Measuring Post-Secondary Student Resilience

Through the Child & Youth Resilience Measure and the Brief Resilience Scale

by

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A thesis submitted in conformity with the requirements for the degree of

Master of Arts in Higher Education

Graduate Department of Leadership, Higher and Adult Education

The Ontario Institute for Studies in Education

University of Toronto

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Master of Arts 2017

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Abstract

This thesis examines how the Child & Youth Resilience Measure (CYRM-12) and the Brief Resilience Scale (BRS) measure post-secondary student resilience as viewed by the University of Toronto in Toronto, Canada, which breaks down resilience into competence domains and adaptive resources. Cognitive interviews were conducted to assess item comprehension, with some items causing confusion with students. The two scales were administered in a survey instrument for a sample of 87 second- and third-year undergraduate students. Internal consistency reliability is high for both the CYRM-12 (Cronbach's alpha = .82) and the BRS (Cronbach's alpha = .83). Exploratory Factor Analysis yielded a 3-factor solution for the CYRM-12 representing family, friends and community, and a 1-factor solution for the BRS representing the ability to recover from stress. Scores from both scales indicate strengths in motivation and achievement orientation with more variability in familial relations and community belongingness. Limitations include a low response rate.

Acknowledgments

I am both grateful for and humbled by this opportunity to conduct a master's thesis project. It is a rewarding experience to be involved in assessing and improving methods to measure student health and success in Canadian post-secondary education.

First and foremost, I must acknowledge Him who "makes firm the steps of the one who delights in Him" (Psalm 37:23). His word is truly "a lamp for my feet, and a light to my path" (Psalm 119:105). I would not be here without the guidance and love of the "God of all comfort" (2 Corinthians 1:3).

Secondly, I would like to sincerely thank and state my appreciation for my thesis supervisor, my mentor and a pillar of support in our department, Dr. Ruth Childs, who is the reason I was able to start and finish this entire project. Without her technical, professional and personal guidance I would not be where I am today, nor would I have been able to develop a critical and comprehensive view of research and practice.

I would also like to thank my second reader, Kulamakan (Mahan) Kulasegaram, who was able to give me the most effective and informative crash course in factor analysis and scale assessment that made interpreting such messy data both possible and appropriate.

Lastly, I must thank my family for all their support throughout the years as well as the DataHost Lab for all their valuable research tips and tricks.

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Introduction

Mental health issues have become a prevalent problem in North America. While some groups in the population exhibit higher risk to mental health problems than others, post-secondary students have been identified as especially vulnerable (Zivin, Eisenberg, Gollust, & Golberstein, 2009). Not only have rates of mental health issues on campuses been on a constant rise (Andrews & Wilding, 2004; Hunt & Eisenberg, 2010; Kirsch et al., 2014), post-secondary students also experience a higher prevalence of mental health issues compared to their non-student counterparts (Hunt & Eisenberg, 2010; Kirsch et al., 2014). There are numerous factors contributing to this phenomenon. Central to these factors is the concept of resilience (or rather the lack thereof) and its effect on student wellbeing and student success (Ungar & Liebenberg, 2011). Institutes of post-secondary education in both Canada and the United States have in fact committed resources towards fostering resilience in students and promoting its protective factors throughout students' academic journeys in higher education (Provostial Advisory Committee, 2014; Skorton, 2012).

Consequently, it is becoming more important to understand how resilience is viewed in the post-secondary context, and more importantly, how it can be measured. This study had two objectives: (1) to identify, based on conceptual alignment, a scale or scales that could be appropriate for use by the The Health & Wellness Centre and Student Life at the University of Toronto (UofT) as additional questions at the end of a long student survey, and (2) to determine the psychometric properties of the scale(s) for this population of students. We hope that the results of this study may also inform resilience research in other institutions and research centres.

Outline

   This thesis will provide a brief and general overview of the prevalence of mental health

issues in North-American post-secondary education. These problems which are intricately

associated with, and affect, student success highlight the role of student resilience as both a

coping mechanism and a protective factor against stressful events. Existing definitions of

resilience are presented, along with the working definition and framework for this study.

Existing scales to measure resilience are examined. Background research about the scales chosen

for use in this study is presented along with a mapping of the items onto the aspects of resilience

we are interested in. The methodology section provides information on how the scales were

chosen and the process for administration, data collection and data analysis. Finally, a discussion

of the reliability of the scales and evidence of the validity of their proposed use illustrates the

scales' potential in assessing student resilience in post-secondary education.

