**Mental Resilience Enhances the Well-Being of Singaporean College Students Through
Reducing Burnout**

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Abstract

Mental resilience is considered as an important factor that allows individuals to cope with stressors and setbacks, though its components may vary depending on cultural contexts.

Study 1 (N = 107) validated and examined the factor structure of a widely-used resilience measure (Connor-Davidson Resilience Scale; CD-RISC) in the Singaporean context, and subsequently used it to test if the longitudinal relationship between resilience and psychological distress among college students would be mediated by academic burnout (Study 2). CD-RISC was correlated with perceived stress, social support, mental health and academic burnout in the expected directions. A 5-factor model was uncovered, interpreted as Approach Coping, Self-belief, Effort, Internal/ Interpersonal Resources, and Spirituality. Results of Study 2 (N = 97) showed that all variables were significantly correlated over time, demonstrating temporal stability. Mediation analyses showed that resilience predicted lower levels of academic burnout, which in turn led to lower psychological distress approximately eight weeks later. The findings show that CD-RISC is a valid research tool in the Singaporean context, although the factors did not replicate those reported in previous studies. The findings also position resilience as a key candidate for promoting mental health among college students through interventions and programs.

(196 words)

Keywords: resilience, burnout, psychological distress, CD-RISC

Mental Resilience Enhances the Well-Being of Singaporean College Students Through Reducing Burnout

Resilience refers to both the process of and positive capacity for successful adaptation despite threatening or challenging circumstances (Masten et al., 1990). Past research has positioned resilience as a key factor that helps individuals respond effectively to issues ranging from daily stressors to major setbacks, thus decreasing psychological distress (Lim et al., 2007). Although the definition of resilience varies across studies and cultural contexts, the construct often centres around two core concepts – the presence of *adversity*, and *positive adaptation* in response (Fletcher & Sarkar, 2013). Resilience is not merely coping passively in response to a stressor. Rather, it is an intricate combination of personality traits that enable a person to harness coping skills which have been developed over time (Davydov et al., 2010). These traits and skills include self-efficacy, engaging the support of others, optimism and faith (Connor & Davidson, 2003). The present study uses this broad definition of resilience, also known as *mental resilience*, comprising both psychological skills and individual traits (Jowkar et al., 2010). In view of past research which suggests that positive adaptation may constitute different behaviors in different cultures (Fletcher & Sarkar, 2013), this study first sought to identify the components of mental resilience in the Singaporean context through validating and examining the factor structure of a widely-used resilience measure – the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) in Study 1. Subsequently, we conducted a short-term longitudinal study to investigate how mental resilience may protect Singaporean college students from burnout, which in turn enhanced their psychological well-being (Study 2).

Measuring Resilience in Context

A methodological review of 19 resilience measures showed that the CD-RISC has the most favorable psychometric properties (Windle et al, 2011). CD-RISC was originally

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developed to measure resilience in adulthood, and comprises five factors: 1) personal competence, high standards and tenacity; 2) trust in one's instincts and tolerance of negative affect; 3) acceptance of change and secure relationships with others; 4) control; and 5) spirituality (Connor & Davidson, 2003). Although CD-RISC has demonstrated strong reliability and validity, replication studies raised questions on the stability of its factor structure. In a study involving American undergraduates, Campbell-Sills and Stein (2007) found support for a four-factor model, which they labelled as *hardiness*, *social support/purpose*, *faith* and *persistence*. The ambiguity in the constituents of resilience is further compounded by cultural differences that affect the type of adversities faced and the meaning attached to them (Yu & Zhang, 2007), as well as processes that count as positive adaptation (Fletcher & Sarkar, 2013). For example, the Chinese version of CD-RISC failed to replicate the models observed in an American sample. Instead, a three-factor model emerged, which the authors labelled as *tenacity*, *strength*, and *optimism* (Yu & Zhang, 2007). This underscores the challenge in measuring resilience across cultures. As Windle et al. (2011) had aptly concluded in their review of resilience measures, the absence of a "gold standard" (p.17) makes it imperative for future studies to conduct validation work in diverse cultures, even with widely-used measures.

