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Keep Calm and Carry On: Emotion Regulation in Entrepreneurs' Learning From Failure

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While failure urges entrepreneurs to learn, it also generates strong emotions that may hinder learning behaviors. Drawing on affective events theory, we develop a model reconciling the countervailing effects of failure. In particular, we focus on failure velocity—rate at which failure events are experienced—to understand entrepreneurs' learning from failure. Survey data from entrepreneurs in the information technology industry reveals an inverted U-shaped relationship between failure velocity and learning behaviors. Emotion regulation moderates this relationship. When failure velocity rises beyond an inflection point, its relationship with learning behaviors is more positive for entrepreneurs with higher emotion regulation.

Experience is simply the name we give our mistakes.

—Oscar Wilde

Introduction

The uncertain and risky nature of entrepreneurship implies a considerable possibility of failure (McGrath, 1999). As a Silicon Valley saying goes, "if you haven't failed, you haven't really tried." The experience of failure indeed offers valuable opportunities for an entrepreneur in learning not only about the market, the product(s), and the venture but, more importantly, about his or her own strengths and weaknesses (Cope, 2005, 2011). However, to utilize the potential of failure for business knowledge or personal growth,

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entrepreneurs need to employ a set of *learning behaviors*—collecting information, identifying the root causes of failure, and reflecting on and discussing relevant experience (Edmondson, 1999). Only with such behaviors in place can an entrepreneur truly benefit from the valuable lessons associated with failure (Cannon & Edmondson, 2001; Cope, 2011).

While the entrepreneurship literature offers rich insights into the content (Cope, 2005, 2011; Singh, Corner, & Pavlovich, 2007) and outcomes (Politis & Gabrielsson, 2009; Shepherd, 2003; Sitkin, 1992; Yamakawa, Peng, & Deeds, 2015) of entrepreneurial learning, the specific learning behaviors employed by entrepreneurs remain largely unexplored. This neglect is problematic, because it allows neither scholars nor entrepreneurs to sufficiently understand how certain desirable results are achieved. To illuminate how, if at all, entrepreneurs learn from failure, scholars need to directly examine a set of concrete, observable learning behaviors (Edmondson, 1999; Walumbwa, Cropanzano, & Hartnell, 2009).

Moreover, the development of the entrepreneurship literature linking failure and learning has been facilitated by a linear assumption that generally predicts a positive relationship between failure experience and certain results, such as decision-making quality (Sitkin, 1992), self-employment knowledge (Shepherd, 2003), and attitude toward failure (Politis & Gabrielsson, 2009). This assumption is incongruent with a growing recognition that business failure is a salient affective event that may trigger intense emotional responses during and long after the event takes place (Morris, Kuratko, Schindehutte, & Spivack, 2012; Shepherd & Cardon, 2009; Shepherd, Wiklund, & Haynie, 2009). As business failure is a painful and sometimes even traumatic experience (Cope, 2005, 2011; Singh et al., 2007), negative emotions elicited by failure events are likely to hamper learning once they are above a certain threshold (Shepherd, Covin, & Kuratko, 2009; Yamakawa et al., 2015). Moreover, "more complex, nonlinear relationships that more accurately depict how these affective mechanisms actually unfold" (Foo, Uy, & Murnieks, 2015, p. 420) may exist. Thus an important question is whether an increasing rate of experiencing failure events will continue to increase entrepreneurs' learning behaviors or whether it will have diminishing returns.

In this study, we examine the relationship between an important aspect of failure experience—failure velocity (Morris et al., 2012), the rate at which business failure events are experienced—and entrepreneurs' learning behaviors. Departing from the linear assumption, we predict that learning behaviors will increase with failure velocity up to an inflection point and then begin to decline. The rationale is that with high failure velocity the emotional interference outweighs the motivational and informational benefits for learning behaviors. Our prediction is rooted in research analyzing the impact of affect and emotion on entrepreneurial actions (Baron, 2008; Foo, Uy, & Baron, 2009; Foo et al., 2015; Welpe, Spörrle, Grichnik, Michl, & Audretsch, 2012) and in affective events theory (AET) (Morris et al.; Weiss & Cropanzano, 1996), which connects events and their associated emotions to individual behaviors.

These theoretical predictions notwithstanding, we observe that of the many entrepreneurs who have encountered multiple business failures and experienced intense emotions, a few manage to maintain high levels of learning behaviors (e.g., Richard Branson and Steve Jobs) as failure velocity increases. What individual differences, then, enable some entrepreneurs to continuously engage in learning behaviors while failure velocity rises beyond the threshold for many others? An emerging body of research shows that the degree to which entrepreneurs cope with and utilize their failure experiences hinges on how effectively they regulate their emotions (Shepherd, 2003; Shepherd & Cardon, 2009; Shepherd, Wiklund et al., 2009). Therefore, we investigate the moderating effect of emotion regulation (Law, Wong, & Song, 2004)—the extent to which individuals manage

their emotions and deal with psychological distress—in the relationship between failure velocity and learning behaviors.

This study makes three primary theoretical contributions. First, we theorize and find evidence for a curvilinear relationship between entrepreneurs' failure velocity and learning behaviors. Our results suggest that low and high failure velocities present different barriers to learning behaviors, whereas a moderate failure velocity strikes a balance between the motivation and the interference brought about by negative emotions. Our research model reconciles the countervailing effects of business failure on entrepreneurs' learning. This is the first empirical study to demonstrate a curvilinear relationship between failure velocity, an important aspect of failure experience, and entrepreneurs' learning behaviors. Moreover, by directly examining the concrete learning behaviors employed by entrepreneurs (i.e., gathering information, searching for root causes, and reflecting on and discussing relevant experience), we provide a valuable addition to the entrepreneurship literature that focuses primarily on the results of learning (e.g., attitude change and sales growth) (Politis & Gabrielsson, 2009; Shepherd, 2003; Sitkin, 1992).

Second, we develop a better understanding of entrepreneurs' active management of emotions. A significant amount of research showing entrepreneurial failure as an emotionally charged experience (e.g., Shepherd, 2003) demonstrates a heightened need for better understanding of how entrepreneurs overcome emotional obstacles (Cardon, Foo, Shepherd, & Wiklund, 2012). We respond to this demand by investigating the moderating role of emotion regulation. In our model, the level of entrepreneurs' learning behaviors with high failure velocity depends on their emotion regulation. Our study elaborates the dual functions of emotion (i.e., both as information provider and as interference for cognitive functioning) and advances an explanation rooted in emotion regulation to account for when negative emotions facilitate learning behaviors rather than hampering them.

Third, we contribute to an important stream of entrepreneurship research distinguishing the two dimensions of affect: valence and activation (Baron, Hmieleski, & Henry, 2012; Foo et al., 2015; Hayton & Cholakova, 2012). Guided by AET, we theorize how negative emotions of different intensities impact entrepreneurs' motivation, cognition, and (eventually) behaviors. In leveraging a unique situation such as business failure, where the prevailing emotions have the same valence (i.e., negative) and varied activation levels, we complement most[1] existing research, which holds the effect of activation constant when examining the effect of different valence (e.g., Baron et al.; Hayton & Cholakova).

The argument of this article unfolds in four steps. We first provide a comprehensive review of previous research on business failure and define failure velocity for this study. Next, we hypothesize a curvilinear influence of failure velocity on learning behaviors and a moderation effect of emotion regulation. We then test these hypotheses using multisource survey data, collected in the United States and Finland. We conclude with the implications of these theoretical and empirical analyses.

