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### Stress, vulnerability and resilience: a developmental approach

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**Publication date**  
2011

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#### **Citation for published version (APA):**

Broekman, B. F. P. (2011). *Stress, vulnerability and resilience: a developmental approach*.

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## The development and validation of the Singapore Youth Resilience Scale (SYRESS)

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*The international journal of educational and psychological assessment* 2011;8:16-30



*"Children of the world" by Fleur Deiters, 6 years old*



## **Abstract**

### **Objective**

Resilience research suggests that multiple conceptualisations of resilience are descriptions of the various aspects of the construct. A resilience scale developed on the basis of a particular conceptualisation therefore may not adequately represent all aspects of resilience. Multicultural resilience research also suggests that cross-cultural use of resilience measures developed in Western countries is theoretically unsound.

### **Methods**

In this paper, we report the development and validation of the Singapore Adolescent Resilience Scale (SYRESS), a 50-items 10-domain hybrid scale which not only encompasses the various aspects of resilience but also incorporates the contextual aspects unique to local youths.

### **Results**

The SYRESS showed good internal consistency (Cronbach's alpha = 0.95,  $P < 0.01$ ), test-retest reliability ( $r = 0.82$ ,  $P < 0.01$ ), and convergent validity with the Connor-Davidson Resilience Scale (CD-RISC) ( $r = 0.88$ ,  $P < 0.01$ ), World Health Organisation Quality of Life (WHOQOL-BREF) ( $r = 0.55$ ,  $P < 0.01$ ), and the General Health Questionnaire (GHQ-28) ( $r = -0.33$ ,  $P < 0.01$ ). Factor analyses revealed a 10-factor structure (total variance 63.4%) for the SYRESS and hierarchical analyses showed that SYRESS significantly contributed additional variance to the prediction of the WHOQOL-BREF and GHQ-28 scores over that contributed by CD-RISC alone, suggesting that as a hybrid scale, SYRESS is a more comprehensive measure.

### **Conclusions**

As a hybrid resilience scale the SYRESS showed to be a comprehensive measure for well-being and mental health in a Singaporean population.

## 1. Introduction

Resilience has been defined as the process, or the achievement, of positive adaptation despite adversities or challenging life conditions (Davydov et al., 2010; Luthar et al., 2000). It has been conceptualised as a set of personality traits that buffers the negative effects of stress (Ahern et al., 2008), the ability to cope with change or stressors (Wagnild and Young, 1993), or simply as a set of personal resources that can be tapped into, to moderate the effects of stressors when the need arises (Davydov et al., 2010). These various conceptualisations have given rise to substantial variations in its measurement and its underlying mechanisms (Luthar et al., 2000). Among these underlying mechanisms are the availability of positive social support, and the presence of certain internal attributes like perseverance and effective coping skills (Ahern et al., 2008; Collishaw et al., 2007; Luthar, 1991; Luthar and Zigler, 1992; Smokowski et al., 1999). Some have suggested that these various conceptualisations and the respective underlying mechanisms are not conflicting views, but merely descriptions of the many different facets of the same construct (Luthar et al., 2000). Given the above, it may be reasoned that the various instruments developed to measure resilience are also measuring the different aspects of resilience. A review of existing scales reveals indeed that these scales measure a plethora of underlying mechanisms ranging from protective resources of healthy adjustment to personality characteristics that enhance adaptation. However, none of the scales measures all of these underlying mechanisms. For instance, the Resilience Scale (RS) (Wagnild and Young, 1993) does not assess the domains of positive acceptance of change and challenges, and emotional regulation, which are assessed in both the Connor-Davidson Resilience Scale (CD-RISC) (Connor and Davidson, 2003) and the Adolescent Resilience Scale (ARS) (Oshio et al., 2003). On the other hand, the ARS does not assess the idea of self-reliance and sense of personal competence, which is assessed in the CD-RISC and RS. And spiritual influences on resilience are assessed only in the CD-RISC. A scale developed based on one particular conceptualisation of the resilience construct, therefore, does not seem to capture the entire possible spectrum of underlying mechanisms of resilience. We hypothesize that a scale with a broad conceptualization of the construct of resilience, that includes more domains and underlying mechanisms, may better capture the various aspects of resilience. To date, no study has yet attempted to develop a hybrid scale that more comprehensively measures resilience.

