

PROFILING RESILIENCE AMONG CONSTRUCTION MANAGEMENT STUDENTS: AN INTERNATIONAL COMPARISON

Michelle Turner¹, Sarah Holdsworth², Christina Scott-Young³ and Ashley Johnson⁴

^{1,2&3} *School of Property, Construction and Project Management, RMIT University, GPO Box 2476, Melbourne, Victoria 3001, Australia.*

⁴ *Myers Lawson School of Construction, Virginia Polytechnic Institute and State University, 1345 Perry Street, Blacksburg, Virginia, 24061, United States.*

Elevated levels of psychological distress are becoming more prevalent for students in higher education. Given this concerning trend, there has been a call to action. Resilience is identified as a capability that can assist students to manage their stress and increase wellbeing. The Resilience at University scale was administered to construction management students in Australia, the United States, Hong Kong, and Singapore. Two hundred and twenty-nine students completed the survey. Principle components analysis identified five resilience factors: finding you're calling/living authentically; managing stress; maintaining perspective, staying healthy; and building networks. Results indicated significant differences between countries on all resilience factors. Of the four countries, Singapore was the most resilient and Hong Kong had the lowest score for all resilience factors. Capacity to maintain perspective was low for all students, irrespective of country. First year students had a lower capacity for finding their calling / living authentically than for other year levels. Final year students had a higher capacity to manage stress than commencing students. The results suggest that demographic characteristics and situational determinants may have a bigger impact on resilience than discipline of study. Findings offer important implications for the development of resilience among university students.

Keywords: education, resilience, university students, wellbeing.

INTRODUCTION

Academic stress is associated with lower course grades, coping and motivation for students in higher education (Struthers, Perry and Menec, 2000). Of concern are global trends which reveal the increasing prevalence of stress among students undertaking studies in higher education (Robotham and Julian, 2006; Stallman, 2010; Laidlaw, McLellan and Ozakinci, 2016). Stallman (2010) reports that rates of psychological distress among university students are significantly higher when compared with the general population. Consistent with global trends, Larcombe *et al.*, (2016) found that one in four university students experience very high levels of psychological distress, and emphasised the need for targeted mental health promotion and support services. Resilience has been identified as a critical capability that can assist students to succeed.

¹ michelle.turner@rmit.edu.au

Resilience is positively linked to academic engagement and achievement (Martin *et al.*, 2015), and contributes to students' mental health and wellbeing (Munro and Pooley, 2009; Watson and Field, 2011; Hartley, 2013).

Resilience has been defined as an individual's ability to bounce back in the face of stress and adversity (Gerson and Fernandez, 2013; Walker, Gleaves and Grey, 2006). Holdsworth, Turner and Scott-Young (2017, p.12) contend that in an academic setting, resilience extends beyond the concept of bouncing back and is more aptly defined as 'the positive adaptation to situations of stress and adversity within the context of the situated formal or informal learning experience which enables student progress, growth, and learning'. Resilience is acknowledged as a multi-dimensional construct (Wagnild and Young, 1996; Connor and Davidson, 2003) that is contextual and will vary over the life course (Windle, 2011). Assets and resources within the individual, their life and environment facilitate a capacity to adapt in the face of stress and adversity (Windle, 2011).

Research exploring resilience in higher education has applied various methodological designs that have primarily focused on one country. These include multiple universities in one country (e.g. DeRosier, Frank, Schwartz and Leary, 2013), first year students at one university (e.g. Kotzé and Kleynhans, 2013), and one discipline at one university (e.g. Beauvais, Stewart, DeNisco and Beauvais, 2014). Resilience has been studied in disciplines like medicine, social work and nursing, but it is not well understood whether previous studies of resilience can be generalised to the construction management discipline. In recognition of this limitation, empirical research has been undertaken with students of construction management (Turner, Scott-Young and Holdsworth, 2015; Holdsworth *et al.*, 2017) to better understand their resilience profile, with a view to supporting students mental health, academic engagement and achievement as well as preparing them for the imminent stressors associated with the construction industry (Bowen, Govender and Edwards, 2014; Leung, Chan and Cooper, 2015).