Theoretical Background

Business Failure and Failure Velocity

How does one know that an entrepreneur has failed? This question has attracted much scholarly attention and resulted in various criteria for failure. An intuitive criterion concerns the "continuance or discontinuance of a business" (Bruno, Mcquarrie, &

1. For an exception, see Foo et al. (2015).

Torgrimson, 1992; Singh et al., 2007; Singh, Corner, & Pavlovich, 2015). However, entrepreneurs may close a business for many reasons, ranging from shifting personal interest to creditors' demands for liquidation. Because the termination of a business elicits drastically different emotions depending on its causes (Ucbasaran, Shepherd, Lockett, & Lyon, 2013), this criterion may not provide sufficient guidance in interpreting such an emotion-laden event (Shepherd, 2003). Headd (2003), for example, showed that about 30% of entrepreneurs believed that their businesses were successful at the time of closure. Entrepreneurial failure should thus not be equated with voluntary termination for reasons such as pursuing more lucrative opportunities or taking (early) retirement (Cope, 2011).

Another criterion for failure entails comparing the performance of an entrepreneurial initiative to certain pre-set goals (Cope, 2011; McGrath, 1999; Ucbasaran, Westhead, Wright, & Flores, 2010) or performance standards (Yamakawa & Cardon, 2015). Adopting this criterion, some scholars (e.g., Mantere, Aula, Schildt, & Vaara, 2013; Politis & Gabrielsson, 2009) argue that failure does not necessarily require a full exit of entrepreneurs or complete termination of the business. As long as performance deviates from expected results and calls into question entrepreneurs' prevailing beliefs, such a deviation should be considered a failure. Attempting to capture all the personal mishaps and hardships experienced by entrepreneurs (Politis & Gabrielsson), this criterion risks being too broad.

Using a narrower performance criterion, a popular school of thought restricts failure to the bankruptcy or insolvency of a business (Jenkins, Wiklund, & Brundin, 2014; Shepherd, Wiklund et al., 2009; Yamakawa et al., 2015; Zacharakis, Meyer, & DeCastro, 1999). These scholars argue that entrepreneurial failure occurs when a drop in revenues, a rise in expenses, or both are of such magnitude that the venture becomes insolvent and is unable to attract new debt or equity funding. However, Cope (2005, 2011) points out that entrepreneurial failure also concerns the inability of an entrepreneur to continue the business (e.g., because of a hostile takeover by another firm or having other owners force the entrepreneur to exit). Therefore, a purely financial view of failure neglects many other important legal, relational, or personal factors associated with business failure (Bruno et al., 1992).

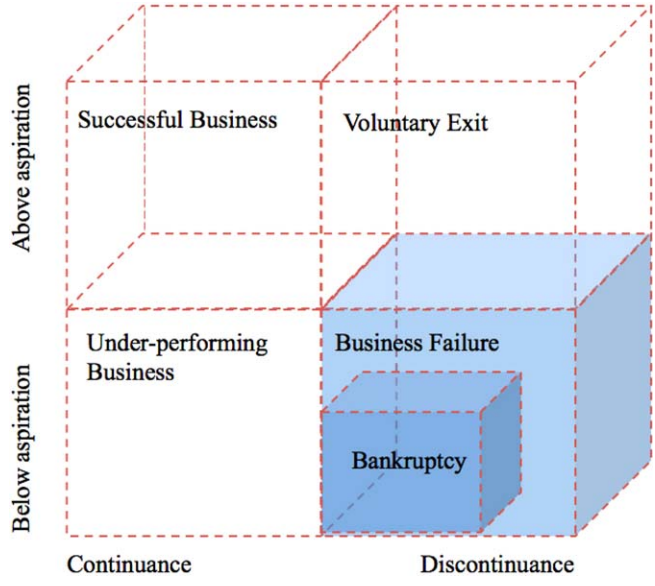
In sum, business continuance or discontinuance and the performance threshold emerge as a relevant pair of criteria for understanding entrepreneurial failure. Applying this pair, we categorize an entrepreneur's business in one of the four situations depicted in Figure 1. Among operating businesses, one that performs above entrepreneurs' and/or venture capitalists' aspirations is a *successful business*, whereas one that performs below aspirations yet continues to exist because of an escalation of commitment (Shepherd, Wiklund et al., 2009) is an *under-performing business* (DeTienne, Shepherd, & De Castro, 2008). Among discontinued businesses, one that the entrepreneur terminates voluntarily (despite above-aspiration performance) to allow more family time or to maximize personal wealth (Wennberg, Wiklund, DeTienne, & Cardon, 2010), is a *voluntary exit*, whereas one that the entrepreneur involuntarily terminates for reasons such as financial difficulties, legal problems, or partnership disputes is a *business failure*.[2]

However, the occurrence of business failures alone does not fully capture how an entrepreneur experiences failure. This "experiencing" of failure, according to (Morris et al., 2012), varies in volume (the number of failure events experienced), velocity (the rate at which those events are experienced), and volatility (the degree or intensity due to highs and lows associated with those events). Given the temporal dynamics of the entrepreneurial process (Bird & West, 1997), in this study we choose to focus on failure

2. We consider bankruptcy or insolvency a subset of business failure (i.e., failure due to financial reasons).

Figure 1

Categorization of Business Situations



velocity, because it captures not only the number of business failures but also the average time between two failure events. These temporal dynamics have important implications for learning behaviors, due to the discounting effects of distant events (Madsen & Desai, 2010) and the delayed impact of events on behavior and performance (Rahmandad, 2008).

Failure as an Affective Event

Despite different criteria for defining entrepreneurial failure, scholars generally agree that business failure is an emotionally charged experience (e.g., Shepherd, 2003; Shepherd & Cardon, 2009; Singh et al., 2015). In-depth qualitative research shows that entrepreneurs often devote substantial financial and personal resources to found, nurture, and develop a business (e.g., Cope, 2011; Singh et al., 2007). As a result, entrepreneurs are deeply attached to their businesses (Baron, 2008; Cardon, Zietsma, Saparito, Matherne, & Davis, 2005) and respond to business failure with negative emotions, including disappointment, sorrow, fear, anger, shame, and grief (Cope, 2011; Shepherd, 2003; Singh et al., 2007; Ucbasaran et al., 2013). Indeed, for entrepreneurs, business failure represents a personal loss that can generate emotions as intense as those elicited by the loss of a loved one (Shepherd). This close bond between an entrepreneur and his or her business makes business failure a salient affective event (Cope, 2003; Cope & Watts, 2000; Morris et al., 2012). The experience of such events, according to AET (Weiss & Cropanzano, 1996), will have lasting effects on an individual's emotions and eventual behaviors. We, therefore, seek to understand the impact of entrepreneurial failure experience on entrepreneurs' learning behaviors through the lens of AET.

An entrepreneur's experience is a series of events imbued with affect and emotion (Morris et al., 2012). While many daily operations (such as building a team and developing a product) represent events that are continuous, certain milestones (e.g., the opening and the closing of a business) represent events that are discontinuous (Cope, 2003). These discontinuous events are salient for entrepreneurs because they are high in affect. Salient events largely shape the entrepreneurial experience (Morris et al.) and have the most critical influence on an entrepreneur's learning (Cope).

