of energy to work hard, long hours with high levels of effort and persistence (Baum & Locke 2004, Cardon et al. 2009). According to Cardon et al.'s (2009) theory, entrepreneurial passion should have a motivating function in all phases of the entrepreneurial process for two reasons: First, within Russell & Carroll's (1999) two-dimensional semantic structure of affect, passion is pleasant and activating. Pleasant and activating feelings are a source of motivation and, thus, have an effect on people's efforts (Seo et al. 2004). Experiencing activating pleasant feelings creates action tendencies to move toward an object (in contrast to avoiding an object), and activating pleasant feelings are linked to a physiological response that provides the energetic basis for making active efforts (Elliot 2006). Second, entrepreneurial passion positively affects entrepreneurial effort through goal setting (Baum & Locke 2004, Cardon et al. 2009). High levels of entrepreneurial passion should lead to setting more challenging goals because the positive feeling associated with entrepreneurial passion should increase entrepreneurs' expectations and needs for being successful in the activities related to that positive feeling (Cardon et al. 2009, Seo et al. 2004). As a consequence, passionate entrepreneurs should set high goals because they would not be satisfied with achieving only low or medium goals (Locke & Latham 2002). Additionally, entrepreneurial passion should lead to higher levels of goal commitment.

There is empirical evidence for a positive effect of passion in the postlaunch phase of the entrepreneurial process as well (Baum & Locke 2004, Murnieks et al. 2012). However, it is also important to note that entrepreneurial passion may be an outcome of entrepreneurs' actions. Some scholars have argued that entrepreneurs' efforts may increase entrepreneurial passion (M.M. Gielnik, A. Schmitt, M. Spitzmüller, D.K. Klemann & M. Frese, unpublished manuscript). Based on goal-setting theory (Locke & Latham 2002) and self-perception theory (Bem 1972), they have hypothesized that high effort leads to goal achievement and high self-perceived effort, which are two mediating mechanisms in the relationship between entrepreneurial effort and passion. The group found support for their hypothesized effect of effort on entrepreneurial passion (M.M. Gielnik, A. Schmitt, M. Spitzmüller, D.K. Klemann & M. Frese, unpublished manuscript). Hence, future research should examine the potential virtuous cycle of entrepreneurial passion and effort.

**Positive and negative affect.** Affect (including feelings, moods, and emotions) is a hot topic in entrepreneurship (Cardon et al. 2012). Baron et al. (2012) focused on positive affect and argued that positive affect has positive effects on cognitive performance, accuracy of perception, task motivation (see also the section on entrepreneurial passion above), and self-regulation. They further argued that this relationship, however, is curvilinear such that positive affect has positive effects up to an inflection point beyond which the effects become negative. Beyond the inflection point, positive affect is associated with costs, such as increased susceptibility to cognitive errors, inappropriate long-term goals, or increased impulsivity. Research findings support the hypothesized positive effects of positive affect in entrepreneurship: For example, positive affect influences the introduction of product/service innovations through creativity (Baron & Tang 2011). Moreover, positive affect positively influences effort on entrepreneurial tasks beyond what is immediately required for the start-up (Foo et al. 2009).

Like positive affect, negative affect may have a positive function in entrepreneurship. Based on control theory (Carver & Scheier 1990), Foo et al. (2009) argued that negative affect serves as information that progress toward the goal is inadequate and slower than expected. This should prompt entrepreneurs to invest more effort into tasks that are immediately required. The authors' diary study provided support for this positive effect of negative affect (Foo et al. 2009). Furthermore, Foo (2011) also showed that negative affect in the form of anger may have positive

effects for opportunity evaluation. Anger is associated with appraisal tendencies of high confidence and control, thus leading to lower risk perceptions and more positive opportunity evaluations (Foo 2011). It would be interesting to examine whether positive affect and negative affect interact as described by the affective shift model advanced recently in the areas of creativity (Bledow et al. 2013, George & Zhou 2002) and engagement (Bledow et al. 2011). These studies suggest that the combination of negative and positive affect is important. First, negative affect has to be present, and second, it needs to be reduced; the result is then a much higher degree of creativity and engagement than that produced by positive (or negative) affect alone.