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Background

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Prevalence of Mental Health Issues

   To begin, in order to properly comprehend the current prevalence of mental health issues

amongst post-secondary students, one must place this statistic in its proper context. Between

2001 and 2011, there was an 11% increase in college-aged individuals in the United States.

Forty-two percent of this cohort were enrolled in post-secondary institutions (Snyder & Dillow,

2013). During that same period, however, "mental, emotional or psychiatric

condition/depression" became the most prominent student disability designation, with a

staggering 42% increase from 2002 to 2008 (U. S. Government Accountability Office, 2009, p.

38). Some researchers hypothesize that increased self-seeking behaviour may contribute to the

increase in prevalence; however, this is not to distract from the effect of a true rise in prevalence

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(Hunt & Eisenberg, 2010; Kirsch et al., 2014). Unsurprisingly, this high rate has led to suicide becoming the first or second leading cause of death at many US colleges (Kirsch et al., 2014).

In Canada, the latest American College Health Association (ACHA) National College Health Assessment survey (2016) involved 41 post-secondary institutions and 43,780 students. This survey assessed different aspects of health behaviours by students, including mental health states. The findings of this report reiterate the severity of the mental health epidemic in Canada. The majority of students surveyed reported feeling lonely (67%), depressed (74%) and overwhelmed by all the work they had to do (90%), and one in every two students indicated they experience more than average or tremendous amounts of stress (ACHA, 2016). Therefore, while comprehensive mental health data in Canada has only been accessible for a few years, it is now clear that mental health problems are significant in universities and colleges here, much like in the U.S.

Relationship between Mental Health Issues and Student Success

Research has shown not only that mental health is linked with educational attainment (Choi, Buskey, & Johnson, 2010; Lockard, Hayes, McAleavey, & Locke, 2012), but also that problems with social and emotional adjustments are as influential as academic factors in predicting attrition in post-secondary institutions (Lee, Olson, Locke, Michelson, & Odes, 2009; Salzer, 2012). It is estimated that in the U.S., nearly 4.3 million individuals did not complete college because of "early onset psychiatric disorders" (Marsh & Wilcoxon, 2015). Similarly, the ACHA emphasizes that assessing student health supports "short- and long-term healthy behaviours ... fulfilling the academic mission" (2016, p. 1). In Canada, 33% of students reported anxiety as negatively affecting their academic performance, while one in five students reported the same effect due to depression (ACHA, 2016). Other relevant factors stated as negatively

affecting academics include stress (42%), Attention Deficit Hyperactivity Disorder (5%),

concern for a friend or family member (15%), grief (7%), homesickness (6%), sleep difficulties

(28%), and work (17%) (ACHA, 2016). It is evident then that mental health issues do affect

academic success in post-secondary education. This is consistent with the University of

Toronto's (UofT) statement that supporting mental health "is aligned with the University's

priorities, including academic excellence and student engagement" (Provostial Advisory

Committee, 2014, p. 19). This is where resilience comes into play.

Role of Resilience

Resilience can be briefly defined as the capacity of an individual to successfully

withstand stress or hardship (a more detailed definition is provided in Defining Resilience). In

the context of higher education, the role of resilience is not always clearly defined, and can be a

source of contention. Some, such as Psychologist Peter Gray, will place the student at the centre

of the problem describing a generation that has "not been given the opportunity to learn how to

solve their own problems ... [students are] going to college still unable or unwilling to take

responsibility for themselves, still feeling that if a problem arises they need an adult to solve it"

(2015, p. 1). Others cite the lack of student resiliency as the natural result of increased levels of

anxiety and depression for students who are expecting economic insecurity, labour market

fluctuations and shifting career trajectories (Resiliency Working Group, 2015). Regardless of the

merits of either side of the argument, there is no denying that students should be equipped with

the necessary tools and coping mechanisms to successfully overcome the stress and challenges of

post-secondary education.

Resilience has the potential to protect against many of these aforementioned issues, and

thus, alleviate the burden of mental health problems and promote student success. In fact,

previous researchers have concluded that individuals who show resilience display positive

mental health, social competence and self-esteem (Masten et al., 1999). Therefore, institutes of

higher education must properly understand resilience, how to promote it, and how to accurately

measure it.