The affect and emotion associated with a salient event have an important influence on entrepreneurs' motivation (Seo, Barrett, & Bartunek, 2004), judgment (Welpe et al., 2012), and, ultimately, efforts (Foo et al., 2009, 2015). On one hand, the negative emotions generated during and after failure events signal a goal not achieved or an aspiration not met (Carver & Scheier, 1990). These emotions in turn motivate entrepreneurs to exert additional efforts to close the gap between their current and desired states (Foo et al., 2009) by, for example, engaging in learning behaviors. On the other hand, negative emotions shift entrepreneurs' attention toward coping with an immediate threat to their well-being (Foo et al., 2009), leaving little capacity for learning through collecting and processing of failure-related information. As a result, negative emotions could block behaviors that are future-oriented or cognitively demanding (Foo et al., 2009; Gaddis, Connelly, & Mumford, 2004). However, the interference introduced by negative emotions varies according to different levels of activation and different tendencies toward emotion regulation (Weiss & Cropanzano, 1996).

According to AET, individuals' reactions to failure vary across their dispositional characteristics. First, individuals differ in the level of activation of affective responses to a given event (e.g., a positive person tends to react to events more positively than a negative person). Second, individuals differ in the ability to regulate their affective responses. For entrepreneurs, recent research shows that they share many affective dispositions: They are generally known to be highly passionate (Cardon et al., 2012), confident, and optimistic (Koellinger, Minniti, & Schade, 2007), and to have higher dispositional positive affect than the general population (Baron et al., 2012; Baron, Tang, & Hmieleski, 2011). Nonetheless, considerable heterogeneity exists in entrepreneurs' tendency to regulate emotions (Shepherd, Covin et al., 2009). Therefore, in this study, we explore emotion regulation as the key individual difference explaining the variance in the relationship between entrepreneurs' failure velocity and learning behaviors.

Hypotheses Development

Failure Velocity and Entrepreneurs' Learning Behaviors

Extrapolating from the theoretical arguments of AET and research on entrepreneurs' affect and emotion, we propose a curvilinear relationship that entrepreneurs' learning behaviors increase with failure velocity up to an inflection point, beyond which further increase in velocity will see diminishing returns.

Entrepreneurs are often "overconfident" (Busenitz & Barney, 1997), tending to start their ventures with overly optimistic estimations of risk (Koellinger et al., 2007). Therefore, the absence of failure reinforces emotions such as feeling content and serene—emotions that are positive in valence and low in activation. Such emotional states do not encourage individuals to exert extra mental effort to gather information or increase cognitive activity (De Dreu, Baas, & Nijstad, 2008). Put differently, entrepreneurs who have never experienced failure may run the risk of remaining in their initial state of "novelty"

or "ignorance" (Politis, 2005, p. 417), lacking the motivation for engaging in more learning behaviors.

A very low level of failure velocity[3] means, on average, an extended time between a prior failure event and current learning behaviors. The effects of a life event, even one as salient for an entrepreneur as a business failure, would eventually wear off with time (e.g., Brickman, Coates, & Janoff-Bulman, 1978). Both individual learning and organizational learning literatures show that an event's effect is discounted with an increased time elapsed since its occurrence (Madsen & Desai, 2010; Rahmandad, 2008). Even though an entrepreneur may experience heightened negative emotions at the very moment of a failure event or shortly after it occurs, the activation level of that emotion will drop over time. Consequently, when the average time between failure event and current learning increases, the informational and motivational values of such events decrease, creating a weaker impetus for learning behaviors.

An initial increase in the failure velocity is likely to increase learning behaviors. While entrepreneurs carry with them assumptions of how various causes and effects are related, assumptions in the entrepreneurial process are subject to continuous assessment (McGrath, 1999). Business failure as an event represents a negation of one or more of these assumptions and elicits emotions such as disappointment and anger (Cope, 2003). By signaling to entrepreneurs that things are not on the right track (Carver & Scheier, 1990), negative emotions provide important feedback on their skills and competence (Minniti & Bygrave, 2001). As a result, failure urges entrepreneurs to search for new information, reconsider prior assumptions, and discuss their previous mistakes with relevant stakeholders (Cope, 2011; McGrath; Minniti & Bygrave). Moreover, increasing failure velocity means that the average time elapsed between failure events is shorter, and that the motivational and informational effect of failure becomes more salient as its velocity rises. Consequently, entrepreneurs' learning behaviors initially increase with failure velocity.

However, a further increase in failure velocity can evoke emotional responses that are potentially detrimental to entrepreneurs' learning behaviors. As previously discussed, because business failures are highly emotional and often traumatic events (Shepherd, 2003), considerable temporal and psychological distance is required for overcoming the painful emotions (Cope, 2011). Research on trauma recovery has shown that until a highly affective event is assimilated and integrated into existing schematic representations, the psychological elements of such an experience will continue to produce intrusive and emotionally upsetting recollections (Creamer, Burgess, & Pattison, 1992). Recovery from failure thus involves a gradual healing process.

As a high level of entrepreneurial failure velocity, on average, entails a short processing interval between business failure and current learning behaviors, negative emotions stay at high levels of activation. These heightened negative emotions can either create demands incompatible with learning activities or divert cognitive resources away from them (Fiedler & Garcia, 1987; Weiss & Cropanzano, 1996). In the meantime, as the activation level of negative emotions increases, their motivational effect levels off while their interference with cognitive functioning continues building up (Foo et al., 2015). Because learning behaviors such as disentangling relevant information from noise and processing useful information are cognitively demanding (Catino & Patriotta, 2013), further increase in entrepreneurial failure velocity becomes less beneficial. In such cases, the emotional

3. Mathematically speaking, having experienced no failure at all (i.e., a zero failure velocity) is comparable to having a failure event that is infinitely distant.

interference of negative emotions outweighs the motivation they bring about. Additionally, without being able to come to terms with entrepreneurial failure, entrepreneurs may experience self-stigmatization, which leads to both withdrawal from social interaction and suppression of learning behaviors such as seeking feedback from or discussing problems with others (Cope, 2011; Singh et al., 2007). Thus we hypothesize the following:

> **Hypothesis 1:** The relationship between entrepreneurial failure velocity and entrepreneurs' learning behaviors is inverted U-shaped: Learning behaviors increase with failure velocity until an inflection point and then decrease with failure velocity.

The Moderating Role of Emotion Regulation

According to AET, an affective event triggers two appraisal phases. The first phase determines the valence of affect (i.e., positive vs. negative), by evaluating the event's impact on the individual's well-being, and the activation level (i.e., strong vs. weak) of the affect, by gauging the importance of the event (Weiss & Beal, 2005). Insofar as a business failure impedes an entrepreneur's well-being, such an event generally produces negative affect (e.g., Shepherd, 2003; Ucbasaran et al., 2013). Yet the activation level of the negative affect may differ depending on the perceived importance of the business failure. The second phase produces discrete emotions (e.g., dissatisfaction vs. depression) through a closer assessment of the content, causes, and consequences of the event, together with the individual's potential for coping with it (Weiss & Beal). Entrepreneurs can regulate their emotions in either one or both of these appraisal stages to maintain learning behaviors even in the face of high failure velocity.

Emotion regulation influences which emotions to have, when to have them, and how to experience and express them (Gross, 1998). The regulation mechanism relies on two distinct sets of strategies: antecedent-focused and response-focused (Gross, 2002). In the first appraisal phase, when emotions have neither fully developed nor changed the behavioral or physiological responses, antecedent-focused emotion regulation strategies are relevant. In the case of a failure event, entrepreneurs can select which of the many aspects of a business failure they will focus on. Once they attend to a particular aspect of the event, entrepreneurs can further select which of many possible meanings to attach to it.