Higher education students undertaking studies in construction management have demonstrated strengths in three resilience-building behaviours (building networks/interacting cooperatively, staying healthy, and living authentically), but were less skilled in maintaining perspective (Turner, Scott-Young and Holdsworth, 2015; 2016). This knowledge enables educators to respond to the resilience needs and capabilities of students, and implement strategies to support resilience development (Holdsworth *et al.*, 2017). While this research has served to extend our understanding of the resilience profile of construction management students, the research is limited to one university in Australia. Given that resilience is contextual in nature (Windle, 2011) and may differ across cultures (Ungar *et al.*, 2008), it is not clear whether these findings can be generalised more broadly to students undertaking construction management studies in other countries.

Very few studies of resilience have incorporated students undertaking higher education across more than one country. One exception is Pidgeon *et al.*, (2014), who incorporated university students from Australia, the United States and Hong Kong. In their preliminary analysis, no significant differences were found between the dependent variables (perceived social support, psychological distress, and campus connectedness), therefore the samples were merged to create one large, international sample to explore resilience. Consequently, little is known about student resilience across cultures.

AIM

Although recent research has explored the resilience of students in the construction management discipline, to date, there has been an emphasis on Australian students. It is not known whether students undertaking studies in construction management in other countries share the same resilience profile as Australian students. This study aims to explore the resilience profile of students undertaking construction management across different countries. The research questions framing the research are: (1) Do construction management students share a similar resilience profile across countries? (2) What are the differences between student resilience according to country?

METHODS

Sampling Strategy

A purposive sampling strategy was applied to the research. Construction management students in Australia, the United States, Hong Kong, and Singapore were invited to participate in the research. All students were undertaking an undergraduate construction management program that was delivered in English. The construction management programs in Australia and the United States were delivered on a full time basis and classes were conducted during the day over the course of a semester. Hong Kong and Singapore delivered their program on a part-time basis. Their classes were held in the evening to cater for students who may be working full-time, and delivered according to an intensive mode whereby multiple classes were conducted over a shorter period of time. Participation in the research was voluntary and all data were coded to ensure participant confidentiality and anonymity.

Data Instrument and Analysis

Participants completed a questionnaire that comprised of demographic questions and the Resilience at University (RAU) measure. The RAU (Turner, Holdsworth and Scott-Young, 2017) is a relatively new scale adapted from the Resilience at Work (RAW) measure (Winwood, Colon and McEwen, 2013). The RAU has 20 items and six subscales: (1) finding your calling; (2) interacting cooperatively and living authentically; (3) managing stress; (4) building networks; (5) maintaining perspective; and (6) staying healthy. The six subscales of the RAU closely replicate the seven subscales of the RAW scale as suggested by Winwood *et al.*, (2013), with the grouping of the interacting cooperatively and living authentically subscales. Examples of the RAU items include 'When things go wrong with my university studies, they do not overshadow the other parts of my life', and 'I have friends at university whom I can rely on to support me when I need it'. Instructions given to participants specified that the questions referred to their experience at university, including the time spent at university, as well as the time spent on their studies outside of university. Participants were asked to indicate their agreement with the items on a seven-point Likert scale from 'strongly disagree' (0) to 'strongly agree' (6). The data were subject to principal component analysis (PCA) using varimax rotation. Cronbach's alpha coefficients and confidence intervals were calculated to ascertain the internal consistency reliability of the survey and subscales. Independent-samples t-tests and analysis of variance were applied to the data to enable a finer grained analysis of resilience according to country, gender, and year of study.

RESULTS

Participants

Two hundred and twenty-nine students undertaking a Bachelor degree in construction management completed the survey. Fifty-three (23%) participants were from Australia, 45 (20%) were from Hong Kong, 53 (23%) were from Singapore, and 78 (34%) were from the United States. Seventy-five percent ($n=171$) of participants were male and 25% ($n=58$) were female. While the sample included participants from all year levels, just over half were undertaking their first year of study (53%). The mean age of the sample was 23 years ($SD=3.1$). Participants from Singapore (mean=26.5 years, $SD=4.0$) were slightly older than participants from Australia (mean=22.5 years, $SD=2.7$), Hong Kong (mean=22.6 years, $SD=1.9$) and the United States (mean=21.9 years, $SD=1.7$). All participants from Singapore worked (mean hours per week= 44.6, $SD=7.0$), as did the majority (96%) of participants from Hong Kong (mean hours per week= 46.6, $SD=10.9$). Working participants from Hong Kong and Singapore were employed in the construction industry. The majority of participants from Australia also worked (75.5%), but only part-time, with lower average weekly work hours (mean=21.6, $SD=9.9$). In the United States, 25% of participants worked (mean hours per week= 19.4, $SD=14.3$). The Australian (32%) and Singapore (49%) samples had higher numbers of international students when compared with the United States (3.8%) and Hong Kong sample (6.72%).