Nonetheless, validation work for the CD-RISC is not starting on a blank slate in the Singaporean context. Lim et al. (2007) had shown that scores on the CD-RISC was correlated with a locally-designed resilience measure among Singaporean youths, known as the *Singapore Youth Resilience Scale* (SYRESS). However, that study was set out to test the convergent validity of the newly-developed SYRESS against the CD-RISC, assuming that the latter is a culturally relevant instrument in Singapore. No other local studies have scrutinized the CD-RISC by testing its construct validity. Moreover, Lim et al.'s (2007) validation study involved an adolescent sample, and it remains unknown if the scale can be used for a college

sample in Singapore who may face unique challenges. Hence, Study 1 focuses on validating the CD-RISC by examining its convergent and predictive validities in a Singaporean college sample, along with identifying components that make up the construct of resilience through factor analysis.

Resilience, Burnout and Mental Health in College

For many, the pursuit of higher education is a developmental phase characterized by rigorous educational and social demands, often resulting in academic burnout (Schaufeli et al., 2002). Burnout is defined as an “internal and emotional response to external stressors that consume, exceed, and deplete ... personal and social resources” (Treglown et al., 2016, p.3). It is not merely exhaustion, but denotes internal reactions such as emotional and cognitive distancing in response to stressors. Disconcertingly, burnout is correlated with drop-out and poorer academic performance (Neumann et al., 1990) and greater psychological distress (García-Izquierdo et al., 2018).

Few studies have empirically investigated the relationship between resilience, burnout and mental health in a university sample. Current research has focused on examining burnout among medical and nursing students, possibly due to burnout being more closely associated with caregiving and healthcare occupations (Maslach et al., 2001). Mealer et al. (2012) found that highly resilient nurses were less likely to develop burnout syndrome and psychological disorders including anxiety and depression. More recently, Arroigante and Aparicio-Zaldivar (2017) found that decreasing burnout leads to enhanced resilience, which in turn predicts better mental health. However, a more theoretically sound pathway would be to examine how burnout mediates the relationship between resilience and mental health outcomes, in view of the trait-like component in mental resilience. Furthermore, past research has shown that mental resilience could serve to reduce burnout rates (e.g., Mealer et al., 2012). Hence, the present study focuses on burnout as the mediator, by looking at how resilience may reduce

burnout which in turn decreases psychological distress (See Figure 1). The emphasis on mental resilience as a precedent also has significant practical implications as psychological interventions can be feasibly implemented to enhance resilience. For example, Steinhardt and Dolbier (2008) found that resilience could be learnt through a 4-week intervention program, which in turn improved individuals' coping strategies and lowered psychological symptoms of distress.

[Insert Figure 1 about here]

Even fewer studies have used a longitudinal design to probe the stability of resilience and burnout over time. The stability of these constructs will clarify whether they are situationally-induced or chronic in nature. Although Arrogante and Aparicio-Zaldivar (2017) found that the concurrent relationship between burnout and mental health could be mediated by mental resilience, García-Izquierdo et al. (2018) found that resilience at the start of university did not significantly predict greater psychological well-being at the end of university. To make stronger temporal conclusions about the inter-relationships between resilience, burnout and psychological distress, this study adopted a short-term longitudinal design that modelled the effects over the course of a semester (about eight weeks apart) in a Singaporean residential college (Study 2).

Research Questions and Hypotheses

This research addressed four research questions in two studies. Study 1 examined the psychometric properties (internal consistency, convergent and predictive validities) and the factor structure of CD-RISC using a Singaporean university sample. First, scores on the CD-RISC were correlated with the SYRESS, as was done by Lim et al. (2007), albeit with a college sample. Convergent validity was also tested by linking CD-RISC with established measures known to be related to resilience in past studies – perceived stress, availability of

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and satisfaction with social support (Connor & Davidson, 2003), burnout (Arrogante & Aparicio-Zaldivar, 2017) and mental health status (Hartley, 2013). Finally, the factor structure of the CD-RISC was examined. Having established the validity of the CD-RISC, Study 2 extended current research by looking at the mechanism through which psychological distress could be reduced at a later time point (eight weeks apart). For Study 2, we hypothesized that mental resilience will be stable in between semesters considering the trait component, while academic burnout and psychological distress would differ as they are measured at time points of varying stress levels. We also expect the relationship between resilience and psychological distress to be mediated by burnout.