In the second appraisal phase, where a certain emotional response is underway, response-focused emotion regulation strategies come into play. First, emotion regulation channels emotional responses toward motivating learning behaviors (Shepherd, Covin et al., 2009). While failure events generally elicit negative affect, negative emotions differ in their activation for learning behaviors (Seo et al., 2004). Entrepreneurs with higher emotion regulation are more likely to view failure as less permanent or to view themselves as more capable of coping with it (Cardon & McGrath, 1999), despite high failure velocity. This appraisal process translates into dissatisfaction with the current state, thereby motivating entrepreneurs to engage in learning behaviors (Shepherd, Covin et al., 2009; Yamakawa & Cardon, 2015). In contrast, entrepreneurs with lower emotion regulation are more likely to focus on factors beyond their control (e.g., the actions of competitors, customers, and suppliers) (Eggers & Song, 2015) and deem failure as less manageable. This evaluation gives rise to emotions such as helplessness and depression, which lead entrepreneurs to believe further learning behaviors are of little help for improving their current situation (Seo et al.).

Second, entrepreneurs with higher emotion regulation are better able to control the timing and expression of their emotions. At high levels of failure velocity, negative

emotions could create various barriers to engaging in learning behaviors. For example, failure triggers fear (Singh et al., 2007), which causes individuals to either deny or avoid the associated experience (Quinn & Fanselow, 2006) and grief (Shepherd, 2003), which is retrieved or even intensified when entrepreneurs reflect on and analyze the failure experience (Cisler, Olatunji, Feldner, & Forsyth, 2010). When entrepreneurs are able to manage such negative emotions at the critical time for learning, they are more likely to effectively collect, analyze, and internalize the valuable information that a failure event generates. Consequently, entrepreneurs with higher emotion regulation are more likely to keep negative emotions from interfering with learning behaviors at the critical phase.

Given the impact of emotion regulation on the two appraisal stages of an affective event, we expect emotion regulation to change the trajectory of learning behaviors associated with high levels of failure velocity. Consistent with our logic, empirical evidence from academic performance—an achievement-related situation comparable to that of entrepreneurial performance—supports the moderating effect of emotion regulation in learning from failure (Parker, Summerfeldt, Hogan, & Majeski, 2004). Prior conceptual work in corporate entrepreneurship (Shepherd, Covin et al., 2009; Shepherd, Haynie, & Patzelt, 2013) also suggests that emotion regulation affects how entrepreneurs mobilize motivational and cognitive resources to learn from project failures. Thus we hypothesize the following:

> **Hypothesis 2:** Emotion regulation moderates the relationship between failure velocity and entrepreneurs' learning behaviors, so that beyond the inflection point the relationship is more positive for entrepreneurs with higher emotion regulation.

Methods

Sample and Data Collection

In 2012, we conducted a multi-source survey with firms in the information technology (IT) industry (Standard Industrial Classification Code: 7371–7379). Learning is of critical importance for entrepreneurs in the IT industry, given that they have to rapidly adjust to globalization and technological innovation (Bingham & Davis, 2012; Davis & Eisenhardt, 2011). We targeted firms with 5–499 employees for better visibility of entrepreneurs' learning behaviors in small and medium-sized firms (Bingham & Davis).

The initial inclusion criterion, first applied to U.S. firms listed in the Dun and Bradstreet database, resulted in 1,556 eligible firms. Given this large number, we drew a random sample of 500 firms, 87 of which we were not able to reach due to change of address.[4] The percentage of undeliverable surveys (17.4%) in our study is in line with that in other survey studies using the same database (e.g., Hmieleski & Baron, 2009). To increase the generalizability of our findings beyond a large market, we included Finland as a second geographic area for data collection. Despite a smaller market size, the IT industry in Finland is of similar maturity to that of the United States (Bingham & Davis,

4. Around 20% of firms listed in Dun and Bradstreet change addresses each year (Hmieleski & Baron, 2009).

2012). We applied the same criterion to the Statistics Finland database and identified 775 eligible firms. In total, we sent surveys to 1,188 firms. To ensure conceptual equivalence between the English and Finnish versions of our surveys, we translated the survey from English to Finnish, and then back-translated from Finnish to English (Brislin, 1980).

To avoid both common-source bias and social desirability bias (Morrison & Phelps, 1999), we measured controls, independent variables, and dependent variables separately in two waves, using two sources. Entrepreneurs provided information about their age, gender, education, trait affects, learning goal orientation, failure velocity, and emotion regulation. After receiving the entrepreneurs' replies, we contacted them again and asked them to invite two senior managers (with whom they interacted most frequently and shared strategic decision-making responsibilities) to participate. These managers then assessed the entrepreneurs' learning behaviors in a separate survey.

In the first survey, 57 American and 149 Finnish entrepreneurs responded (response rates of 13.8% and 19.2%, respectively).[5] The average firm in our sample was 9 years old (SD = 6.38), with 35 employees (SD = 48.04) in 2011. To examine nonresponse bias, we compared the age and number of employees in the participating firms with the population from which our sample was drawn. Additionally, we used Armstrong and Overton's (1977) extrapolation method, comparing the sample means of all the study variables (i.e., *failure velocity*, *emotion regulation*, and *learning behaviors*) across early and late responding groups. None of the *t*-test results was significant, suggesting that nonresponse bias was not a serious threat.

In the second survey, which took place on average 4–6 weeks after the first one, 68 American managers and 217 Finnish managers responded. After matching entrepreneurs' and managers' responses, we obtained 155 pairs of data: 52 from the United States and 103 from Finland. In cases where both invited managers responded (57% of the participating firms), the two evaluations of learning behaviors were averaged. The r_{wg} value was .90, indicating a high degree of agreement between the two managers. List-wise deletion of missing data rendered a final sample size of 142 paired data points (49 from the United States and 93 from Finland).

Our entrepreneur sample consisted of three categories: first-time, serial, and portfolio entrepreneurs. About a quarter of the participating entrepreneurs had experienced a business failure at least once (19.01% had one business failure, 4.23% had two business failures, and 0.70% had four business failures).[6] Entrepreneurs in our sample were on average 47 years old (SD = 8.88), had some college education, and had spent 20 years (SD = 9.53) in the IT industry. Given the specific demographic feature of the IT industry, most of these entrepreneurs (92.25%) were male. There was no significant difference in age, gender, education, or experience between the participating entrepreneurs from the United States and Finland. Managers had an average age of 40 (SD = 8.95), and about three quarters of them (73.81%) were male. The managers and their corresponding entrepreneurs had been working together for an average of 6 years (SD = 5.08), in most cases (71.4%) interacting daily. Given this evidence, the managers were in a good position to evaluate the corresponding entrepreneurs' learning behaviors.

5. These response rates are well within the acceptable norms for survey research (Baruch, 1999). And studies using a similar approach (e.g., Brouthers, Nakos, & Dimitratos, 2014) typically report a lower response rate in the United States than in Europe.

6. This proportion is consistent with the samples used in previous studies (e.g., Politis & Gabrielsson, 2009; Ucbasaran et al., 2010).