### Conclusion

We have selected psychological constructs and shown how they can help both to broaden our understanding of the entrepreneurship process and to develop a fuller picture of I/O psychology. That understanding should include how organizations come into existence, how individuals and small teams of entrepreneurs affect the economic conditions of societies, and how actions in the specific situation of entrepreneurship are developed. The fascinating part of entrepreneurship is not just that it is a highly complex job, but that the job changes its task structure in different phases of the entrepreneurship process. The first phases present a different task structure than the post-launch phase; therefore, there are a number of interesting relationships both between the individual and the task structure and between individuals within start-up teams, which have not been studied much. Also, the strong action orientation of entrepreneurship may allow researchers to examine a number of hypotheses that are cannot be studied in established organizations, such as the relationship between strong individuals and how some individuals may dominate groups of entrepreneurs, how organizational culture come to be developed in firms, what changes happen during these various phases, or how individual and organizational characteristics interact with the environment to produce positive and negative effects for entrepreneurs and their firms.

### A FRAMEWORK FOR THE PSYCHOLOGY OF ENTREPRENEURSHIP

Instead of a lengthy summary of the research presented above, we present a model that is largely based on earlier work of our group—the so-called Giessen-Amsterdam model or, as we now call it more descriptively, the action-characteristics model of entrepreneurship (see **Figure 1**). It is a working model, because we think that researchers can adjust it to their specific areas of inquiry; further, it is a loose model in the sense that additional constructs can easily be added or deleted depending upon our current state of knowledge. For the sake of completeness, we have included variables in this model that we did not discuss in the above review; a major reason for leaving them out of the above discussion is that it is organized along the issue of how entrepreneurship can learn from I/O psychology and vice versa and the knowledge developed via meta-analyses. Therefore, we omitted a number of constructs that have already been studied in the psychology of entrepreneurship. Obviously, the model is more of a framework than a real theoretical model. However, it offers several hypotheses to inform the area of the psychology of entrepreneurship.

First, the model puts action characteristics at center stage. There are no direct paths hypothesized to entrepreneurial success except from action and action characteristics. It may be surprising to many people that we do not expect a path from the environment to entrepreneurial success, but this reflects the idea that action is of basic importance. If the environment is not affecting action characteristics or if it is not moderating the effects of action characteristics, then we hypothesize no effect. Similarly, personality, motivation, education, and cognitive factors do not affect success directly but only indirectly through the entrepreneurs' actions.

