

DOES INDIVIDUAL RESILIENCE INFLUENCE ENTREPRENEURIAL SUCCESS?

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ABSTRACT

The purpose of this paper is to explore if a well-accepted conceptualization of individual level resilience can be used to predict entrepreneurial success, thus offering the field an operationalization of resilience in entrepreneurs. Whilst many accept the importance of entrepreneurial resilience, it remains largely a metaphor applied to any aspect of entrepreneurship, from individual level to business to system level resilience. We explore resilience in a sample of 215 founding entrepreneurs and use regression analysis to examine the relationship between resilience and entrepreneurial success as indicated by individual level variables, and between resilience and entrepreneurial success as indicated by business performance variables. We find resilience in entrepreneurs comprises hardiness and persistence; that entrepreneurs are more resilient than other populations; and that resilience does predict entrepreneurial success. The results offer a parsimonious scale for use in future research into the resilience of entrepreneurs, the indicators of which could provide useful guidance in the development of resilience education and training for entrepreneurs. This research responds to recognition that the term resilience has multiple meanings and is a metaphor needing additional conceptualisation for the context in which it is used. These findings suggest that individual level resilience in entrepreneurs can be conceptualised as hardiness and persistence, and operationalized by the items in the CD-RISC 10-item scale.

INTRODUCTION

Resilience is emerging as a critical phenomenon in entrepreneurship with entrepreneurs, academics, journalists and bloggers pointing to its importance to success (Suster, 2009, Featherstone, 2009, Hedner et al., 2011, Francis, 2014, Jozefak, 2011). However, resilience is a term with multiple definitions applicable to literatures as diverse such as mechanics, scientific methods, psychology, manufacturing, social research, climate change, and sustainability science causing some to question its status as a fashionable buzz-word (Alexander, 2013). Bergstrom and Dekker (2014) note that resilience is a fractal phenomenon whose recognisable and recurring features vary at the spatial scales of micro (human), meso (organisations), macro (societal) and cross-scale (social-ecological).

Within the domain of entrepreneurship, entrepreneurial resilience is variously conceptualised as a phenomenon associated with distinct aspects of entrepreneurship, most frequently the individual, the venture, and the team (Hayward et al., 2010, Hedner et al., 2011, Hmieleski and Carr, 2008). This multiplicity of conceptualisations mirrors that of other domains and presents a challenge to the field in measuring, understanding and therefore enhancing entrepreneurial resilience for the benefit of the community. In response to the evolution, and broad adoption/adaption, of resilience across many domains Masten (2014, p. 6) has recently re-defined resilience as “the capacity of a dynamic system to adapt successfully to disturbances that

threaten system function, viability, or development". Building on this definition, Bergstrom and Dekker (2014) open the path for entrepreneurship scholars to develop an agreed conceptualisation of resilience at each spatial scale of interest (for example: entrepreneur, venture, team, society or social-ecological) to facilitate its operationalization in research. Accordingly, the term entrepreneurial resilience could remain as Welsh (2014) suggests, a metaphor for any experience of recovery or "bouncing back" after adversity at any spatial or temporal scale whether that be the individual, the team, the venture, the society or business/ecological system/subsystem. Entrepreneurship scholars could hone the definition, measurement and research of resilience at each scale thereby building the body of unambiguous knowledge regarding the experience of resilience in the differing contexts of entrepreneurship, ultimately providing an agreed conceptualisation and operationalization for each spatial scale of interest.

In this paper, resilience is examined at Bergstrom and Dekker's micro level (2014) the entrepreneur. The search for the character, trait or situational premise that explains the capacity of a person to function effectively in the face of the adversity, stress, and uncertainty of entrepreneurship, and which differentiates them from non-entrepreneurs, has generated considerable discussion (Alvarez, 2005, Gartner, 1988, Sarasvathy, 2004, Miller, 2015). The lens of individual level resilience provides explanatory value as to "why some individuals, and not others, are able to develop successful new ventures" (Hmieleski and Carr, 2008, Baron, 2002) providing impetus to bring the teaching and development of resilience into the entrepreneurship curriculum (Awogbenle and Iwuamadi, 2010, Morris et al., 2013, Duening, 2010).