There is also an increasing awareness of the need to incorporate culture and diversity into the study of resilience (Arrington and Wilson, 2000). Because of different geographical, historical and social environments, various cultures can have different understandings of adversity and positive adaptation (Yu and Zhang, 2007). Indeed, research into the cultural and contextual influences on resilience has revealed that there are global as well as culturally and contextually specific aspects to understanding resilience (Ungar, 2006, 2008), and that cultural beliefs play a significant role in determining an individual's approach to adversities in life (Lee et al., 2010). Thus, although the construct of resilience is believed to be universal, there may be additional specific underlying mechanisms of the development of resilience unique to the culture in question (Ungar, 2008). Since patterns of resilience can be context-dependent, direct wholesale cross-cultural applications of standardized measures may not be viable (Ungar, 2008). For instance, although some measures of resilience developed in Western countries have been validated cross culturally (e.g. CD-RISC), the findings indicate

that the understanding of the construct requires some modification according to the culture in which it is measured (Yu and Zhang, 2007). Thus, to better measure resilience in any culture, the unique contextual and cultural aspects must be considered and incorporated into the measurement scale. However, to date, no scale has been developed to measure resilience in Singapore.

A recent review showed that most existing scales are not suitable for use in adolescent populations (Ahern et al., 2006). Efforts aimed at understanding youth resilience are not new (Luthar et al., 2000). Adolescence is often considered to be a period of rapid development and developmental challenges (Engle et al., 1996; Flisher and Gerein, 2008; Friedman, 1989). Many studies have found that, despite exposure to such stresses, some adolescents exhibit resilience and achieve positive development during this period of transition (Lee et al., 2010; Richter, 2006). This suggests that adolescents can be protected from harm through enhancing their resilience. In Singapore, adolescents face a highly stressful academic environment and are exposed to considerable challenging conditions complicated by a multitude of stresses (Ang and Huan, 2006). The mental health problems caused by these stresses have been well-documented (Ang and Huan, 2006). Despite the key role resilience plays in enhancing adolescents' wellbeing, to date, there is no scale developed to measure resilience in the adolescent population in Singapore.

The current study therefore aims to develop and validate a resilience scale, that not only encompasses the various aspects of resilience, but also incorporates the contextual and cultural aspects unique to the adolescent population in Singapore. In the current study, the CD-RISC (Connor and Davidson, 2003) was used as a convergent validity indicator of SYRESS. Measures of quality of life (World Health Organization Quality of Life, WHOQOL-BREF, WHOQOL-Group, 1998) and general health status (General Health Questionnaire and GHQ-28) (Goldberg and Hillier, 1979) were also used as validity indicators of SYRESS as previous studies have shown that resilience is positively related to positive development (Alriksson-Schmidt et al., 2006; Lee et al., 2010) and general health (Haddadi and Besharat, 2010).

## **2. Method**

### **2.1. Development of the Singapore Youth Resilience Scale (SYRESS)**

The content of the scale was drawn from multiple sources. First, an exhaustive review of the literature was performed, including recent published resilience scales (Adolescent Resilience Scale (ARS), Oshio et al., 2003; Connor-Davidson Resilience Scale (CD-RISC), Connor and Davidson, 2003; Resilience Scale (RS), Wagnild and Young, 1993; Resiliency Scales for Children and Adolescents (RSCA), Prince-Embury, 2007). A focus group comprising researchers, child psychologists and pediatric psychiatrists, with pooled local and international content expertise, then reviewed the domains and question items in these established scales. They identified and selected from among them a comprehensive list of question items that reflect the salient features and global underpinnings of resilience. Items that reflected the local culture but which were not included in the list were added. With an exhaustive list of domains and a saturated pool of associated question items thus generated, an external expert panel with similar content expertise was consulted on the comprehensiveness and