Measures

Learning Behaviors. We assess learning behaviors using a seven-item scale adapted from Edmondson (1999). For consistency with our individual level of analysis, we changed the reference point from *team*—used in Edmondson's original scale—to *individual* (see Liu, Hu, Li, Wang, & Lin, 2014, for a similar approach). Managers evaluated the degree to which an entrepreneur, for example, "makes sure that he or she stops to reflect on his or her experience," and "goes out and gets all the information he or she possibly can from others—such as customers or other parts of the organization." These items were rated on a 5-point Likert scale (1 = "strongly disagree" and 5 = "strongly agree"), with a reliability of .83.

Failure Velocity.[7] In line with the definition of failure velocity–the rate at which business failure events are experienced (Morris et al., 2012), we operationalize this construct as the ratio of the number of failed businesses to the number of years as an IT entrepreneur. In particular, the number of failed businesses is gauged by the question "Of all the businesses you started, how many have you terminated due to any of the following reasons: financial difficulty, legal problems, or partnership dispute?"

Emotion Regulation. Using the four items from Law et al. (2004), we measure entrepreneurs' *emotion regulation*. This emotion regulation scale is a sub dimension of emotional intelligence, with questions such as "I can always calm down quickly even when I am very angry" and "I am able to control my temper so that I can handle difficulties rationally." The entrepreneurs rated these items on a 5-point scale (1 = "strongly disagree" and 5 = "strongly agree"). The reliability of this scale was .79.

Control Variables. Previous studies show that gender, cognitive ability, and dispositional affect have an impact on entrepreneurs' coping with and learning from failure (e.g., Foo et al., 2009; Jenkins et al., 2014). We, therefore, control for *gender* (1 = female; 2 = male), *education level* (highest educational attainment, coded as 1 = high school diploma, 2 = associate's degree, 3 = bachelor's degree, 4 = master's degree, and 5 = doctoral degree), and *dispositional affect* (measured by the short Positive and Negative Affect Schedule; Thompson, 2007). As *learning goal orientation* also influences learning behaviors (e.g., Elliott & Dweck, 1988), we control for this orientation of entrepreneurs (measured by a five-item scale from Vande Walle, 1997). Finally, we control for the *country* where a firm was operating at the time of our data collection (1 = the United States; 2 = Finland).

Before merging the U.S. and Finnish data, we tested for measurement invariance following Steenkamp and Baumgartner's (1998) procedure. To determine whether our measure is comparable across contexts, we compared the fit indices of a set of increasingly constrained multi-group structural equations. In line with studies focusing on the general relationships among variables (e.g., Collewaert & Sapienza, 2016; Monsen & Boss, 2009), rather than a cross-cultural comparison (e.g., König, Steinmetz, Frese, Rauch, &

7. To help distinguish the velocity from the volume of failure events, we offer the following three cases: Entrepreneur A failed once in 1 year, Entrepreneur B failed four times in 5 years, and Entrepreneur C failed four times in 3 years. A has a failure velocity of 1, whereas B has .8. Although A has experienced less volume (i.e., number) of failure events, he or she has experienced a higher velocity of failure events than B. Further, while B and C have experienced the same volume of failure events (i.e., N = 4), their velocity values are different (.8 and 1.33, respectively).

Table 1

Measurement Invariance Assessment: Configural, Metric, and Scalar Invariance

	Models	Comparisons	$\chi 2$(df)	$\Delta\chi 2(\Delta df)$	RMSEA	CFI	TLI
A	Configural invariance	–	28.20(26)$^{n.s.}$	–	.035	.99	.98
B	Full metric invariance	A versus B	39.60(32)$^{n.s.}$	11.40(6) $^{n.s.}$	.058	.96	.95
C	Full scalar invariance	B versus C	62.42(38)**	22.82(6)***	.095	.88	.87
D	Partial scalar invariance†	B versus D	49.40(37) $^{n.s.}$	9.80(5) $^{n.s.}$	.069	.94	.93

Note: † Intercept of one learning item is freed.
** $p < .01$, *** $p < .001$, n.s. = not significant. RMSEA, root mean square error of approximation; CFI, confirmatory factor analysis; TLI, TuckerLewis index.

Wang, 2007), we focused on the configural, metric, and scalar invariance of our dependent variable—learning behavior. We first tested for configural invariance (representing the same pattern of factor loadings) by allowing the scale indicators to load freely on the construct in both groups. This configural model served as a baseline model, to which more restricted models were compared (i.e., metric invariance, where both groups have equal loadings on measured items, and scalar invariance, where both groups have equal intercepts on measured items). The results in Table 1 show that our models achieve configural, full metric, and partial scalar invariance. Overall, these results indicated equivalence of the measurement scale and good comparability of the construct across groups, justifying our decision to merge the two subsamples (Collewaert & Sapienza, 2016). Furthermore, the reliability of our learning behavior scale was .84 in the U.S. sample and .79 in the Finnish sample, indicating that the variable was reliable in both study contexts and that measurement artifacts do not bias the substantive conclusions.

Analytical Approach

To test our hypotheses, we use robust regression[8] (Cook, 1977; Hamilton, 1991), *rreg* in STATA 13. To check for the presence of multicollinearity, we calculate the variance inflation factors (VIFs) for each regression model. All VIFs are below the acceptable limit of 5 (O'Brien, 2007), with the highest mean VIF at 3.06. These values suggest that multicollinearity does not influence the model results. Before conducting the regression analysis, we mean-center all the study and control variables, including the interaction terms (Aiken & West, 1991).

Results

Table 2 presents descriptive statistics and correlations among all variables, and Table 3 presents the results of the hypothesis tests.

8. Compared to ordinary least squares (OLS) regressions, robust regressions produce a more reliable results when dealing with multinational data (Khavul, Pérez-Nordtvedt, & Wood, 2010; Yamakawa et al., 2015). Robust regressions also better resist the pull of outliers and produce more efficient standard errors. The interpretation of robust coefficients, standard errors, and measures of fit is identical to that of OLS.

Table 2

Descriptive Statistics and Correlations

	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9
1. Gender	.08	.27	0	1									
2. Country	1.65	.48	1	2	−.01								
3. Education level	2.67	1.04	1	5	−.26**	−.27**							
4. Positive affect	3.56	.62	1	5	.03	−.58***	.18*						
5. Negative affect	2.57	.58	1	4.4	−.06	.24**	−.06	.05					
6. Learning goal orientation	4.11	.54	2.8	5	.02	−.11	.08	.24**	.07				
7. Industry experience†	20.13	9.53	4	42	.00	-.08	.06	−.05	.09	−.15			
8. Failure velocity	.02	.05	0	.25	.00	−.17*	−.18*	.09	−.05	−.05	−.25**		
9. Learning behavior	3.77	.63	1.86	5	.05	−.33***	.10	.18*	−.02	.14	−.02	−.14	
10. Emotion regulation	3.83	.60	2.25	5	−.00	−.04	.05	.02	−.23**	.15	.10	−.11	.07

Note: † Industry experience is a denominator in failure velocity measure.
*$p < .05$, **$p < .01$, ***$p < .001$ two-tailed tests.