The objective of this research is to test if an operationalized, well accepted conceptualisation of individual level resilience can be used to predict entrepreneurial success and therefore offer the field a conceptualization for use in theory building and future research around resilience in entrepreneurs. To do so, differences between the level of resilience displayed in entrepreneur and other populations, and the the role of individual level resilience in entrepreneurial success, are investigated. Findings suggest that individual level resilience in entrepreneurs can be conceptualised as hardiness and persistence, does predict entrepreneurial success when indicated by individual level variables, and can be adequately captured by the Connor-Davidson Resilience Scale (10-item). This paper proceeds as follows. Firstly, the literature on resilience at the individual level, particularly in the context of research into the resilience of entrepreneurs, is briefly reviewed. The research is then presented, and finally results, conclusions and limitations are presented.

These findings are interesting for three reasons. Firstly, they add to the emerging body of knowledge that examines the nature of entrepreneurs' resilience (Bullough et al., 2014, Sun et al., 2011, Ayala Calvo and Manzano Garcia, 2010, Roche et al., 2014). Secondly, they contribute to the search for useful measure of psychological resilience in entrepreneurs across more than one culture (Manzano-Garcia and Ayala Calvo, 2013, Ayala and Manzano, 2014) and contribute understanding of the factors that comprise resilience in entrepreneurs and the items that best capture these factors. Finally, other fields recognise the importance of teaching and developing resilience for professional development and personal growth (Tempski et al., 2012, McAllister and McKinnon, 2009, Ahangar, 2010). The field of entrepreneurship calls for the education of future generations of entrepreneurs to be tackled by research that informs teaching (Winkel, 2013). Thus, this research offers some interesting findings about a well-accepted

measure of psychological resilience that can be used to inform the understanding and teaching of what it is that comprises individual level resilience in entrepreneurs.

LITERATURE REVIEW

Resilience is a phenomenon suggested to be important in the context of successful entrepreneurship, is linked to desirable characteristics of both entrepreneurs and their ventures, and offered as part of the explanation for success (Ahangar, 2010, Wee, 2008, DeAngelis, 2011, Kuemmerle, 2002). Research has been conducted examining resilience as a feature of the entrepreneurial venture or organisation (Powell and Baker, 2012, Branzei and Abdelnour, 2010, Gittell et al., 2005, Sutcliffe and Vogus, 2003, Steiner and Cleary, 2014, Yang and Danes, 2015, Farmer and Kilpatrick, 2009), the entrepreneurial team (Blatt, 2009), family (Chrisman et al., 2011, Jaskiewicz et al., 2015), community and state (Junaid et al., 2014, Gebhardt, 2012, Virapart, 2011), and the individual entrepreneur (Duening, 2010, Hayward et al., 2010, Dewald and Bowen, 2010, Hmieleski and Carr, 2008, Albornoz, 2008, Amanjee et al., 2006, Ayala and Manzano, 2014, Markman and Baron, 2003).

Resilience is important to understand because it can serve as a protective measure in the face of extreme stress, trauma and adversity (Green et al., 2014) and inform programs designed to prevent less or maladaptive outcomes of stress, trauma and adversity (Ballenger-Browning and Johnson, 2010). Entrepreneurship is a field of endeavour characterised by stress and adversity, if not also in some instances trauma. Thus, understanding resilience becomes a priority if scholars are to assist those who undertake entrepreneurship for the benefit of the wider community. In this research, resilience at the individual level is the phenomenon of interest.

Individual level resilience is a latent construct that came to prominence in the context of research into children and youth with good developmental outcomes despite their high risk status (Garmezy, 1996, Werner, 1995). Alexander (2013) traces the origins and application of resilience agreeing with Masten (2014) that its meaningfulness has evolved across a variety of disciplines and domains. For example resilience is studied, and policies to address it are developed with: at-risk children, teachers and students, employees and managers, health professionals, military personnel, disaster planning, communities, governments, health and social systems (Schinke et al., 2004, Seligman, 2011, McAllister and McKinnon, 2009, Tempiski et al., 2012, Brown et al., 2001, Richardson, 2002, Welsh, 2014, Lew, 2014).

Despite the criticisms of complex non-linear causes and incomplete understanding of its components, resilience is widely accepted in the child development literature as a phenomenon that exists when functional outcomes are perceived in the context of risk and life stressors, or adaptation to a risk situation as a consequence of the interaction of a range of risk and protective factors (Olsson et al., 2003). For an overview of the development of the theory of resilience and notable theorists, see Masten (2014).