Local Context for the Study

UofT has also been examining the relationships between mental health issues, resilience

and student success. Along with the expansion of academic success services, accessibility offices

and health and wellness services in response to the increase in mental health difficulties on

campus, the Office of the Vice-President & Provost at UofT created a committee on student

mental health in the fall of 2013 (Provostial Advisory Committee, 2014). This committee was

tasked with developing an institutional framework and strategy to deal with the mental health

crisis on campus. The committee adopted a multidisciplinary approach including consultations

with different populations on- and off-campus, and a review of best practices in order to

formulate its recommendations (Provostial Advisory Committee, 2014). The committee

formulated a set of 22 recommendations for the strategy UofT should adopt to address student

mental health issues. It was in fact this report that contributed to the formation of the new Health

& Wellness Centre (HWC) (Provostial Advisory Committee, 2014). For a full list of the 22

recommendations published by The Office of the Vice-President & Provost, please refer to

Appendix A.

It is important to note that UofT does acknowledge in its report that (1) there are

"linkages between student mental wellness and academic performance" as observed in empirical

studies (2014, p. 9), and (2) there is an increase in the number and complexity of mental health

problems reported by Counselling services (2014). Furthermore, the report draws significantly

from the Mental Health Commission of Canada's national mental health strategy (Bartram et al., 2012), past American College Health Association assessments, and a student mental health report by the Canadian Association of College & University Student Services & Canadian Mental Health Association (2013). This can be seen in the committee's definition of mental health, which reflects a continuum (Keyes, 2007), that is to say, mental health is seen as a spectrum with constantly changing states that can overlap and have no clear definition. The definition developed by the committee also adopts a systems approach which promotes a holistic understanding of health including the context of the academic setting and its impact on wellness and academic achievement (Byrd & McKinney, 2012; MacKean, 2011).

Moreover, in the summer of 2014, members from HWC, Student Life and other stakeholders from UofT formed a Resiliency Working Group (hereafter referred to as the Working Group), with a mission to "promote, facilitate, and support student life programming that would foster student resiliency" (Resiliency Working Group, 2015, p. 1). This Working Group's research and practices align with the University's Mental Health Framework (Provostial Advisory Committee, 2014).

Rationale

Naturally, then, there arises a need to understand, promote and measure resilience at the University of Toronto and in the overall context of higher education. The purpose of this study is to choose scales to measure resilience in this context. This is not only to support student service bodies at UofT, such as the Health & Wellness Centre and Student Life as mentioned earlier, but also to combine the scales in a valid and reliable instrument that has potential to be used and adapted by other researchers and institutions.

Disclosure of Interest

Authors of this research study have no conflicts of interest to declare. We are neither hired by the University of Toronto for this study, nor are affiliated with Student Life, the Health & Wellness Centre or any other student services body at the institution.

Defining Resilience

Existing Definitions

The first step in creating a new instrument is to define the constructs and sub-constructs the instrument is meant to measure. There are various definitions of resilience in the literature focusing on different dimensions. However, as illustrated by Wong (2013) in his thesis on resiliency, most definitions have one common feature which is the view that resilience is a two-dimensional phenomenon. In order for a person to be resilient, two conditions must be met: (1) exposure to a considerable threat or severe adversity, and (2) positive adaption in spite of stress (Gewirtz, Forgatch, & Wieling, 2008; Luthar, Cicchetti, & Becker, 2000; Masten & Obradović, 2006; Rutter, 2006). In other words, the individual has to successfully withstand or overcome a certain adversity, hardship or threat to demonstrate resiliency (Masten et al., 2004; Roisman, Masten, Coatsworth, & Tellegen, 2004; Schulenberg, Bryant, & O'malley, 2004).

Other researchers, such as Michael Ungar, emphasize the role of culture, and how resilience is conceptualized and realized in one's own context (2008). In this view, resilience is not a fixed trait. It is the capacity of individuals to navigate their way to resources around them – whether psychological, social, cultural or physical – and negotiate for those resources to be provided in culturally meaningful ways (Ungar, 2008). Resilience then can grow or diminish as the individual's interactions with his environment change throughout his lifetime. Masten (2001), on the other hand, describes resilience as "ordinary magic," implying it is a common and

natural process of human development:

> The great surprise of resilience research is the ordinariness of the phenomena ...
>
> Resilience does not come from rare and special qualities, but from ordinary everyday
>
> magic of ordinary, normative human resources in the minds, brains, and bodies of
>
> children, in their families and relationships, and in their communities. (p. 227)

Ungar's (2008) and Masten's (2001) definitions of resilience contribute the most to the working

definition adopted by the Working Group, which will guide this study.