Resilience

As 229 participants completed the 20-item scale, the subject-to-item ratio of approximately 11:1 was considered appropriate for factor analysis (Nunnally, 1978). Furthermore, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value was 0.91, exceeding the recommended value of 0.6 (Kaiser, 1970). The Bartlett's Test of Sphericity (Bartlett, 1954) was significant ($p=.000$), and the correlation matrix revealed the presence of many coefficients of 0.30 and above, therefore verifying that the dataset was suitable for factor analysis.

Principal components analysis (with varimax rotation) yielded a five-factor structure that explained 73.13% of the variance. The five-factor solution closely replicated the six-factor structure of the RAU scale as suggested by Turner *et al.*, (2017). The major difference was the grouping of the items from the finding your calling and living authentically subscales onto one factor, and the exclusion of the two-item interacting cooperatively subscale. The rotated components matrix is shown in Table 1. Factor one had an eigenvalue of 8.41 and explained 46.75% of the variance, and included all items from the finding you're calling and living authentically subscales. Factor two had an eigenvalue of 1.74 and explained 9.69% of the variance, and included all items from the managing stress subscale. Factor three had an eigenvalue of 1.20 and explained 6.69% of the variance, and included all items from the maintaining perspective subscale. Factor four had an eigenvalue of .93 and explained 5.147% of the variance, and included all items from the staying healthy subscale. Factor five had an eigenvalue of .87 and explained 4.85% of the variance, and included all items from the building networks subscale. Worthington and Whittaker (2006) contend that it is possible to retain a two-item factor if the items are highly correlated (i.e. $r > .70$) and relatively uncorrelated with other variables. Factor five met these conditions ($r=.84$), while the two items of factor four had a medium correlation ($r=.59$) however were relatively uncorrelated with other variables. While factor four (staying healthy) did not meet the stringent conditions outlined by Worthington and Whittaker (2006), the factor was retained for further analysis as it signifies a key behaviour associated with resilience capability (Winwood *et*

al., 2013). The two items from the interacting cooperatively subscale were excluded from analysis due to cross loading.

Table 1: Rotated component matrix for the resilience items

Scale item	Measure	Component				
		1	2	3	4	5
The university work that I do fits well with my personal values and beliefs	Finding your calling	.792	.188	.127	-.017	.228
My university is somewhere where I feel that I belong.	Finding your calling	.732	.136	.096	.080	.379
Generally I appreciate what I have in my university environment.	Finding your calling	.709	.278	.222	-.021	.162
The university work that I do helps to fulfil my sense of purpose in life.	Finding your calling	.702	.084	.143	.149	.151
I have important core values that I hold fast to in my university life.	Living authentically	.681	.214	.094	.280	.133
I know my personal strengths and I use them regularly at university.	Living authentically	.670	.296	.126	.314	.232
I am able to change my mood at university when I need to.	Living authentically	.648	.316	.314	.290	.001
I have developed some reliable ways to relax when I am under pressure at university.	Managing stress	.331	.821	.190	.123	.091
I have developed some reliable ways to deal with the personal stress of challenging events at university.	Managing stress	.364	.737	.181	.263	.172
I make sure I take breaks to maintain my strength and energy when I am working hard at university.	Managing stress	.281	.712	.298	.201	.106
I am careful to ensure that my university work does not dominate my personal life.	Managing stress	.086	.697	.292	.122	.166
Nothing at university ever really “fazes me” for long.	Maintaining perspective	.216	.236	.816	.018	.123
When things go wrong at university, they do not overshadow the other parts of my life.	Maintaining perspective	.166	.265	.752	.075	.093
Negative people at university do not pull me down.	Maintaining perspective	.143	.175	.745	.228	.067
I am careful about eating well and healthily.	Staying healthy	.148	.220	.115	.836	.013
I have a good level of physical fitness.	Staying healthy	.192	.165	.144	.798	.211
I have friends at university whom I can rely on to support me when I need it.	Building networks	.387	.181	.115	.128	.834
I have a strong and reliable network of supportive students at university.	Building networks	.366	.195	.167	.133	.825