The existence of individual level resilience is not readily evident. The various definitions of individual level resilience are derived from differing sources of information about the presence of resilience. Accordingly, resilience is variously defined as the ability to adapt in the face of trauma, adversity, tragedy or even significant ongoing stressors (Masten, 2014), the embodiment of personal qualities that enable one to thrive in the face of adversity (Connor and Davidson, 2003), a personality characteristic that moderates the negative effects of stress and promotes adaptation (Ahern et al., 2006). Frequently the quality of resilience is attributed to individuals who in the face of overwhelming adversity are able to adapt and restore equilibrium to their lives and avoid the potentially deleterious effects of stress (Wagnild and Young, 1993).

Resilience may be viewed as a measure of successful stress coping (Connor and Davidson, 2003).

Kaplan (1999) offers a model to understand resilience that encapsulates key constructs inherent in the various definitions of resilience of outcomes, risk factors (and their complements) and protective factors (and their complements). The contribution of risk and protective factors to positive outcomes in adulthood has been well documented through empirical longitudinal studies (Fergusson and Lynskey 1996; Kadushin, 1975; Schoon, 2006; Werner and Smith, 2001). Other studies of children in particular risk situations such as family breakdown, chronic poverty, parental psychopathology and war (Werner, 1995) have also provided rich information on the concept of risk and adaptation. The risk and resilience framework resonates so well with practitioners and theoreticians that interventions are suggested as being applicable to enhance adult outcomes for children in other situations, such as children with disabilities (Murray, 2003), immigrant children (Yeh et al., 2008), and children who have or have had chronic physical illness (Pless and Stein, 1996).

Within the field of entrepreneurship, individual level resilience is considered to be of such importance that a lack of it, or not enough of it, is considered to be unhelpful at best, and detrimental at worst, to entrepreneurial endeavours. In other words, entrepreneurs are understood to be resilient, and this is proposed as part of the explanation of their success. Thus:

H1 *Entrepreneurs display higher levels of resilience than other populations.*

Capturing and measuring the individual's resilience has presented challenges for scale developers (Ahern et al., 2006). The Connor-Davidson Resilience Scale Resilience (CD-RISC) is one well accepted measure of resilience in which resilience is conceptualised as comprising five factors persistence, tenacity, self-efficacy; emotional and cognitive control under pressure; adaptability/ability to bounce back; control/meaning; and meaning (Connor and Davidson, 2003). These factors are consistent with the descriptions of resilience in entrepreneurship and entrepreneurs (Hedner et al., 2011, Hayward et al., 2010). The scale's reliability and construct validity has been confirmed in clinical and non-clinical populations, across cultures and professions, and in entrepreneurs (Connor and Davidson, 2003, Ayala and Manzano, 2014, Manzano-Garcia and Ayala Calvo, 2013) see <http://www.connordavidson-resiliencescale.com/> for a list of research using this scale).

Nonetheless, the CD-RISC has also been found to have an unstable factor structure (Green et al., 2014). In a study of Spanish entrepreneurs using the 25-item CD-RISC, three factors emerged (hardiness, resourcefulness and optimism) predicting entrepreneurial success (Ayala and Manzano, 2014, Manzano-Garcia and Ayala Calvo, 2013). In response to the factor instability, Campbell-Sills and Stein (2007) refined the 25-item scale to a 10-item scale and found that individual level resilience comprises two factors: hardiness and persistence. Both of these emergent factors are consistent with descriptions of entrepreneurs particularly in the context of their resilience. At the time of writing other papers using the 10-item scale in the context of the resilience of entrepreneurs had not been identified.

Entrepreneurial success is an important, broadly conceived phenomenon often understood more by implication or context (Fisher et al., 2014). Nonetheless it been both subjectively and objectively defined (Alstete, 2008, Hiemstra et al., 2006). Entrepreneurial success is indicated objectively by sales and subjectively by interviewee estimation of comparative growth (Ayala and Manzano, 2014, Manzano-Garcia and Ayala Calvo, 2013). Objective business indicators are used as proxies for entrepreneurial success such as number of employees, average annual

turnover, and average rate of growth (Achtenhagen et al., 2010). Entrepreneurs subjectively perceive their success using their autonomy, satisfaction and goal achievement (Fisher et al., 2014). Therefore, for the purposes of this research subjective and objective indicators of entrepreneurial success are separated, and distinguished by the terms entrepreneurial success individual, and entrepreneurial success business. Furthermore, explaining entrepreneurial success by linking measures of firm performance to individual level variables has been questioned (Baron and Henry, 2011 p. 261), implying that a relationship between individual level variables and firm performance is not a reasonable assumption because of the array of other variables that may impact firm performance beyond the individual. Thus:

H2 Individual level resilience predicts entrepreneurial success individual.