cultural relevance of the items in the list. These experts provided additional feedback and inputs. This generated a pool of 166 items, which was subsequently content-analyzed and classified by domains. Items that lacked face validity for the domain and redundant items that were very similar to a more ideally worded item were eliminated. This resulted in the removal of 71 items, and the remaining 95 items were rewritten or modified where necessary. This prototype scale was reviewed by another external panel of 10 psychiatric experts who did not participate in the focus group discussions. They were similarly asked to review the comprehensiveness and cultural relevance of the question items. Their critical feedback led to a further elimination of 11 items and further changes to the wording of the items. The amended prototype scale of 84 items was then pre-tested in a convenience sample of 20 adolescents to check for clarity of instructions and question wordings. The final prototype scale comprised 84 provisional items reflecting 10 domains of resilience. The provisional domains were: emotional regulation (8 items), spirituality (7 items), family and social support (8 items), self-belief - satisfaction and a sense of purpose in life (15 items), self-confidence during stress (5 items), coping with challenges (6 items), flexibility (6 items), optimism (6 items), humour (5 items), and coping style (18 items). The questionnaire was designed as a self-rating scale that requires the respondent to indicate how much he/she agrees with each statement on a Likert scale ranging from 'never' (1) to 'always' (5). The summed scores across all domains and subscale scores for individual domains required the scores for 8 items to be reversed. Higher scores on the SYRESS denote greater resilience.

## 2.2. Participants

The 84-item prototype version of the scale was empirically tested for its internal reliability and construct validity among pupils in Grades 7 to 9 of a typical public mainstream secondary level school. The analysis in the present study was performed on data from 190 adolescents: 98 males and 92 females aged between 12 to 16 years (mean age: 12.8 years).

## 2.3. Consent and procedure

The study was approved by the National University of Singapore Institutional Review Board, and permission to conduct the study at the participating school was obtained from the Ministry of Education and the principal of the school. The purpose of the study was explained to the participants and parents through a participant information sheet and parent information sheet respectively. Both participants and parents provided signed informed consent. The questionnaires were administered in English, the first language of education for all students in Singapore. The questionnaires included brief demographic data, the prototype SYRESS, CD-RISC, WHOQOL-BREF and GHQ-28. The test-retest reliability was assessed two weeks later on a subsample of 30 randomly selected participants who completed the SYRESS for the second time.

## 2.4. Measures

### 2.4.1. Connor-Davidson Resilience Scale (CD-RISC)

CD-RISC (Connor and Davidson, 2003) is an established resilience scale that comprises 25 items, each rated on a 5-point Likert scale ranging from 'not true at all' (0) to 'true nearly all the time' (4), with higher scores reflecting greater resilience. The scale has been found to be valid and reliable, with a Cronbach's alpha of .89 (Ahern et al., 2006; Connor and Davidson, 2003). Its Cronbach's alpha in the present study was .94.

#### 2.4.2. *World Health Organization Quality of Life (WHOQOL-BREF)*

WHOQOL-BREF (WHOQOL-Group, 1998) comprises 26 items measuring the individual's perception of quality of life in each of 4 domains: physical health, psychological, social relationships, and environment. Higher scores denote a perceived higher quality of life. It has been shown to adequately assess the domains in a large number of diverse cultures (WHOQOL-Group, 1998). It has been well validated in Asian participants (Saxena et al., 2001) and found to have good validity and reliability in assessing the quality of life in adolescents (Chen et al., 2006). The WHOQOL-BREF demonstrates good internal consistency, with Cronbach's alpha values ranging from .66 to .84 (WHOQOL-Group, 1998). Its Cronbach's alpha in the present study was .93.

#### 2.4.3. *General Health Questionnaire (GHQ-28)*

GHQ (Goldberg and Hillier, 1979) is used in many studies to detect minor psychiatric disturbances in community or non-psychiatric clinical settings. The 28 items in the questionnaire measure responses to 4 subscales that examine somatic symptoms, anxiety and insomnia, social dysfunction and severe depression. Symptoms are assessed during the past few weeks on a 4-point scale that ranges from a 'better or healthier than normal' (0) through 'worse/more than usual' (4). Higher scores denote greater severity. Good validity of the GHQ-28 has been reported for adult respondents by the authors (Goldberg and Hillier, 1979), and cross-validated in younger people (Banks, 1983), as well as in Singaporeans (Fones et al., 1998). In the present study, its Cronbach's alpha was .94.