Study 1

Method

Participants

Students from a public university and a residential college in Singapore were recruited. Participants were 107 students (44 males; 45.4% and 53 females; 54.6%), with a mean age of 21.64 years ($SD = 2.03$). Of the participants, 88 (81.5%) were Singaporean citizens while 19 (17.6%) were of other nationalities. More than half (57.0%) of the respondents had a religion while 43.0% did not.

Procedure

The research procedure was approved by the Institutional Review Board of the National University of Singapore. Participants were recruited via the university's research participation program and online advertisements. The voluntary nature of their participation was emphasised, with informed written consent obtained. Participants completed an online survey in the university's laboratory, which took no more than 30 minutes to complete. All

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participants received a small token of appreciation (S\$4) and were given a debrief on the purpose of the study.

Measures

Resilience. CD-RISC (Connor & Davidson, 2003) contains 25 items rated on a 5-point Likert scale from *not true at all (0)* to *true nearly all the time (4)*. The scale was rated based on respondents' subjective experiences over the past month, with a higher score reflecting greater resilience. CD-RISC has been shown to have good convergent validity with high correlations with hardiness, social support, perceived stress, degree of disability and stress vulnerability (Connor & Davidson, 2003), and good internal consistency. α was .90 in this study.

Singapore Youth Resilience Scale (SYRESS). SYRESS (Lim et al., 2007) is a 50-item questionnaire measured on a 5-point Likert scale that ranges from *never (1)* to *always (5)*. It consists of 10 factors, including commitment, optimism and responsibility, with convergent validity with the CD-RISC (Lim et al., 2007). α was .92 in this study.

Perceived Stress Scale (PSS). PSS (Cohen et al., 1983) is a 10-item self-report that measures general perceived stress in the last month. Items were scored from *never (1)* to *very often (4)*. Higher total scores indicate higher perceived stress. PSS is correlated with a range of self-reported and behavioral criteria, such as depressive and physical symptomatology (Cohen et al., 1983). It has also been empirically validated with college samples in various cultures (Lee, 2012). α was .86.

Social Support Questionnaire (SSQ-6). SSQ-6 (Sarason et al., 1987) measures the number of persons that an individual can rely on when assistance is needed (availability) and perceived satisfaction with the support provided. Items were rated on a 6-point Likert scale, with higher total scores indicating greater availability and satisfaction. When the Chinese version was administered in Hong Kong, it was found to have satisfactory reliability and

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content validity (Cheng & Chan, 2005). α s were .85 and .92 for availability and satisfaction respectively.

Maslach's Burnout Inventory- Student Survey (MBI-SS). MBI is the most widely used measure on burnout, and has been well-validated in cultures such as Malaysia (Chen et al., 2014). MBI-SS (Schaufeli et al., 2002) is a modified version of the MBI which was adapted for use in student samples. MBI-SS consists of 15 items from three subscales: Exhaustion, Cynicism and Efficacy. Exhaustion is the feeling of being emotionally overtaxed; cynicism is taking a distant attitude towards academic activities and academic inefficacy denotes a self-perceived incompetence in academics. Items were scored on a 7-point Likert scale ranging from *never (1)* to *always (7)*. High scores on exhaustion and cynicism and low scores on efficacy were indicative of greater burnout. α was .90 for Exhaustion, .90 for Cynicism and .81 for Efficacy. In this study, the inter-correlations among the three subscales were high (ranged from .41 to .51, $ps < .01$) and a composite burnout score was thus computed by averaging scores on the items (with reverse coding for efficacy) for parsimony. α for the composite was .75.

Mental Health Inventory (MHI-5). MHI-5 (Berwick et al., 1991) is a 5-item scale that provides an assessment of several domains of mental health including anxiety, depression, positive affect and general distress. Items were rated on a 5-point scale from *all of the time (1)* to *none of the time (5)*. MHI-5 has reliability and validity statistics similar to the full 38-item MHI (Berwick et al., 1991), and has been used as a screening tool for psychological disorders, including depression and anxiety disorder. Scores were summed ($\alpha = .84$).