H3 Individual level resilience does not predict entrepreneurial success business.

We present our methodology in the next section.

METHOD

To test the hypotheses, an online survey was distributed to 3,585 founding Australian entrepreneurs recruited through a mix of self-selection and convenience sampling. For the purposes of this research an entrepreneur is defined as a person who founded a for-profit business, in which he or she holds a majority shareholding, from an opportunity he or she identified, that generated sustainable income streams for more than five years, employed more than three full time employees in addition to the entrepreneur, and enabled the entrepreneur to be financially self-sufficient through the profits generated by the activities of that business.

The Connor-Davidson Resilience Scale (Revised) a 10-item scale, comprising two factors (hardiness and persistence), that determines the extent to which a person displays resilience, with higher scores reflecting greater resilience. Scale items are ranked on a five-point Likert type scale from not true at all (0) to true nearly all the time (4). Items include “I am able to adapt when changes occur”, “I think of myself as a strong person when dealing with life’s challenges and difficulties”. Cronbach’s $\alpha = .85$; items are summed to produce a scale score up to 40 (Campbell-Sills and Stein, 2007).

Entrepreneurial success individual - comprises 4 items on a 5-point Likert type scale. Items comprise - I am successful if I: am personally satisfied with my life and business; do only that which I want to do in life and business; continually grow my business; achieve the business goals I set out to achieve in founding at least one business. The statements are ranked on a five point Likert type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Cronbach’s $\alpha = .72$ indicates satisfactory internal reliability, (M=16.00, SD=.2.85). The items are averaged to produce a scale score for entrepreneurial success individual (ESI).

Entrepreneurial Success business - a formative index was developed using six indicators of business activity: staff numbers and growth in staff numbers, turnover and growth in turnover, return on investment and growth in return on investment (Achtenhagen *et al.*, 2010, Baron *et al.*, 2010, Rauch *et al.*, 2000). Following Diamantopoulos and Winklhofer (2001) a global question was used to capture the essence of the factor, “This business has been operational for years”. The six business indicators were correlated with this item, three were significant with this statement (p=.000), the remainder were dropped from the index which comprises for the purposes of this research: “In 2008, the approximate number of full time and part time staff

employed in the business ”; “Approximate average annual turnover for the period 2006-2008 was ”; “In the period 2006-2008, the average rate of growth per annum for this business was ___”. The items were summed and their average used as the scale score ($M=1.787$, $SD=.612$) to indicate entrepreneurial success business (ESB).

The control variables were age, gender and level of education attainment. Gender was measured as a dichotomous variable (1 = female, 2 = male). Age and level of education attained were coded for each level, with age having 6 levels (1-6, $M=3.00$, $SD=1.11$), and education having 12 levels (1-12, $M=8.79$, $SD=2.60$).

RESULTS

Analysis was performed using SPSS Statistics and AMOS Versions 22. Data was screened to remove incomplete responses and those that did not meet the criteria for an entrepreneur. This reduced the 415 responses to a final sample size of 215 entrepreneurs, of whom 51 were women (23.7%). The majority were aged between 31-50 years (62%) and university educated (61%). The profile of the respondents is shown in Table 1.

Sex	N=215
Men	75%
Women	24%
Age Range	
18 to 30 years	7%
31 to 40 years	29%
41 to 50 years	33%
51 to 60 years	21%
61 to 70 years	9%
Over 70 years	1%
Education Level	
High School	15%
TAFE/Trade	25%
Bachelor's Degree	17%
Honours/Graduate Diploma	9%
Masters	24%
PhD	10%

A *t*-test was performed comparing the means reported for 5 other populations on the CD-RISC (10 items) against the mean derived for the sample of entrepreneurs in this research. The mean of this sample is higher and significantly different from the means in each of the other samples, suggesting the result is a significant difference and not due to chance (see Table 2). Previous research has supported a unidimensional model for the CD-RISC 10-item across different populations (Campbell-Sills and Stein, 2007, Gucciardi et al., 2011, L. et al., 2010, Coates et al., 2013), therefore confirmatory factor analysis (CFA) was used to assess the factor structure in this sample.