Cronbach’s alpha coefficients were calculated to ascertain the internal consistency reliability of the scale and subscales. The internal consistency of the resilience scale (18 items) was very good ($\alpha = 0.92$). All subscales (factors) demonstrated satisfactory internal consistency: $\alpha = 0.89$ for factor 1, $\alpha = 0.87$ for factor 2, $\alpha = 0.78$ for factor 3, $\alpha = 0.74$ for factor 4, $\alpha = 0.91$ for factor 5.

The mean score for each of the factors were calculated according to country, as outlined in Table 2. Of the four countries, Hong Kong had the lowest score for all resilience factors. Capacity to maintain perspective was the lowest scoring factor for all students, irrespective of country. A one-way between groups analysis of variance was conducted

to explore differences between countries. There was a significant difference for factor 1 (finding your calling and living authentically) between all countries, with the exception of Singapore and the United States: $F(3, 215)=46.3, p=.000$. There was a significant difference for factor 2 (managing stress) between Australia and Singapore, Australia and the United States, Hong Kong and Singapore, and Hong Kong and the United States: $F(3,216)=12.2, p=.000$. There was a significant difference for factor 3 (maintaining perspective) between Hong Kong and all three countries: $F(3,217)=7.0, p=.000$. There was a significant difference for factor 4 (staying healthy) between Hong Kong and all three countries: $F(3,218)=9.3, p=.000$. There was a significant difference for factor 5 (building networks) between Australia and Hong Kong, Australia and the United States, Singapore and Hong Kong, and Hong Kong and the United States: $F(3,218)=17.7, p=.000$.

Table 2: Mean scores of resilience factors according to country

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Australia	4.2 (SD=.80)	4.0 (SD=1.27)	3.9 (SD=1.11)	4.0 (SD=1.22)	4.3 (SD=1.40)
Singapore	4.7 (SD=.60)	4.6 (SD=.74)	4.2 (SD=1.06)	4.5 (SD=1.18)	4.7 (SD=.98)
Hong Kong	3.3(SD=.79)	3.5 (SD=.94)	3.2 (SD=.93)	3.3 (SD=1.30)	3.4 (SD=1.12)
United States	4.9 (SD=.74)	4.5 (SD=1.04)	3.9 (SD=1.29)	4.3 (SD=1.12)	5.0 (SD=1.08)

A one-way between groups analysis of variance was conducted to explore differences between year-of-study. There was a significant difference for factor 1 (finding your calling and living authentically) between first year students ($M=4.0, SD=.97$) and other year levels: $F(4,24)=10.5, p=.000$. First year students had a lower capacity for their finding their calling and living authentically when compared with other year levels. There was a significant difference for factor 2 (managing stress) between first year ($M=4.10, SD=1.07$) and fourth year ($M=4.73, SD=.89$) students: $F(4,215)=2.5, p=.03$. No significant differences were found for factor 3 (maintaining perspective) and factor 4 (staying healthy). For factor 5 (building networks), there was a significance difference between first year students ($M=4.08, SD=1.28$) with second year ($M=5.16, SD=1.06$) and fourth year ($M=5.13, SD=1.08$) students: $F(4,217)=9.1, p=.000$.

Independent-samples t-tests were calculated to assess the differences between genders across the sample, however no significant differences were found on the five resilience factors. No significant differences were found for student status according to local or international.

DISCUSSION

This study aimed to explore the resilience profile of students undertaking construction management across four countries. Results indicated clear differences across countries, with students from Singapore demonstrating the highest level of resilience, followed by the United States, Australia, and Hong Kong. Students from Singapore had the highest level of managing stress (factor 2), maintaining perspective (factor 3), and staying healthy (factor 4). Students from the United States had the highest levels of finding your calling and living authentically (factor 1) and building networks (factor 5). Students from Hong Kong were lowest on all five resilience factors. The results suggest that mode of study (full time or part time), curriculum delivery (12 week semester or intensive), and number of work hours did not appear to moderate levels of resilience. For example, the demographic characteristics of the student sample from Singapore and Hong Kong were similar, with most students working full time in the construction industry while undertaking studies on a part-time basis. The Singapore sample worked 44 hours per

week while the Hong Kong sample worked 46 hours per week. This is in contrast to students from Australia and the United States who both worked on a part time basis while undertaking full time studies. The majority of participants from Australia worked an average of 21.6 hours per week, while 25% of students from the United States worked an average of 19.4 hours per week. The results suggest that demographic characteristics (such as age and year of study) and situational determinants (such as country and culture) may have a bigger impact on resilience than discipline of study.