Frese • Gielnik





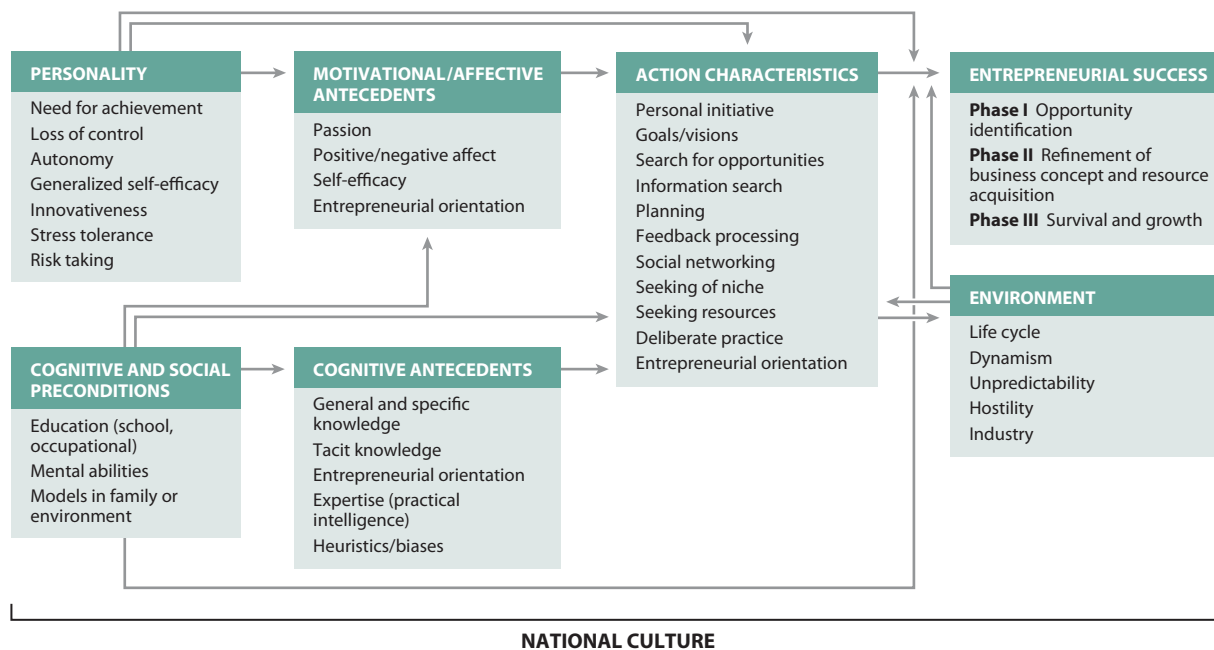


Figure 1

The action-characteristics model of entrepreneurship (Frese 2009).

Second, action characteristics are at center stage in all phases of entrepreneurship, which leads to the idea that different action characteristics are important in different phases. In the first phase, taking action is important for identifying and developing a business opportunity (Dimov 2007). Entrepreneurs who come up with a business idea have to gather feedback and seek additional information to modify, shape, and refine the idea such that it becomes a viable and feasible business concept (Dimov 2007). In this phase, the product or the service has to be actively built. In the second phase, entrepreneurs have to perform several start-up activities to establish viable business structures and operational procedures (Gartner 1985). These start-up activities include acquiring the necessary resources and equipment, fulfilling legal requirements, and developing marketing and sales strategies; furthermore, an entrepreneur has to test whether the product/service can attract buyers (Reynolds 2007). Entrepreneurs who are more active in this phase, that is, who perform more start-up activities and who spread those activities over time, are more likely to successfully start a new venture (Carter et al. 1996, Lichtenstein et al. 2007). In the third phase, entrepreneurs have to take the necessary action to manage survival and growth of the new company. Important actions are, for example, handling conflicts, negotiating contracts, forming alliances, developing new business strategies, and so forth (Baron 2007).

The construct summarized under action characteristics is not actions per se, but rather ways of performing an action. It may help to provide an example here: Any action is accompanied or followed by feedback. However, there are large differences in how feedback is processed and developed. Some entrepreneurs develop a number of feedback systems, in which they get feedback from potential customers, they ask more questions, and they attempt to use whatever unobtrusive feedback exists. Some entrepreneurs also actively encourage critiques and negative feedback in order to learn to improve their products/services. All of this determines how effective feedback is

developed and used. The more active this process, the more likely that success will follow (Ashford & Tsui 1991). This type of reasoning can be done with every one of the action characteristics described in **Figure 1**. In each case, an active approach to goal setting, information search, planning, etc., has a different effect than if a non-active approach were taken.

Third, we assume that the more active action characteristics lead to actions that are more likely successful. In other words, the characteristics that are typical of personal initiative—being self-starting, proactive, and able to overcome barriers—are more likely to lead to higher success if they affect the different action characteristics. Frese (2009) argues that all action characteristics can be more or less active and that in general the more active action characteristics have been shown to be related to success. Thus, for example, active social network strategies are related to entrepreneurial success (X.Y. Zhao et al. 2010). Similarly, active forms of learning in the sense of deliberate practice are related to entrepreneurial success (Unger et al. 2009).