Table 2
COMPARISON OF POPULATION MEANS OTHER STUDIES AND THIS STUDY USING CD-RISC

CD-RISC 10 items	Current Study, n=215							
	Mean	Std	α	Mean	Std	t	Sig	α
USA undergraduate students n=1622 (Campbell-Sills and Stein, 2007)	27.21	5.84	.83	33.3	4.7	18.8	.000	.82
Spanish 1 st year university students n=681 (Notario-Pacheco <i>et al.</i> , 2001)	27.41	6.36	.85	33.3	4.7	18.3	.000	.82
Australian adult cricketers n=321 (Gucciardi <i>et al.</i> , 2011)	29.51	4.88	.83	33.3	4.7	11.8	.000	.82
Australian adolescent cricketers n=199 (Gucciardi <i>et al.</i> , 2011)	28.57	5.21	.82	33.3	4.7	14.7	.000	.82
Chinese earthquake victims n=341 teachers	24.83	7.42	.91	33.3	4.7	26.2	.000	.82

A one-factor congeneric model for the factor resilience was a satisfactory fit using Bollen-Stein p as Mardia's Coefficient suggested non-normal data: $\chi^2(35)=61.44$, Bollen-Stein $p=.33$, SRMR = .05, RMSEA = .06(.03, .08), TLI = .94, CFI = .95. Cronbach's $\alpha = .82$ for 10 items suggested good reliability. Factor loadings were all significant at $p=.000$ and ranged between .35 and .73. Standardised residuals and modification indices did not suggest points of model misfit. A scale score for the factor resilience was derived by taking the sum of the items (see Table 3 for CFA results).

Table 3
CFA RESULTS CD-RISC STANDARDISED FACTOR LOADINGS (λ) ERROR TERMS (θ)

Item and description	λ	θ
1 - able to adapt when changes occur	.53	.29
4 - can deal with whatever comes my way	.62	.38
6 - try to see the humorous side of problems	.35	.12
7 - coping with stress can make me stronger	.57	.33
8 - tend to bounce back after illness, injury, or other hardships	.59	.35
11 - can achieve my goals, even if there are obstacles	.56	.32
14 - stay focussed under pressure	.54	.30
16 - not easily discouraged by failure	.71	.51
17 - think of self as a strong person	.73	.54
19 - able to handle unpleasant or painful feelings	.49	.24
Reliability	.82	
<i>M</i>	33.3	
<i>SD</i>	4.7	

The relationships between resilience as measured by the CDRISC-10 item and entrepreneurial success (individual and business) were explored using the enter method in SPSS to generate a hierarchical linear regression controlling for education, gender and age. Table 4 reports the correlations between the control, independent and dependent variables.

Variables	1.	2.	3.	4.	5.	6.
1. Education	1					
2. Gender	.071	1				
3. Age	.009	.138*	1			
4. Entrepreneurial success individual	-.086	-.189**	-.121	1		
5. Entrepreneurial success business	-.144*	-.015	-.066	.061	1	
6. Resilience	-.043	-.086	-.010	.199**	.127	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The validity of each model was evaluated using R^2 , Adjusted R^2 and the F test of statistical significance. Benchmarks were met for beta coefficients and standard errors, Durbin-Watson statistic (acceptable between 1.5-2.5), Condition Index (acceptable at less than 30) and VIF values (acceptable at less than 5). Table 5 presents the results of regression analysis.

	Entrepreneurial Success Individual		Entrepreneurial Success Business	
	β^a	SE ^{aa}	β^a	SE ^{aa}
Education	-.067	.075	-.140	.016
Gender	-.148*	.464	.014	.099
Age	-.098	.177	-.065	.038
Resilience	.183**	.041	.121	.009
R^2	.081**		.040	
Adjusted R^2	.064**		.021	
F value	4.63**		2.166	

^a Standardised regression coefficients

^{aa} Standard Error

** $p < .01$

* $p < .05$

DISCUSSION

The results of the hypothesis testing and their implications are discussed in the following section.

Levels of resilience

The one sample t -test result show that entrepreneurs have significantly ($p=.000$) higher mean scores ($M=33.3$, $SD=4.76$) for resilience than do five other populations on whom the CD-

RISC 10-item scale has been administered. These results give support to the findings of Manzano-Garcia and Ayala Calvo (2013) who used the full CD-RISC (25-items) to examine resilience in a sample of Spanish entrepreneurs and found above average levels of resilience.