#### 2.4.4. *Singapore Youth Resilience Scale (SYRESS)*

The development of SYRESS, measuring 10 domains of resilience, is described above in more detail.

### 2.5. Data analyses

To examine the factor structure of the SYRESS, an Exploratory Factor Analysis (EFA) using the principal components analysis method with an oblique rotation was performed on the scores of the 84-item prototype SYRESS. An oblique rotation was chosen because correlation between factors was expected. The number of factors to retain was evaluated based on the (1) eigenvalues (greater than 1.00), (2) scree plot analysis, and (3) interpretability of the resulting structure. Because the purpose of the EFA was to establish meaningful factors underlying the SYRESS, a minimum loading of .30 was used as a selection criterion. To ensure its comprehensiveness, factors that had at least 3 items loaded on it were retained. To assess the internal consistency of the scale, Cronbach's coefficient alphas were computed for the SYRESS and for each of its factors. The convergent validity of the scale was evaluated by correlating the SYRESS with CD-RISC, WHOQOL-BREF and GHQ-28 using Pearson product-moment correlation coefficients. The scores on the SYRESS were expected to be positively correlated with CD-RISC scores and WHOQOL-BREF scores, and negatively correlated with GHQ-28 scores. The correlations between the SYRESS scores and each of the WHOQOL-BREF domains and GHQ-28 subscale scores were also explored. To examine if the hybrid SYRESS was a more comprehensive measure of resilience than existing established scales, hierarchical multiple regression analysis was performed using the SYRESS and CD-RISC scores as predictor variables and the WHOQOL-BREF and GHQ scores as outcome variables respectively. All statistical analyses were carried out using SPSS 17.0 for Windows.

### 3. Results

#### 3.1. Preliminary analyses

The Kaiser-Meyer-Olkin measure of sampling adequacy index for the sample was .90 and the Bartlett's test of sphericity was highly significant ( $R^2 = 10586.03$ ,  $df = 3486$ ,  $P < .0001$ ).

#### 3.2. Factor analyses

Analysis of the data yielded a total of 10 factors with eigenvalues above 1.0 (See Table 1). Of the 84 items, 34 items were dropped from subsequent analyses because they had loadings of  $< .30$ . These procedures resulted in a 50-item scale that accounted for 63.4% of the variance in the SYRESS scores (See Table 1).

**Table 1. Eigenvalues and total cumulative variance explained**

Factor	Eigenvalue	Total cumulative variance explained (%)
1	16.17	32.33
2	2.65	37.62
3	2.31	42.24
4	2.29	46.81
5	1.72	50.24
6	1.54	53.33
7	1.40	56.14
8	1.30	58.73
9	1.23	61.18
10	1.12	63.42

The pattern matrix is presented in Table 2. The first factor consists of 8 items and accounted for 32.3% of the variance. It represents the individual's perseverance and commitment in the pursuit of goals. The second factor comprises 7 items and relates to the individual's positive self-image and optimism. Factor 3 consists of 5 items and relates to the availability of social support and the individual's ability to seek this support when necessary. Three items load onto Factor 4, which reflects the individual's sense of humour and the ability to think positively. Factor 5 comprises 5 items and reflects the individual's ability to regulate emotions. Factor 6 consists of 6 items and relates to the individual's sense of spirituality and faith. Factor 7 consists of 6 items and relates to a sense of personal confidence and responsibility. Factor 8 consists of 4 items, which reflects a sense of personal control. Factor 9 and 10 consist of each 3 items and relate to the individual's flexibility and coping skills when facing adversity. See Table 3.