Fourth, **Figure 1** is organized in such a way that (with the exception of environment) the constructs on the left side are more distal constructs, more distal from action and more distal from impacting success, whereas the constructs on the right side are nearer to action and, therefore, nearer to influencing success. For this reason, we gave a few constructs a double entry, for example, self-efficacy and entrepreneurial orientation. There is a difference between general self-efficacy (a personality trait) and specific self-efficacy (a motivational state) (Chen et al. 2001). The self-efficacy scales in entrepreneurship research usually describe several roles (e.g., starting an organization, thinking creatively, marketing a new product, etc.). If one places the frequently used entrepreneurial self-efficacy scales (e.g., Chen et al. 1998) into a continuum from general to specific or from distal to proximal to action, they usually fall between a highly general construct and a clearly specific one. The more general constructs would be part of personality (and should be less predictive of success), and the more specific ones would be motivational states (and more predictive). We believe that it would be worthwhile for entrepreneurship researchers to differentiate general from specific constructs and to develop hypotheses accordingly. Unfortunately, the complex task requirements of entrepreneurs make this difficult—whenever one wants to build a self-efficacy construct with regard to all of entrepreneurship, it is by necessity relatively general because entrepreneurship covers a wide array of task areas.

Similar reasoning applies to the area of entrepreneurial orientation. If this construct is conceptualized as a strategic stance, then it belongs to action characteristics; if the construct is an orientation or an attitude, it would instead belong to the motivational/affective category. One could also argue that entrepreneurial orientation is a cultural component of a firm, in which case it would be an environmental component. Finally, the facets of entrepreneurial orientation—autonomy, innovativeness, aggressiveness, risk orientation, and proactiveness—could be also personality dimensions. Entrepreneurship research and psychological research in this area need to be very clear about which type of construct they are measuring and about developing appropriate measures for each type of construct.

## CONCLUSIONS AND FUTURE RESEARCH

Entrepreneurship is an exciting field of inquiry for I/O psychology, or as we would like to call it, work and organizational psychology, and the work done in the psychology of entrepreneurship is living proof of this. However, it is not easy for research to be a contribution both to entrepreneurship and to work and organizational psychology alike. All too often, psychology-based entrepreneurship research has been reproductive research in the sense of using an established area of inquiry of work and organizational psychology and applying it to entrepreneurship. In a few cases, established concepts of entrepreneurship (such as entrepreneurial orientation) have been transported into work and organizational psychology.

Frese • Gielnik



15.18

We believe that it would be possible to develop research areas that contribute both to I/O psychology and to entrepreneurship, and we want to provide a few examples that follow from our discussion of the psychology of entrepreneurship. First, we have discussed meta-analytic findings and noted that the results indicate heterogeneous effects across studies. This means that the effects vary across different studies, suggesting that the study contexts or other factors moderate the strength of the effects. Future research should investigate such moderators and identify boundary conditions of theories and hypothesized relationships. For example, Brinckmann et al.'s (2010) meta-analysis found that the effect of planning on performance varies across studies. Rauch et al.'s (2000) study sought to explain why there are different relationships between planning and performance. The authors investigated cultural differences in the planning–performance relationship and found that planning had a positive effect in a highly uncertainty-avoidant culture (Germany) and a negative effect in a minimally uncertainty-avoidant culture (Ireland). It would be interesting to examine whether high uncertainty avoidance with its pressure to plan well leads to reduced short-term exits of new entrepreneurial firms as compared with low uncertainty avoidance. Such research would help to refine our theories by showing under which conditions effects hold or disappear. Culture may be a particularly important factor in this regard, as there are large differences in entrepreneurship across different countries (Freytag & Thurik 2007, Stephan & Uhlaner 2010). Although there have been some advances in understanding the relationships between cultural factors and entrepreneurship (Stephan & Uhlaner 2010), there are likely many additional prediction models that could examine the combination of economic and legal institutions and cross-cultural differences as predictors of entrepreneurial success.