Table 3

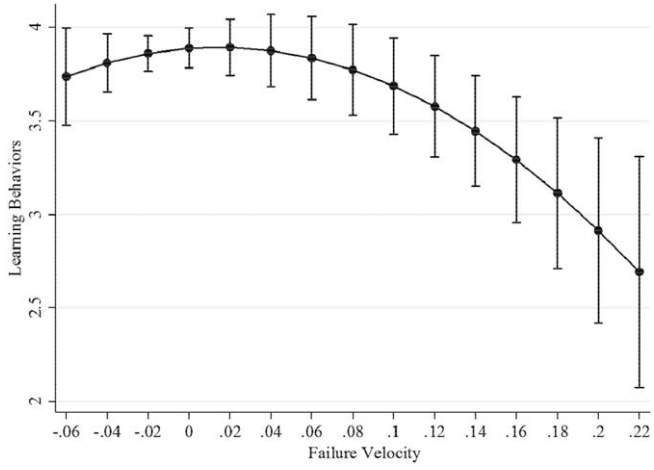
Hierarchical Robust Regression Results for Learning Behaviors

	Model 1		Model 2		Model 3		Model 4	
Dependent variable: Learning behavior	β	SE	β	SE	β	SE	β	SE
Control variables								
Gender	.18	.18	.17	.18	.19	.17	.12	.18
Country	−.59***	.13	−.59***	.13	−.59***	.13	−.61***	.13
Education level	.03	.05	.03	.05	.03	.05	.01	.05
Positive affect	−.07	.09	−.07	.10	−.07	.09	−.07	.09
Negative affect	.16*	.08	.16*	.09	.17*	.08	.12	.09
Learning goal orientation	.03	.09	.04	.09	.02	.09	.02	.09
Direct effects								
Failure velocity			−2.62*	1.05	.83	1.90	−1. 20	2.05
Failure velocity squared					−28.51*	12.47	7.08	17.71
Emotion regulation							−.12	.10
Moderation effects								
Failure velocity × Emotion regulation							−5.80*	3.14
Failure velocity squared × Emotion regulation							83.70**	31.21
F-statistic	5.72		5.05		5.81		4.52	
	(6, 135)		(7, 134)		(8, 133)		(11, 130)	
R^2	.16		.18		.21		.23	
ΔR^2			.02*		.03*		.02*	

Note: Country is coded as 1, the United States, and 2, Finland; Bigger value in education indicates higher education; n = 142.
†< 0.10, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ (two-tailed tests).

Figure 2

Curvilinear Effect of Failure Velocity on Learning Behaviors



Note: Entrepreneurial failure velocity has been mean-centered. Vertical lines around the curve represent 95% confidence intervals.

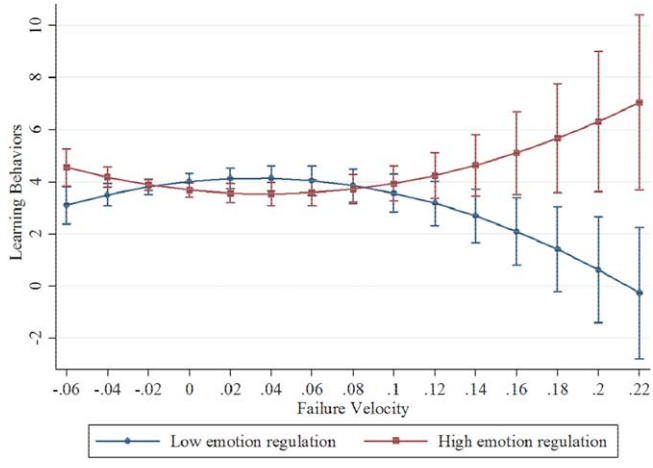
As a baseline model, Model 1 contains only the control variables. Model 2 includes the controls and the linear effect of entrepreneurial failure velocity. In this linear model (model 2), failure is negatively associated with learning behaviors ($\beta = -2.62$, $p < .05$). However, after we account for the nonlinear effect (model 3), the linear effect of failure frequency becomes nonsignificant ($\beta = .83$, $p =$ n.s.). Model 3 evaluates hypothesis 1, which proposes an inverted U-shaped relationship between failure velocity and learning behaviors. This model explains 21% of the variance in learning behaviors and improves significantly on Model 2 ($\Delta R^2 = .03$, $F = 5.23$, df = 1, 133, $p < .05$). Results from Model 3 confirm that the relationship between failure and learning is inverted U-shaped ($\beta = -28.51, p < .05$).

To visualize the curvilinear relationship, we compute and plot in Figure 2 the marginal effect of failure frequency at the full range of its values, with an interval of .02 (Brambor, Clark, & Golder, 2006). None of the 95% confidence intervals of these marginal effects contains zero, signifying that the proposed relationship in hypothesis 1 is significant at all levels of failure velocity. The plot shows that learning behaviors first increase with failure velocity and then start to decrease after the level of failure velocity exceeds .02, revealing an inverted U-shaped relationship between entrepreneurial failure velocity and learning behaviors. Given that we have mean-centered the independent variable, an inflection point of .02 means that when entrepreneurial failure velocity exceeds the mean level, any further increase in it will be negatively related to learning behaviors. The results of Model 3 and the plotted marginal effects in Figure 2 fully support hypothesis 1.

Hypothesis 2, which predicts a moderating effect of emotion regulation, is evaluated in Model 4. This model includes an interaction term of squared failure velocity and emotion regulation. The coefficient associated with this interaction term is significant ($\beta = 83.70$, $p < .01$). Model 4 explains 23% of the variance in learning behaviors and shows a significant increase in explanatory power on Model 3 ($\Delta R^2 = .02$, $F = 3.61$, df = 2, 130, $p < .05$). These results confirm the hypothesized moderating effect of emotion regulation.

Figure 3

Moderation Effect of Emotion Regulation



Note: Entrepreneurial failure velocity has been mean-centered. Vertical lines around the curve represent 95% confidence intervals.

Figure 3 illustrates the plotted marginal effects of the interaction. The different relationships for entrepreneurs with high versus low levels of emotion regulation show that the relationship between failure velocity and learning behaviors is contingent on emotion regulation. For entrepreneurs with low emotion regulation, when failure velocity increases beyond the inflection point, it becomes negatively associated with their learning behaviors. In contrast, for entrepreneurs with high emotion regulation, a further increase in failure velocity relates positively to their learning behaviors. Therefore, when failure velocity increases beyond the inflection point, the relationship between failure velocity and learning behaviors is consistently more positive for entrepreneurs with higher emotion regulation. In addition, once the level of failure velocity exceeds the value of .15 (about one business failure in every 6 years), entrepreneurs better at emotion regulation consistently exhibit more learning behaviors with the same level of failure velocity. Together, these results fully support hypothesis 2.

Robustness Analysis

To further evaluate the robustness of our findings, we conduct four additional tests. First, we test our hypotheses independently of the nonsignificant control variables (i.e., gender, education, positive affect, and learning goal orientation). In these tests, failure velocity has an inverted U-shaped relationship with learning behaviors ($\beta = -26.62$, $p < .05$), and emotion regulation positively moderates this curvilinear relationship ($\beta = 67.56$, $p < .01$). These two coefficients are in the same direction and of the same significance level as those obtained in models with all control variables included.

Second, we test our hypotheses using a subsample of entrepreneurs who have experienced at least one business failure. Similar to the results obtained from the full sample, the relationship between failure velocity and learning behaviors is inverted U-shaped

($\beta = -99.55$, $p < .001$), and emotion regulation positively moderates this relationship ($\beta = 90.68, p < .1$).

Third, by testing country as a moderator, we test whether the country where the data were collected affects our findings. Our analysis shows that country does not moderate the curvilinear relationship between entrepreneurs' failure velocity and learning behaviors ($\beta = 29.56$, n.s.), thereby providing additional justification for our decision to combine the two data sets.