**Table 2. Rotated factor pattern for the Singapore Youth Resilience Scale**

Factor	Item	Item description	Factor loading
1 Perseverance/ Commitment	80	I believe I can achieve my goals, even if it is difficult.	.591
	81	I believe by trying hard, things can be different.	.585
	78	When I start doing something I try to finish it.	.490
	79	I know that sometimes I have to make myself do things that I do not like.	.426
	48	Difficult times are an opportunity for me to learn and grow as a person.	.411
	83	I am able to make a decision even when I do not have all the facts.	.373
	46	I am not afraid of challenges.	.345
	71	I put in my best, no matter what the outcome will be.	.334
2 Positive self-image/ Optimism	33 <sup>a</sup>	I dislike myself.	-.768
	25	I accept myself.	.732
	26	I feel free to be myself.	.710
	13	I feel in harmony with myself.	.466
	57	I am optimistic about my future.	.455
	54	I usually recover quickly after ordinary illness or injuries.	.406
	32	I feel proud about things I have accomplished in life.	.373
3 Relationship/ Social support	18	I allow others to help me when I need it.	.731
	17	In difficult times I have at least one close person I can turn to for help.	.670
	16	My family understands how I feel.	.545
	22	I think others find me easy to work with.	.438
	23	I have good friends that I can trust.	.435
4 Humour/ Positive thinking	63	I can see the funny side of things.	.862
	64	I can find humor in difficult situations.	.824
	65	I can laugh at myself.	.784
5 Emotional regulation	1	I am able to handle unpleasant emotions, like sadness, fear and anger.	.794
	2	I stay calm in difficult circumstances.	.758
	7	I can handle my frustration.	.718
	6	I am able to manage my worries.	.625
	5	I am able to recover emotionally from losses and setbacks.	.377
6 Spirituality/ Faith	10	My religious or moral beliefs give me strength and courage for my life.	.761
	12	Good or bad, I believe that most things happen for a reason.	.760
	11	I find strength in a higher meaning when I face problems.	.710
	9	My personal belief gets me through hard times.	.677
	15	I believe my life has meaning and purpose.	.592
	14	Learning lessons from life can bring out the best in me.	.561
7 Personal confidence/ Responsibility	3	I think about why I get upset.	.659
	31	I am able to rely on myself when there is no help.	.622
	35	I accept responsibility for what I do with my life.	.531
	53	I would change myself if the situation requires it.	.511
	30	I am confident that I can solve problems in life.	.504
	20	I find strength in my relationships.	.383
8 Personal control	73 <sup>a</sup>	The problems I have are caused by other people.	-.793
	72 <sup>a</sup>	In most situations I worry that something bad will happen to me or those I love.	-.501
	40	When I am under stress I remain calm.	.371
	37	Failure does not easily discourage me.	.317
9 Flexibility	45	I can accept it when things are unclear and uncertain.	.831
	82	I do not keep thinking about things I cannot change.	.453
	50	I am able to cope well in unfamiliar situations.	.432
10 Positive coping	69	I try to understand the situation before I act on it.	.729
	68	I know which situations I can handle and which I cannot.	.693
	70	I prepare myself mentally when I meet challenges.	.521

Note: Only loadings above 0.3 are shown. <sup>a</sup> reverse scoring

**Table 3. Cronbach's alpha for individual factors**

Factor	Cronbach's alpha
1 Perseverance/ Commitment	.882
2 Positive self-image/ Optimism	.830
3 Relationship/ Social support	.768
4 Humour/ Positive thinking	.813
5 Emotional regulation	.810
6 Spirituality/ Faith	.859
7 Personal confidence/ Responsibility	.808
8 Personal control	.399
9 Flexibility	.607
10 Positive coping	.835

### 3.3. Reliability and validity

#### 3.3.1. Internal consistency

Cronbach's alpha for the 50-item SYRESS is .95. With the exception of Factors 8 and 9, the Cronbach's alpha values for the factors are all above .70 (see Table 3).

#### 3.3.2. Test-retest reliability

There is a high level of agreement between the mean SYRESS scores at Time 1: 190.55 (SD: 22.58) and Time 2: 194.45 (SD: 20.42), with a test-retest reliability coefficient of .82 ( $P < 0.01$ ).