Study 1 Results

Preliminary Analyses

Data Screening. There were 1, 9 and 4 cases of missing data for the SYRESS, support availability scale and satisfaction of SSQ-6 respectively. Based on Little's MCAR test, the data was found to be missing completely at random, $\chi^2(17) = 7.464, p = .977$. Expectation maximisation was used to treat the missing data. One outlying score each was detected for CD-RISC and social support, and four for satisfaction with social support (all with z scores in excess of ± 3.29). All six outliers were re-coded to one unit larger (or smaller) than the next non-outlying score, following recommendations by Tabachnick and Fidell (2013). No evidence for multicollinearity was found.

Main Analyses

Convergent Validity. Convergent validity was assessed by comparing the bivariate correlations between CD-RISC and the SYRESS, PSS, SSQ, MHI-5 and MBI-SS (see Table 1). All correlations were in the hypothesized direction. Resilience was positively correlated with SYRESS and social support, and negatively correlated with perceived stress, poor mental health and academic burnout.

[Insert Table 1 about here]

Factor Analysis. An exploratory factor analysis with maximum likelihood estimation extraction was done. Oblique rotation was used as the items in CD-RISC were correlated. A five-factor model was extracted based on its rotated factor pattern. Four interpretable factor emerged, with factor loadings ranging from .29 to 1.11. These factors were labelled as *approaching coping in adversity* ("Coping"; $\alpha = .88$), *self-belief and trust in one's ability* ("Trust"; $\alpha = .79$), *effort and purpose* ("Effort"; $\alpha = .76$), *interpersonal/internal resources* ("Resources"; $\alpha = .69$) and *spirituality* ($\alpha = .60$). Coping, trust, effort and resources were correlated, with r s ranging from .47 to .71 ($ps < .001$). Spirituality was not correlated with any

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other factor (r s from .08 to .12). However, internal consistency remains high when resilience was analysed as a single composite ($\alpha = .90$).

Discussion

Reliability and Convergent Validity

Study 1 shows that the CD-RISC has strong internal consistency and good convergent and predictive validities in a sample of Singaporean college students, affirming its potential as an appropriate measure of resilience in this cultural context. The high internal consistency of CD-RISC (.90) is comparable to that (.89) reported by Connor and Davidson (2003). Notably, CD-RISC scores were positively correlated with resilience measured by a locally developed scale (SYRESS), demonstrating convergence. CD-RISC was also positively related to social support, and negatively correlated with perceived stress, academic burnout and general mental health, showing predictive validity.

Factor Structure of Resilience

Five factors of resilience were extracted. Factor 1 was identified as *approach coping in adversity*, where one desires to actively seek ways to solve a problem. This involves focusing on modifying stressors through cognitive or behavioral means in the face of adversity (Herman-Stabl et al., 1995), as opposed to avoidant coping where one withdraws from challenging situations. Factor 2 was *self-belief and trust in one's abilities*, exemplified by items such as thinking of the self as a strong person and believing in one's abilities to make difficult decisions. This factor partially overlaps with the factor "trust in one's instincts" in the original validation study (Connor & Davidson, 2003), which is related to a mindset that can be cultivated. Factor 3 was *effort and purpose*, which entails working hard to attain one's goals and being motivated by one's sense of purpose. This factor positions resilience as a process of positive adaptation which requires continuous effort (Masten et al., 1990). It also overlaps with the factor of *tenacity* from Yu and Zhang's (2007) model of

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resilience based on a Chinese sample, which encompass perseverance and hardiness. Factor 4 pertained to *interpersonal and internal resources*, and includes items detailing secure relationships and knowing where to seek help during adversity. Internal resources are more trait-like and include items which are related to one's sense of humour. Moreover, this factor entails the disposition to take pride in one's achievements and past successes. Finally, Factor 5 was labelled as spirituality, which aligns with a similar factor in the original five-factor model. It refers to attributing happenings in life to a higher force such as God or fate, thus being better able to accept the occurrence of adversities (Connor & Davidson, 2003). Together, these factors could be considered as the key components of resilient traits or psychological skills that are important in this cultural context. Practitioners may hence draw upon these factors when designing interventions to enhance resilience among university students, particularly for those constituents that are more amenable to change.