Second, we have discussed the value of adopting a psychological perspective to elucidate typical constructs in the entrepreneurship domain, such as entrepreneurial alertness or business planning. Future research could further integrate constructs from I/O psychology to provide a more comprehensive approach toward entrepreneurship. For example, in entrepreneurship there is a large literature on venture capital, which is often about selecting promising entrepreneurs. To our knowledge, there are not any selection studies in the international literature on entrepreneurship done within the tradition of I/O psychology. Thus, research drawing on selection theories from I/O psychology may further inform the entrepreneurship literature on venture capital. Similarly, I/O psychology could integrate the existing research on venture capital choices on financing entrepreneurial units as examples of lay-selection procedures. A psychological perspective could also help to inform concepts such as effectuation (Sarasvathy 2001) or improvisation (Baker et al. 2003). This research could discuss potential detrimental effects of non-goal-oriented approaches, for example purely reactive or adaptive behavior by entrepreneurs with negative outcomes for their persistence, innovativeness, and performance. Conversely, the concept of experimental actions with little emphasis on goal setting and planning or potential compensating approaches of improvisation under conditions of little goal setting can be examined in I/O psychology, perhaps leading to new research strands in the otherwise well-developed areas of goal setting and performance (Locke & Latham 2002).

Research seeking to integrate different perspectives could also focus on the person–environment interaction. I/O psychology has been interested in how people interact with their environments. Entrepreneurship often provides extreme environments, for example, extremely high uncertainty or environmental hostility. Thus, interaction effects at the margins can be studied more readily in entrepreneurship than in organizational settings. Moreover, entrepreneurs can sometimes influence their environments more strongly, for example, when they are working in a niche. Again, that is less frequently the case in organizational settings (although organizations also allow a fair amount of change owing to the personal initiative of job holders) (Grant et al. 2010).

Third, we have emphasized that entrepreneurship is a process with different phases. We think that it would be worthwhile to investigate dynamic trends and developments of constructs within but also across the different phases. In general, entrepreneurship is a particularly good area to study the dynamics of performance, that is, performance changes that occur within a person over time. In this regard, “changes over time can imply changes in mean values, changes in correlations between performance dimensions, and lack of stability of performance over time” (Sonnetag & Frese 2012, p. 550). A good example of an exploration of these dynamics is a study that showed how small differences in resources, skills, and motivation, which produced at first very small differences in performance between Sri Lankan peasants who had all started out with the same rice paddies, via positive and negative cycles led to vast differences in wealth between these peasants after 10 years (Kodithuwakku & Rosa 2002). We envision that future studies on the dynamics of performance in I/O psychology will do this in the domain of entrepreneurship. Similarly, Cardon et al.’s (2009) theory of entrepreneurial passion is a good example of a theory specifying dynamics across the different phases of the entrepreneurial process. The authors describe how entrepreneurs’ passion may vary across the different phases of entrepreneurial process and how this has substantial effects on their behavior and decisions. We think that future research taking into account the specific challenges and demands of the different phases of entrepreneurship will provide theories that better explain entrepreneurship.

Fourth, we have noted that the entrepreneurship domain may inform I/O psychology. The hallmark of entrepreneurship is bringing an organization into existence. This is of utmost importance for work and organizational psychology. For example, it is unclear to what extent omissions of organizational design at the starting point impact organizations over the long term. For example, Beckman & Burton (2008) showed that there is path dependency in the creation of a new organization: If a certain role in the starting team is not filled, the area will consequently also later be underdeveloped. Path dependency versus flexibility and its antecedents are certainly areas that would be interesting to study. One area that often worries change managers is how difficult it is to change organizational culture. Researchers could examine the effect of flexibility in the very beginning of the firm on an organization’s long-range agility. The type of organizational culture that develops may also depend upon the action tendencies of a firm’s founder(s). It is, therefore, useful to measure entrepreneurs’ support for a certain organizational culture (culture in the sense of common practices), which is why Koenig et al. (2007) have developed scales that measure such support. We hypothesize that the degree of support exhibited by entrepreneurs is the foundation of organizational culture in an organization and may in the long term help or hinder the development of the organization.

Finally, we think that the entrepreneurship domain may benefit from acknowledging a broader view on potential outcomes, as has been done in I/O psychology. So far, research in entrepreneurship has focused mainly on financial outcomes, such as profit or sales (e.g., Mayer-Haug et al. 2013). Future research could also focus on more subjective outcomes, such as life satisfaction, strain, or work–life balance. This would provide a more holistic understanding of the positive and negative effects of entrepreneurship on people’s economic and also psychological well-being.

### DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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Frese • Gielnik



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