#### 3.3.3. Convergent validity

The SYRESS scores strongly correlate with the CD-RISC scores ( $r = 0.88$ ,  $P < 0.01$ ). They also moderately correlate with the WHOQOL-BREF scores ( $r = 0.57$ ,  $P < 0.01$ ), indicating that a higher level of resilience is related to higher levels of wellbeing. Of the 4 domains, the SYRESS scores most strongly correlate with the psychological domain as measured by the WHOQOL-BREF ( $r = 0.55$ ,  $P < 0.01$ ). The correlation coefficients between SYRESS and each of the WHOQOL-BREF domains are shown in Table 4.

SYRESS negatively correlates with the GHQ-28 ( $r = -0.33$ ,  $P < 0.01$ ), indicating that higher levels of resilience are associated with less psychological morbidity. Of the 4 subscales, they most correlate with the 'severe depression' subscale ( $r = -0.33$ ,  $P < 0.01$ ). The correlation coefficients between SYRESS and each GHQ-28 subscale scores are shown in Table 4.

**Table 4. Correlations between the Singapore Youth Resilience Scale (SYRESS) and WHOQOL-BREF, and between SYRESS and GHQ-28**

	Correlation coefficient	P value
<b>WHOQOL-BREF</b>		
Physical health	.465	< 0.001
Psychological health	.554	< 0.001
Social relationships	.455	< 0.001
Environment	.511	< 0.001
<b>GHQ-28</b>		
Somatic symptoms	-.247	< 0.001
Anxiety and insomnia	-.232	< 0.001
Social dysfunction	-.289	< 0.001
Depression	-.330	< 0.001

### 3.4. Hierarchical regression analyses

Results of the hierarchical regression analyses are shown in Table 5. The results indicate that SYRESS accounted for 35.4% of the variance in the WHOQOL-BREF scores, significantly more by 1.8% than that predicted by CD-RISC alone ( $R^2 = 0.336$ ). SYRESS predicted 10.8% of the variance in the GHQ-28 scores. This was significantly more by 3.6% than that predicted by CD-RISC alone ( $R^2 = 0.072$ ).

**Table 5. Hierarchical multiple regression analyses using CD-RISC and SYRESS to predict WHOQOL-BREF and GHQ-28 Scores**

	Primary predictor	$\beta$	$\rho$	$R^2$	Secondary predictor	$\beta$	$\rho$	$R^2$
WHOQOL-BREF	CD-RISC	.336	.006	.336**	SYRESS	.279	.023	.354*
GHQ-28	CD-RISC	.062	.596	.072	SYRESS	-.194	.007	.108**

\* $p < .05$

\*\* $p < 0.01$

## 4. Discussion

In this study, we developed and tested the internal validity of the SYRESS, a 50-item 10-dimensional resilience scale for use with adolescents in Singapore. The SYRESS demonstrates sound psychometric properties, with good internal consistency and test-retest reliability. The SYRESS strongly correlates ( $r = 0.88$ ) with another measure of resilience (CD-RISC) and it also relates to higher levels of quality of life and wellbeing, particularly psychological wellbeing, as measured by the WHOQOL-BREF and lower psychiatric morbidity as measured by GHQ-28. The strengths of association with quality of life and

psychiatric morbidity are moderate but expected, and are in line with previous findings of associations between resilience and positive development as well as general health (Alriksson-Schmidt et al., 2006; Haddadi and Besharat, 2010; Lee et al., 2010).

Factor analyses revealed a 10-factor structure that explained a total variance of 63.4%. Perhaps not surprisingly, the factors underlying previously published scales from which some of the items have been used in the present study were found to emerge in the analysis. For example, Factor 1 in SYRESS – perseverance and commitment in the pursuit of goals – is also a factor in CD-RISC (Connor and Davidson, 2003). Social support and relatedness (Factor 3) is a factor in both RSCA (Prince-Embury, 2007) and CD-RISC (Connor and Davidson, 2003). Therefore, the present hybrid scale, SYRESS, is found to encompass all the factors represented separately by other existing scales. This suggests that SYRESS is likely to provide a more comprehensive measure of resilience, reflecting a greater multiplicity of underlying mechanisms of resilience. This is supported by the results from the hierarchical regression analyses. These analyses show that SYRESS significantly contributes additional variance to the prediction of the WHOQOL-BREF and GHQ-28 scores over and above that contributed by CD-RISC alone.