Fourth, we replicate our results with a two-stage least squares instrumental variable (IV) regression. Our IVs include entrepreneurial dynamism in 2009–2010 and failure normalization, both of which fulfill the requirement for effective IVs—highly correlated with the predictor and uncorrelated with the error term (Wooldridge, 2002).[9] The first-stage regression analysis shows that entrepreneurial dynamism ($\beta = 2.12$, $p < .05$) and failure normalization ($\beta = -.01$, $p < .01$) are statistically significant predictors of failure velocity. The Sargan and Basmann over-identification test indicated that our IVs were uncorrelated with the error term (Sargan chi-squared test: .05, $p = .82$).

Given that checking for endogeneity in nonlinear relationships is at risk of running a particular form of forbidden regression, one that often leads to inconsistent estimations (Haans, Pieters, & He, 2016; Wooldridge, 2002), we focus only on the linear relationship. The Durbin–Wu–Hausman statistics indicate that endogeneity is not a serious concern in our study (Chi-squared: .99, $p = .32$). Moreover, the linear relationship between failure velocity and learning behaviors remains in the same direction and is significant at the .1 level ($\beta = -5.94$, $p < .1$). Together, these results show that endogeneity (e.g., reverse causality between dependent and independent variables) does not bias our results.

Discussion

Although failure has long been recognized as an integral part of entrepreneurship, knowledge of how and when entrepreneurs learn from failure remains incomplete (Cope, 2011; Politis & Gabrielsson, 2009; Shepherd, 2003). Previous research suggests that while failure provides opportunities for entrepreneurs' personal growth and learning (Cope, 2003, 2011; McGrath, 1999), it also creates emotional obstacles to information processing (Shepherd), deep reflection (Cannon & Edmondson, 2001), and other cognitive functioning (Baron, 2008). Consequently, Yamakawa et al. (2015, p. 23) pose the critical question of whether "every entrepreneur learns from failure."

In light of these recent theoretical debates, this study takes a closer look at entrepreneurs' learning from failure. Adopting the lens of AET (Morris et al., 2012; Weiss & Cropanzano, 1996), we examine the impact of business failure as a salient learning event. Because the rate at which salient events are experienced has important implications for learning, we focus on failure velocity as a particular aspect of how entrepreneurs experience business failure. We explore the relationship between entrepreneurs' failure velocity and their learning behaviors under a nonlinear hypothesis.

9. We choose entrepreneurial dynamism because it serves as a conduit for ongoing entrepreneurial activity (Audretsch & Keilbach, 2004; Kibler, 2013) and thus affects failure rate. Using public data, we calculate entrepreneurial dynamism as new establishment minus firm closures in the region (Armington & Acs, 2002; Audretsch & Fritsch, 1994). We choose failure normalization because cultural attitudes toward failure influence entrepreneurial action (e.g., Shepherd, Patzelt, & Wolfe, 2011). We measure failure normalization using the item ("society takes failure in stride") developed by Shepherd et al. Entrepreneurs rated this item on a Likert scale ranging from 1 = "strongly disagree" to 5 = "strongly agree."

Our findings suggest that with low failure velocity, entrepreneurs may remain complacent and lack sufficient motivation to increase learning behaviors. With high failure velocity, the negative emotions concentrated in a short time frame may distract entrepreneurs from further engagement in learning behaviors. We also find that an intermediate level (i.e., around the sample mean) of failure velocity relates to the highest level of learning behaviors. This high level of learning behaviors is likely to result from optimal motivational and informational effects created by negative emotions at a moderate activation level. Furthermore, we find that entrepreneurs' emotion regulation moderates the curvilinear relationship between failure velocity and learning behaviors: When failure velocity exceeds a threshold, its association with learning behaviors is more positive for entrepreneurs with higher emotion regulation.

With these findings, our study contributes to three interrelated streams of literature. First, we contribute to the growing literature on entrepreneurial failure. To date, much folk wisdom and scholarly work share an implicit assumption that experiencing failure leads to learning. Nonetheless, as this assumption may not be universal, it warrants a more careful examination (Yamakawa et al., 2015). Our study departs from the linear assumption underpinning most existing studies and extends the current discussion by not only developing theory but also providing the first empirical evidence of a curvilinear relationship between entrepreneurs' failure velocity and their learning behaviors.

Furthermore, unlike studies that focus on either the promises or perils of failure, we integrate both sides of the argument using AET as an overarching theoretical framework. Our findings reveal an inflection point of failure velocity, beyond which the interference resulting from high activation level outweighs the drive to achieve better results. In explaining the delicate dynamics between the motivation for engaging in learning behaviors and emotional interference with these behaviors, we reconcile the countervailing effects of failure on entrepreneurs' learning as reported in the literature. In addition, our focus on entrepreneurs' concrete learning behaviors extends the entrepreneurial learning literature by providing important insights into how entrepreneurs draw lessons from critical learning events (Cope & Watts, 2000).

Second, by deepening the understanding of the nonlinear effect of affect and emotion, our findings on the moderation effect of emotion regulation contribute to an important stream of entrepreneurship research (e.g., Cardon et al., 2012; Foo et al., 2009, 2015). Previous research has shown that entrepreneurs are emotional individuals and that their cognition, motivation, and actions are highly subject to their discrete emotions (e.g., Welpe et al., 2012) and dispositional affects (e.g., Baron et al., 2012). However, emotion and affect of similar valence may trigger different behavioral tendencies. In an event such as business failure, negative emotions serve dual functions (Shepherd, Covin et al., 2009): (a) motivating learning behaviors by signaling that things are off track and (b) impeding learning behaviors by competing for cognitive resources.

What requires further investigation is how a regulatory mechanism alters the baseline influence of affect and emotion on entrepreneurs' behaviors (Cardon et al., 2012). The literature on entrepreneurial affect is incomplete unless we integrate the role of emotion regulation. Indeed, Foo et al. (2015) have recently called for researchers to investigate the differences in emotion regulation, to help further understand the behavioral outcomes resulting from experiencing certain emotions. Our study responds to this timely call by theorizing the moderating role of emotion regulation and empirically testing its effect above and beyond dispositional affects.

Third, we enrich the entrepreneurship research on affect and emotion by further distinguishing the impacts of valence and activation. The affective event of our study—business failure—is unique, because the prevailing affect is negatively valenced while the

activation of that affect varies. Extrapolating from the central thesis of AET, which articulates the two appraisal stages and their relationships with the two dimensions of affect (i.e., valence and activation), we delineate how an affective event such as business failure, when experienced with different velocities, generates emotion of the same valence (i.e., negative) while having varied activation. Our reasoning contributes to the recent theoretical development disentangling these two dimensions of affect (Baron et al., 2012; Foo et al., 2015; Hayton & Cholakova, 2012). Furthermore, our study extends prior research holding the effect of activation constant and focusing on the valence (Baron et al.; Hayton & Cholakova), by exploring how the various activation levels of negative emotion exert different influences on entrepreneurs' motivation; cognition; and, eventually, behaviors.