Overall, there were moderate-to-large intercorrelations between all factors except for spirituality. Spirituality can thus be understood as a unique factor that contributes to resilience independently. This is likely because only 57% of the current sample had a religion that would provide a basis for attributing outcomes to the work of a higher force. Nonetheless, given the generally high intercorrelations among factors, the CD-RISC was not analysed by individual components but as a single scale in Study 2 for parsimony.

Study 2

In Study 2, we examined longitudinally how mental resilience would reduce burnout among college students, which in turn contributed to lower levels of psychological distress. Only students from a public residential college in Singapore were recruited. A homogenous sample was selected because residential and non-residential university students tend to face very different challenges. For example, the communal living arrangement in a residential college brings with it added social pressures that may not be experienced by students who

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live off-campus. To examine the stability of burnout and resilience, a longitudinal design was used, where a survey was administered towards the end of the first semester (T1), and another at the beginning of the second semester of the same academic year (T2). The time points were approximately eight weeks apart over a term break, and were selected due to the varying stress levels at different points of the semester. Stress levels at T1 would be higher as it coincides with multiple examinations and assignment deadlines, whereas stress levels at T2 is expected to taper as it occurs at the start of a new semester immediately after a break. The difference in stress levels can thus demonstrate whether resilience, burnout and distress are more chronic or acute in nature, and how an individual's mental state in the previous semester may have an effect on subsequent mental health outcome.

Method

Participants

None of the participants from Study 1 was involved in Study 2. A total of 107 students were recruited, with 97 participants (45.4% males; 54.6% females) retained in the final analysis because 10 of them did not consistently live on campus in the preceding semester. The study was sufficiently powered at .80 for a multiple regression model with two predictors (assuming small-to-medium effects). Participants' mean age was 21.05 years ($SD = 1.86$). Participants' clinical status, defined by whether they had received or were receiving professional help for their mental health within the past six months, was obtained as a covariate. A total of 29.5% of the participants had received help, while 70.5% did not. The majority of the participants were Singaporeans (70.1%).

Measures

Connor-Davidson Resilience Scale (CD-RISC). Psychometric properties of the CD-RISC were reported in Study 1. α s for the full CD-RISC in this study were .91 (T1) and .92 (T2).

Maslach Burnout Inventory (MBI-SS). Psychometric properties were described in Study 1. In this study, α s were .90 (T1) and .91(T2).

General Health Questionnaire (GHQ-12). GHQ-12 (Goldberg & Williams, 1988) is a popular screening measure of psychological distress and minor psychiatric disturbances. GHQ-12 consists of 12 items, each assessing the severity of a mental problem over the past few weeks using a 4-point scale. The items relate to decision-making, feeling under strain, problem-solving, depression, self-confidence, thinking about the self and feeling happy. Higher scores indicate worse conditions. GHQ-12 was found to be negatively correlated with global quality of life score in past research (Montazeri et al., 2003). α s for T1 and T2 were identical at .90.

Procedure

The procedure was approved by the Institutional Review Board of the National University of Singapore. Participants were recruited via the College Community Facebook group and through snowballing. The voluntary nature of the study was emphasised and informed written consent was obtained. Participants completed an online survey at each time point, which took no more than 30 minutes to complete. Beverage vouchers (S\$3 each) were given as a token of appreciation.

Results

Preliminary Analyses. There were no missing data. There was no multivariate outlier and no evidence of multicollinearity. Assumptions related to linearity, homoscedasticity and normality were met. Academic burnout was computed as a single scale for parsimony, and due to the significant correlations among the subscales (ranged from .26 to .54, $ps < .01$).

For the assumptions of the mediation analysis, bivariate correlations (see Table 2) showed that T1 resilience (IV) was related to T2 psychological distress (DV), and T1 resilience was also related to both T1 and T2 burnout (mediators). Burnout at T1 and T2 were

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also associated with psychological distress at T1 and T2. Thus, all assumptions for mediation analysis as suggested by Kenny (2012) were met. To determine if clinical status should be added as a covariate in the mediation analysis, a one-way ANOVA was performed.