The comparative studies investigated the resilience of samples that did not comprise entrepreneurs, and were both culturally similar and distinct to the sample in this research, specifically North American undergraduate students, Spanish undergraduate students, Chinese teachers who had been earthquake victims, and to two teams of Australian cricket players. Questions about the suitability of these mean scores for comparison on the grounds of both culture and group membership could be raised.

The CD-RISC (10 item) is a subset of all the items of the full CD-RISC (25 items), and both versions of the scale have been shown to capture resilience in different cultures including the Australian culture (Connor and Davidson 2003, Gillespie et al., 2009, Gucciardi et al., 2011, Liu et al., 2014). The full 25-item scale has been confirmed as capturing resilience in samples of entrepreneurs (Manzano-Garcia and Ayala Calvo, 2013, Ayala and Manzano, 2014). The results of this study indicate the 10-item scale is also confirmed as capturing resilience in entrepreneurs. The successful use of both versions of the CD-RISC to capture resilience in samples comprising both the same and different cultures and group memberships, suggest any concern about the use of the CD-RISC in different cultural or group settings can be overcome. That is, each scale appears to capture resilience across cultures and groups.

In general, these findings provide additional support for the suggestion that entrepreneurs are people who exhibit high levels of resilience, as compared to average or low levels of resilience, and this may contribute to their experience of success in entrepreneurship (Hmieleski and Carr, 2008). Thus, hypothesis 1 is supported, that is entrepreneurs do display higher levels of resilience than the general population.

Resilience factors

The full 25-item CD-RISC comprises five factors (persistence/tenacity and strong sense of self-efficacy; emotional and cognitive control under pressure; adaptability/ability to bounce back; control/meaning; and meaning (Davidson, 2009)). However, the factor structure has been found to vary with setting from 2 to 5 factors and the emergent factors comprise differing mixes of scale items (Liu et al., 2014, Campbell-Sills and Stein, 2007, Connor and Davidson, 2003). This is also evidenced in the sample of Spanish entrepreneurs where three factors emerged (hardiness, resourcefulness, optimism) from 23 of the 25 items of the full CD-RISC (Manzano-Garcia and Ayala Calvo, 2013). Accordingly, this variability in factors, and the descriptive items that comprise them, contributes somewhat but not conclusively to an understanding of what it is that comprises resilience in entrepreneurs. As the objective of this research is to contribute to the identification of individual level resilience so that educators, policy makers and practitioners can identify, target, research and manage resilience with a view to enhancing good entrepreneurial outcomes, it is desirable to clarify and agree what it is that comprises individual level resilience.

The CD-RISC-10 item scale was confirmed in this sample and comprises two underlying factors for resilience - hardiness and persistence (Campbell-Sills and Stein, 2007) and therefore this research suggests individual level resilience in Australian entrepreneurs is comprised of these two factors. Factor 1 is proposed to be hardiness, suggesting that entrepreneurs are able to adapt to changes, deal with whatever comes their way, believe coping with stress strengthens them, tend to bounce back after illness or hardship, can think clearly and focus under pressure, are not easily discouraged by failure, and believe they can handle unpleasant feelings. Factor 2

is persistence, that is: entrepreneurs try to see the humorous side of problems, believe they can achieve their goals, and think of themselves as strong people.

These factors are consistent with descriptions of resilience in the literature displayed by entrepreneurs (Hedner et al., 2011), reflect discussions in the literature about the capacity of entrepreneurs to bounce back (Envick, 2005), persist and function in adverse environments (Bullough et al., 2014, Branzei and Abdelnour, 2010), create new ventures after failure (Hayward et al., 2010), and reflect 1 out of 3 of the resilience factors found in Spanish entrepreneurs (Manzano-Garcia and Ayala Calvo, 2013). Inspecting the items of the CD-RISC 10-item scale broadens the understanding of what individual level resilience in entrepreneurs is, beyond the generic multidisciplinary explanation of having the capacity or ability to bounce back, rebound or successfully adapt to or after adversity, hardship or change (Li et al., 2015, Welsh, 2014).

The relationship between resilience and entrepreneurial success

Although low, the R2 results in the linear regression analysis are significant for the relationship between entrepreneurial success individual and resilience. Therefore it can be concluded that resilience does predict entrepreneurial success individual and hypothesis 2 is accepted.