Implications for Entrepreneurs and Educators

Our research has important implications for entrepreneurs experiencing various levels of failure velocity. As our findings suggest, some exposure to failure is beneficial for learning behaviors. We, therefore, encourage entrepreneurs who have not experienced any business failure to engage in "visualization" (Dale, 2000) and vicarious learning (Bandura, 1997). "Visualization" is a mental exercise that athletes use to imagine handling various challenging situations before major competitions (Dale). By visualizing failure and processes for coping with it, entrepreneurs not only can mentally undergo the challenging situations they may later encounter in the venture process but can also experience, to a large extent, the emotions accompanying failure. With frequent practice of "visualization," entrepreneurs will be better prepared to respond effectively to business failure or other difficult situations.

Vicarious learning gives entrepreneurs the benefit of learning from the failure experience of others (Kim & Miner, 2007). By observing and analyzing their peers' failures and near-failures, entrepreneurs can develop strategies for coping with failure without actually having closed a business (Wood & Bandura, 1989). Entrepreneurs who have never failed should engage in vicarious learning by attending events such as FailCon, where experienced entrepreneurs openly discuss their own mistakes and failures, or finding mentors who share experiences of how they stumbled but bounced back.

We encourage entrepreneurs who have experienced at least one business failure to fully utilize this (financially and emotionally) costly experience. Our findings suggest that a long processing time between failure and the current state tends to wear off the motivational and informational value of failure. However, keeping a journal of the entrepreneurial process can store key information for later access (Shepherd, 2004), thereby somewhat offsetting this discounting effect. When writing a journal during and after the failure event, entrepreneurs should reconstruct not only what happened but also what they felt. As entrepreneurs explore and document their feelings, these journals can foster introspection (Petranek, 2000) and help them develop a deeper understanding of their experience (Shepherd). Furthermore, a detailed description of the emotional state may take the entrepreneurs back in time to "relive" those critical moments. In the subsequent venture process, entrepreneurs can then use the journal as a medium for reflecting upon distant failure events and for refreshing those valuable lessons.

We encourage entrepreneurs to pay attention to the development of emotional competencies. Our study shows that emotion regulation is critical for overcoming the emotional barriers associated with high failure velocity. Similarly, previous research suggests that understanding and managing emotions influence how effectively entrepreneurs obtain resources and deal with a lack of resources (Shepherd, 2009). Entrepreneurs, especially

those who have experienced a high failure velocity, will benefit from developing strategies of emotion regulation. Unfortunately, most traditional training programs focus on developing entrepreneurs' "hard" skills, including technology commercialization, market analysis, and business plan development, while overlooking important "soft" skills such as emotional intelligence (Henry, Hill, & Leitch, 2005). Entrepreneurs should seek to develop their emotional competencies outside formal programs through, for example, extending their social network and obtaining emotional support from different sources (Shepherd et al., 2009).

Our findings also have important implications for entrepreneurship education. For many organizations, failure holds even more powerful lessons than success (Madsen & Desai, 2010). From an educational perspective, pinpointing why an organization has failed—rather than explaining why an organization has been successful—is often easier (McGrath, 1999). However, despite the educational value of failure and a high failure rate in entrepreneurship (Denrell, 2003), there remains a significant under sampling of failure cases in entrepreneurship education (Shepherd, 2004). We, therefore, urge entrepreneurship educators, both inside and outside academia, to design entrepreneurship education that better reflects the realities facing entrepreneurs and to specifically include more informative cases of failure in the curricula.

Limitations and Future Research Directions

This study has three main limitations that call for future research. First, our sample is not perfectly representative. Entrepreneurs who have experienced failure(s) may choose to continue or to exit from their entrepreneurial career. Contact information for entrepreneurs who have quit their entrepreneurial career is not available in any public database. Reaching this group is a general challenge for failure-related studies (e.g., Yamakawa & Cardon, 2015), and ours is no exception. As our findings reflect the reality of individuals continuing their entrepreneurial career, they thus cannot be generalized to a population beyond our reach. However, insights on failure-related learning behaviors and their relationship with emotion regulation are particularly useful for those who continue their entrepreneurial career and, by implication, continue to face the risk of entrepreneurial failure.

Second, this study relies on entrepreneurs' retrospective accounts of their business failures due to relational, legal, and financial reasons. Due to imperfect memory, simplification, and rationalization, retrospective accounts are subject to cognitive biases (DeRue & Wellman, 2009) and attribution errors (Ross, 1977). When answering our survey, entrepreneurs may not be able to recall all failure events caused by reasons that we specified, or, they may include failure events caused by other reasons (e.g., the collapse of the dotcom bubble). Nevertheless, our analysis gains confidence from research demonstrating that retrospective reports converge with real-time reports of life events (Ptacek, Smith, Espe, & Raffety, 1994), especially when the events being recalled are salient and personally experienced (DeRue & Wellman). Although issues related to retrospective memories are potential limitations, they are not likely to compromise the validity of our results. However, future studies may consider a real-time capture of failure events, measuring emotions and behaviors as such events unfold.

Third, the study is cross-sectional and thus unable to completely rule out potential reverse causality (i.e., that the lack of learning behaviors will make an entrepreneur fail more frequently than his or her peers). However, our hypotheses are rooted in a large body of research that has established failure experiences as a predictor of entrepreneurs'

learning (e.g., Cope, 2003, 2011; McGrath, 1999; Minniti & Bygrave, 2001; Shepherd, 2003; Yamakawa & Cardon, 2015). Moreover, AET and its related empirical research offer strong evidence that events experienced by individuals are predictive of subsequent attitudes and behaviors (Weiss & Cropanzano, 1996). We have also taken methodological steps to mitigate concerns of reverse causality by (a) measuring failure *prior* to the point when learning behaviors were observed and (b) using IVs regression to check for endogeneity. Nonetheless, whether or not a causal relationship exists between failure and learning behaviors needs further exploration in experimental studies. Future research could consider employing natural experiments (e.g., following cohorts of entrepreneurs in regions with different failure rates) or simulating failure in laboratories (e.g., providing participants different feedback for entrepreneurial tasks).

Indeed, the entrepreneurship is as much an affective journey as it is a cognitive one (Baron, 2008; Cardon et al., 2012; Foo et al., 2009, 2015). As we begin to understand velocity as one aspect of an entrepreneur's critical experience and the role of emotion regulation in learning from this experience, we recognize much opportunity for future research that further explores the multi-faced nature of the entrepreneurial process. In addition to failure velocity, researchers could explore the interaction between volatility and velocity and their joint effect on the emotion, cognition, and action of entrepreneurs. Furthermore, beyond emotion regulation, other mechanisms can also influence the baseline relationship between failure and learning. For example, recent theoretical development suggests that entrepreneurs may not always access failure with a problem-solving motive; rather, their primary motive may be to maintain a positive self-image (Jordan & Audia, 2012). An entrepreneur's propensity to assess failure in a self-enhancing way is likely to distort perceptions and attenuate emotions, thus functioning as a moderator in his or her learning from failure.

Finally, teams are common in the creation and development of new ventures (Klotz, Hmieleski, Bradley, & Busenitz, 2014). The dynamics in a funding team of a new venture, or, in the top management team of a more matured venture, make the learning of entrepreneurs a social process. It is thus beneficial for entrepreneurship scholars and practitioners to further explore the inputs, processes, and states of such a social process (Klotz et al.). The input factors of learning in entrepreneurial teams may include the prior experience, learning behaviors, and cognitive styles of team members, whereas processes and states-related factors may include the membership change, affective tone, cohesion, and psychological safety in these entrepreneurial teams. We believe that a detailed investigation of the interplay of cognition and emotion, both at the individual level and at the team level, will create additional insight into entrepreneurial learning.

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