The variation in resilience across the four countries may have been influenced by cultural differences. The American Psychological Association (2017) identifies that an individual's culture may have an impact on how he or she communicates feelings and deals with adversity, thus shaping resilience. Furthermore, culture may influence whether and how a person connects with significant others, including extended family members and community resources. Ungar (2013) also contends that culture has a critical impact on resilience through the availability and accessibility of resources, and the meaningfulness of the resources provided. This is particularly pertinent, as assets and resources within the individual, their life and environment facilitate a capacity to adapt in the face of stress and adversity (Windle, 2011).

Cultural differences may have impacted on students' capacity to build networks. Building networks is associated with developing and maintaining personal support networks both within and outside of the university, and has been identified as a critical component of resilience (American Psychological Association, 2017; Friberg, Hjemdal, Rosenvinge and Martinussen, 2003; Grant and Kinman, 2012). The results identified that building networks (factor 5) had the biggest variance between lowest and highest mean scores, with students from the United States having the highest level (mean=5.0), followed by Singapore (mean=4.7), Australia (mean=4.3), and Hong Kong (mean=3.4). It is not well understood what cultural factors contributed to building and maintaining support networks for participants across the four countries, and this warrants further research.

Maintaining perspective is described as an individual's capacity to reframe setbacks, maintain a solution focus, and manage negativity (Winwood *et al.*, 2013). In an academic setting, the ability to maintain perspective supports learning and growth and is inherently related to resilience (Holdsworth *et al.*, 2017). Maintaining perspective was the lowest resilience factor for all countries, however students from Singapore (mean=4.2) demonstrated a higher capacity compared with students from Australia and the United States (mean=3.9), and Hong Kong (mean=3.2). This may be an area of resilience development which educators can usefully target through the integration of perspective-building strategies into the curriculum.

Learning from past experiences has been identified as a resilience building strategy (American Psychological Association, 2017; Beyond Blue, 2016), and results of this study suggest that level of resilience improved with age. First year students had a lower capacity for finding your calling and living authentically (factor 1), managing stress (factor 2), and building networks (factor 5) when compared with fourth year students. Furthermore, the sample from Singapore was approximately four years older than the sample from Australia, Hong Kong and the United States. It is possible that age and experience may have contributed towards higher levels of resilience in the Singapore sample when compared with the other countries.

CONCLUSIONS

This research contributes to our understanding of resilience for students undertaking studies in construction management. Results indicated that there were distinct differences between countries. Further research is required to better understand the factors contributing to these findings. Future research may incorporate student interviews in order to gain a more in-depth understanding of the country-specific situational determinants that shape student resilience. Future research may also usefully identify which resources are considered important for resilience development across cultures, and explore whether these resources are readily available to students.

These findings have implications for educators of the construction management discipline. The results suggest that demographic characteristics and situational determinants may have a bigger impact on resilience than discipline of study. Based on this premise, resilience-building resources and strategies which are culturally nuanced could be usefully implemented in the first year curriculum such as: stress management (such as mindfulness and relaxation training); reframing setbacks and maintaining perspective; and building university support networks that facilitate an earlier adjustment for new students and mitigate the negative impacts of transition stress and anxiety. The continued scaffolding of resilience strengths-based training throughout the curriculum in subsequent years is likely to further consolidate student well-being and establish positive habits which can be transferred by university graduates into their work environment.

The sample of this study was limited to construction management students from four countries. Given that one university from each country participated in the research, the results are not able to be generalised to construction management students of the four participating countries. Furthermore, the focus was on undergraduate students, therefore the results cannot be generalised to postgraduate students. Despite these limitations, the research offers new insights into the resilience of students undertaking studies in higher education and contributes to efforts to support academic success and student wellbeing.

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