The domains represented by the factors of the resilience construct in SYRESS evidently reflect universal mechanisms and determinants of resilience. Qualities such as perseverance and determination have been found to be salient in helping youths overcome adversities (Smokowski et al., 1999). Self-efficacy and effective coping styles have also been consistently linked to resilience (Campbell-Sills et al., 2006; Carson et al., 1992; Rutter, 1990). Variables such as a sense of humour and the ability to think positively have also been positively related to psychological health (Ciarrochi et al., 2007; Martin et al., 2003). Also, the ability to manage one's negative emotional states and having a healthy self-esteem have been associated with less psychological distress (Kassel et al., 2006; Mäkikangas et al., 2004). Similarly, the relationship between higher perceived social support and better mental health is well-established (Hefner and Eisenberg, 2009; Smokowski et al., 1999), and helpseeking behaviour has been an important resilience strategy (Castro et al., 2010). Self-trust and religiosity have also been found to predict psychological health and adjustment (Ball et al., 2003; van Dyke and Elias, 2007; Johnson, 2004). That the construct of resilience includes universal core dimensions can therefore not be over-emphasized. The contribution of cultural-specific items in the scale to the additional variance due to SYRESS should be discussed. Since no 'new' factor has apparently emerged in the factor analysis, it would appear that the 'cultural-specific' items have either been discarded during the data reduction process, or subsumed under existing factors. The latter appear to be most likely. Rather than any unique cultural domain per se, cultural elements were embedded in the items that were linguistically and semantically validated prior to analysis for the factors representing various domains reflecting universal mechanisms of resilience. However, it is possible that there are cultural-relevant items that were not conceived and included. Also, there may well be a lack of cultural influence because adolescents in Singapore are influenced by Western media and ideals, and Singaporean adolescents have come to adopt many Western perspectives and preferred ways of behaving. However, this does not imply that scales established in a Western context may be directly applied to other local cultural contexts. It is interesting to note that spirituality and faith was a factor that emerged in both the SYRESS and the CD-RISC, but not in either the Chinese version of the CD-RISC (Yu and Zhang, 2007) or in the Resilience Scale for Chinese

Adolescents (developed in China, which assesses adolescents coping with adversities) (Hu and Gan, 2008). The emergence of this factor is reflective of the high level of religiosity in both American and Singaporean societies and cultures. Southeast Asia is the home to most major world religions (Evers, 2004) and Singapore, in particular, is a hub for a multitude of religious faiths (Department of Statistics, 2000). It is not surprising, then, to find spirituality and faith an underlying dimension of resilience in the SYRESS, as it is in CD-RISC (Connor and Davidson, 2003). On the other hand, cross-cultural studies have found that Chinese people from China today do not have strong religious traditions and understandably, the spirituality dimension is absent in these scales (Yu and Zhang, 2007). On the whole, this shows that the underlying mechanisms of SYRESS are still a set of patterns and expressions of resilience that are universal but should be suited for the cultural context of a country.

Some limitations in the study should be noted. First, with a relatively small sample which was recruited from one school, the extent of its generalisability as a measure of resilience is unclear. This should be further investigated in future studies. Second, it is possible that we have missed out other culturally-relevant items. Future studies may adopt an emic approach and generate cultural-specific items from the perspective of youth. In addition, the comprehensiveness of the measure was justified by determining if it makes additional contribution in predicting the scores of the GHQ-28 and WHOQOL-BREF, but this could be done additionally for other correlates of resilience. Further longitudinal studies should validate its use in moderating the effects of life adversities and predicting mental health outcomes.

Notwithstanding the need for further research, the findings from the present study indicate that the SYRESS is a validated tool and a more comprehensive measure of resilience in adolescents. Indeed, as a hybrid scale, the SYRESS has the advantage of encompassing all the underlying mechanisms measured separately by other regular scales but remaining a relatively short and easy scale to administer and score. The findings from the present study also suggest that the resilience construct is multi-faceted and the assessment of resilience should reflect this multiplicity.