Differences in clinical status was significant, $F(1,95) = 4.95, p = .03$, with participants who have sought counseling help in the past six months being more likely to experience psychological distress ($M = 26.50, SD = 1.18$ vs. $M = 23.38, SD = 0.75$). Clinical status was therefore included as a covariate.

Main Analyses

Longitudinal associations. To investigate the stability of the variables, bivariate correlations were computed between corresponding variables at T1 and T2. Psychological distress, resilience and academic burnout were significantly correlated between T1 and T2 (See Table 2; absolute values ranged from .32 to .74). This indicated stability between scores over time. The results also showed that resilience at T1 and T2 were associated with lower psychological distress and burnout at T2.

[Insert Table 2 about here]

Pairwise Comparisons. Repeated measures *t*-tests were conducted for all corresponding variables measured at T1 and T2. Descriptive statistics appear in Table 2. There was a temporal difference in academic burnout, $t(96) = 3.65, p < .001, d = .23$, where academic burnout was higher at T1 compared to T2. Psychological distress also decreased at T2 compared to T1, $t(96) = 2.42, p = .02, d = .18$. The effect sizes were small for differences in academic burnout and psychological distress across the two time points. Resilience scores were not significantly different between time points, $t(96) = -1.18, p = .24$.

Mediation. Mediation analyses were conducted with T1 resilience as the causal variable, T2 psychological distress as the outcome variable, and burnout at T1 and T2 as the mediating variable in two separate models. Burnout at two time points were examined

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separately as an exploratory analysis, because no specific hypothesis was made about whether earlier and concurrent burnout might mediate the effect of resilience on psychological distress differently. Because the components that comprise academic burnout were significantly correlated (ranged from .26 to .54 for T1 and .32 to .59 for T2, $p < .05$) with high internal consistency (.90), burnout was examined as a single construct in the mediation models for parsimony.

The standardized path coefficients associated with each mediational model are presented in Figure 2. The relationship between T1 resilience and T2 psychological distress was partially mediated by T1 burnout. The total effect of T1 resilience on T2 psychological distress was -.50, and the direct effect of T1 resilience on psychological distress, controlling for T1 burnout, was -.27, $p = .009$. The standardized mean bootstrapped indirect effect of T1 resilience on T2 psychological distress was -.22 (95% CI: -.35, -.10). The effect size was large, following Kenny (2012) suggested rule of thumb for interpreting standardized effect: .01 for small; .09 for medium; and .25 for large effects.

In comparison, T2 burnout fully mediated the relationship between T1 resilience and T2 psychological distress. The total effect of resilience on distress was -0.5, and the direct effect of T1 resilience on T2 psychological distress after controlling for T2 burnout was -.14, $p = .11$. The standardized mean bootstrapped indirect effect of T1 resilience on T2 psychological distress through T2 Burnout was -.36 (95% CI: -.46, -.24), which is a large effect (Kenny, 2012).

[Insert Figure 2 about here]

Discussion

In this study, resilience, academic burnout and psychological distress were measured at two time points. Bivariate correlations revealed that all three variables were significantly correlated between T1 and T2, demonstrating temporal stability. Overall, the results suggest

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that psychological distress and academic burnout might be chronic in nature, while also being induced by time-specific stressors as burnout and psychological distress decreased after a term break at the start of a new semester.

The hypothesized mediating effects were supported. Mental resilience predicted lower concurrent (T1) academic burnout, which in turn lowered subsequent psychological distress in a partial mediation. A similar pattern of results was observed for T2 burnout, this time a full mediation. Large effect sizes were observed in both mediation models. Overall, these findings position burnout as a key mediator, and explicate how resilience may work to reduce psychological distress by lowering burnout rate. Given the longitudinal design, temporal causal links can be drawn between resilience, burnout and distress.

The mediation effects observed differ from that by Arrogante and Aparicio-Zaldivar (2017), where resilience was investigated as a mediator between burnout and mental health. In that study, the authors concluded that resilience prevents the occurrence of burnout syndrome in critical care professionals. However, given that resilience was postulated as a mediator in that study, their findings imply that burnout leads to lower resilience, which then decreases one's mental health. Hence, resilience cannot be said to prevent or buffer the effects of burnout, but instead leads to poorer mental health when burnout is already high. This present study extends past research by postulating that resilience, as a construct constituting both trait-like and acquired characteristics, may serve to reduce college students' psychological distress through regulating burnout.