The lack of significant relationship between resilience and entrepreneurial success business is consistent with the observation that expecting a relationship between individual level variables and business performance is optimistic (Baron and Henry, 2011). The CD-RISC is a measure comprising individual level variables comprising an affective-cognitive component (hardiness) and behavioural capacities (persistence) (Liu *et al.*, 2014). It is intuitively plausible to suggest that an individual's hardiness and persistence (the factors of resilience) would not predict business performance outcomes as these are ultimately the result of how revenues and costs perform in the environment in which the business operates. To suggest otherwise is to draw a long bow, particularly when one considers all the variables that can impact business performance outcomes irrespective of the hardiness and persistence of the entrepreneur. Thus, hypothesis 3 is supported in this research; that is, entrepreneurial success business is not predicted by individual level resilience.

On balance, it is suggested that individual level entrepreneurial resilience be defined as the combination of hardiness and persistence and be operationalized by the 10 items of the CD-RISC revised scale. The CD-RISC 10-item scale is preferred to the full 25 item scale which to date has been shown to vary with the setting. In the context of research into entrepreneurs, all items in the full scale have not been retained and load differently on factors that are suggestive of the original conceptualisation although different (see Manzano-Garcia & Ayala Calvo, 2013). By comparison, the 10-item scale has exhibited sound psychometric properties and a unidimensional single factor in other populations (Notario-Pacheco et al., 2001, Gucciardi et al., 2011). Given this scale is parsimonious, and that the 10 items can narrow the focus of researchers and educators to clear and unequivocal indicators of individual level resilience in entrepreneurs, it is suggested the revised 10-item scale could prove useful as a measure of the factors underlying individual level resilience in entrepreneurs, and the indicators that describe these factors. The 10-item scale provides entrepreneurship educators with markers around which they can build teaching and learning tasks and activities that will contribute to the development of resilience in students of entrepreneurship.

CONCLUSION

Overall, this research supports some of the findings of Manzano-Garcia and Ayala Calvo (2013, 2014) who found that resilience was comprised of hardiness, resourcefulness and optimism and predicts entrepreneurial success. Specifically, the results of this research suggest that the CD-RISC does capture aspects of individual level resilience in entrepreneurs and observes the relationship with entrepreneurial success depends on how it is operationalized. That is, when entrepreneurial success is operationalized by business performance measures there is no relationship with individual level resilience.

Following Bergstrom and Dekker (2014) these results suggest the venture or business is a different scale compared to the micro scale of the individual, and it is appropriate to conceptualise and operationalize venture or business resilience and its indicators differently to individual level resilience. It follows then, that the entrepreneurial resilience spoken of describing the business or venture is not the same entrepreneurial resilience when in the context of the entrepreneur. Therefore, the phrase “entrepreneurial resilience” should be understood as a metaphor that needs, in every instance of usage, to be further and clearly conceptualised and operationalized.

These modest findings contribute to the entrepreneurship literature by providing statistical support for the suggestion that entrepreneurs do need to be resilient (Duening, 2010; Hayward et al., 2010). Some argue resilience can be learned or the underlying traits enhanced through training (Albornoz, 2008; Jensen, Trollope-Kumar, Waters and Everson, 2008). Therefore, proactive steps can be defensibly taken to include the development of resilience in entrepreneurship education, and in the programs of government and other providers involved in the stimulation and encouragement of entrepreneurship. Knowing in particular what it is that comprises resilience, which itself is part of the explanation for entrepreneurial success, may benefit the entrepreneur and key stakeholders such as financiers, educators and policy makers.

Future opportunities arising from this research include use of the revised CD-RISC 10-item scale to determine if the structure of resilience found in this research remains stable in other cultures of entrepreneurs. If so, findings would provide additional support for a consistent set of resilience factors, and their indicators, for use with future resilience research particularly in entrepreneurs.

There are a number of limitations to this research including that the measures rely on self-report, the participants are drawn from one culture, and operationalization of the dependent variable used (entrepreneurial success) is open to contention and context. Thus the results may not be generalizable and the authors recognise this is an early stage effort to examine individual level resilience in the context of entrepreneurial success and can be improved upon by future researchers. Nonetheless, the results are offered as a contribution to the scholarly research and discussion into developing the understanding of the contribution of individual level resilience to entrepreneurship.

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