General Discussion

Study 1 demonstrated the validity of CD-RISC in measuring mental resilience in a Singaporean college context. Owing to its shorter length, the CD-RISC has benefits over the longer 50-item locally-developed SYRESS. Importantly, as CD-RISC is a widely-used measure across cultures, establishing its validity in the local context provides justification for

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its use in local research and enables comparability of findings with other studies in different contexts. Study 1 also uncovered five different facets underlying resilience. The findings reveal that psychological skills (i.e., approach coping), mindsets (i.e., perspective-taking as part of internal resources and self-belief), processes (i.e., putting in the requisite effort) and personality traits (i.e., finding humour) make up the construct of resilience in this cultural context. Clearly defining these factors provide valuable information for college campuses to structure mental health promotion interventions, such as imparting coping skills and strengthening interpersonal resources. Interestingly, the original five-factor model (Connor & Davidson, 2003) was not replicated. In fact, the factors uncovered in this study also did not align perfectly with the four-factor model in the U.S. (Campbell-Sills & Stein, 2007) or three-factor model in China (Yu & Zhang, 2007). Hence, consistent with observations noted in previous studies, what counts as “positive adaptations” is likely to vary depending on cultural contexts (Fletcher & Sarkar, 2003), which underscores the importance of scale validation before model-testing.

Findings from Study 2 also provide a theoretical basis for promoting resilience interventions in college campuses. Amidst a stressful residential college environment, mental resilience predicted lower psychological distress through decreasing academic burnout. In the study by Arrogante and Aparicio-Zaldivar (2017), the predictor variable under investigation was burnout, and thus to achieve better mental health, burnout rates would have to be lowered through unidentified means. While seemingly intuitive, changing the academic and social climate to reduce burnout and psychological distress is challenging in a college environment. System-level changes that involve modifying deep-seated academic climate and practices would presumably take more time to realise, possibly entailing major restructuring.

In comparison, resilience can be feasibly strengthened as a skill or psychological resource through interventions at the individual level. These programs are easier to develop

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and implement by counseling centres in colleges and universities, and could show great promise when incorporated into mental health promotion efforts on campus to reduce academic burnout and enhance psychological well-being among college students. We propose that such interventions are likely to serve both as a preventive and mitigative mental health measure, but future intervention studies should focus on quantifying the effectiveness of such programs. As burnout and distress seem to be chronic in nature, being resilient may be able to mitigate these effects by preventing escalating levels of burnout and distress in the first place.

Strengths and Limitations

The two studies reported in this paper present several strengths, including the validation of a widely-used resilience measure in the Singaporean context in Study 1, and the adoption of a longitudinal design in Study 2 which allowed us to track the temporal stability and causal relations between variables. The findings also have strong practical implications, singling out modifiable factors that can be the target of interventions to promote college students' mental well-being. However, the conclusions drawn from these two studies must be interpreted in light of several limitations. First, the exclusive use of self-reported measures provided by a single informant might have resulted in an inflation of correlation arising from common method variance. However, the decision to rely on a single informant was borne out of our interest to focus on the perceptions and lived experiences of the college students. Moreover, despite the CD-RISC having a high internal consistency, not all factors were inter-correlated. Specifically, the factor of spirituality was not significantly correlated to any other factors. However, for parsimony, resilience was analysed as a single factor in Study 2, as is the common practice in the literature (e.g. Arrogante & Aparicio-Zaldivar, 2017). Continuing efforts should be devoted towards validating the CD-RISC or other resilience measures in the Singaporean context, involving more diverse samples.

Conclusion

This study has ascertained the reliability and validity of the CD-RISC to measure resilience among Singaporean college students, and identified a unique factor structure of resilience. Given how resilience has implications for college students to thrive amid adversity and challenges, it is imperative that resilience interventions be developed to improve the mental well-being of college communities.

Declarations

Funding

Conflict of interest statement

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethics approval

This study was approved by the Yale-NUS College Ethics Review Committee and the Institutional Review Board at the National University of Singapore (NUS).

Informed Consent

Informed written consent was given by all research participants in this study.

Availability of data and material

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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