Working Definition

After investigating how resilience is viewed in different contexts and examining their

own student population, the Working Group at UofT adopted the following definition:

> Resiliency is a developed trait, one that is a common and ordinary human adaptive
>
> process. It is the capacity to overcome adversity and the ability to adapt and learn from
>
> challenges; it is an individual capacity that exists in relation to stress or adversity and it is
>
> the capacity of a community to alleviate individual and/or systemic stress or adversity.
>
> (Resiliency Working Group, 2015, p.9)

This definition is also supplemented by a list of skills and characteristics that "de-abstracts" this

definition and provides tangible indicators for professionals and researchers to use (Resiliency

Working Group, 2015). These same characteristics will also provide the subconstructs and

criteria to search for and develop resilience scale items. A theoretical framework that expands on

this definition and breaks down resilience into its subconstructs is discussed in the next section.

Theoretical Framework of Resilience

Existing Frameworks

In his examination of the resilience literature, Wong identified a few popular theoretical models of resilience (2013). The first is Norman Garmezy's Triarchic Theory of resilience (1985). This theory identifies three levels of protective processes incorporating the individual, family and community (Garmezy, 1985; Werner & Smith, 1982). Individual characteristics such as intellectual ability, creativity and self-efficacy, and family attributes, including parent-child attachment and supervision, all contribute to an individual's capacity of resilience. There are also community circumstances that principally depend on the care and support by older adults in the community provided there exists strong community integration (Flynn, Ghazal, Legault, Vandermeulen, & Petrick, 2004; Garmezy, 1985).

Another important and prominent framework is Urie Bronfenbrenner's ecological model (1977) which also suggests multiple levels of resilience. However, these levels are interdependent and do not focus on the individual's own traits and capabilities. The first level is the microsystem which examines "the complex of relations between the developing person and environment in an immediate setting" (Bronfenbrenner, 1977, p.514). The second level is the mesosystem which examines the interrelations between the major settings the person is part of (e.g. family, school and peer group). The third level is the exosystem looking at community factors such as the presence and quality of an individual's school. The fourth level is the macrosystem which comprises the culture's beliefs, political landscape and values (Bronfenbrenner, 1977; Lynch & Cicchetti, 1998). This is important because this model emphasizes the influence culture has on resilience. It also raises the question of how students adopt resilience factors in their daily lives given the distinct cultures they come from. This

becomes a critical concept to understand on campuses that are especially diversified in cultures and backgrounds.

What these frameworks have in common is that resilience is understood as consisting of many layers. Often, it is not only individual factors or community factors that influence one's resilience capacity but a combination of different levels. Moreover, the role of culture complicates the task of measuring resilience in that it removes an element of universality and emphasizes the importance of assessing local contexts.

Working Framework

For the purposes of this study then, the same a-theoretical and non-interventionistic (lacking a specific intervention) model adopted by the Working Group will be used here. This is done for two reasons: firstly, to support the intended use of the scales in measuring subconstructs of resilience relevant to the University of Toronto, and secondly, because the framework provides a comprehensive view of resilience allowing researchers and practitioners to focus on and measure specific resilience constructs that are of interest to them. The chosen framework is Garmezy and Masten's *Project Competence* framework of resilience (Masten & Tellegen, 2012). According to the Working Group's interpretation of this framework, an individual's resilience can be evaluated by:

1. An individual's ability to effectively function and achieve in age-relevant domains (e.g., academic competence, social competence, work competence);

2. Individual or contextual adaptive resources or assets (e.g., having adult support, autonomy, achievement orientation); and

3. The nature and severity of life stressors or adversity. (Resiliency Working Group, 2015, p. 4)

This model also identifies competence domains for emerging and young adults. These refer to the demonstration of successful engagement and achievement in age-relevant domains. The Competence Domains are (Resiliency Working Group, 2015):

- Academic competence: performing well in school/academically.

- Social competence (with peers): acceptance by others; has high quality of friendships; has close, confiding friendships; has an active social life.

- Work competence: doing well at work; successfully and reliably holds a job.

- Romantic relationships: capacity to form a close and positive reciprocal relationship with a romantic partner.

- Conduct: follows societal norms; rule-abiding behaviours vs. rule-breaking, disruptive/aggressive or unlawful behaviour.

Resilience in emerging adults (age 17 to 23) and young adults (around age 30) is characterized by having key assets or resources; these adaptive resources include:

- Achievement orientation ("Planfulness"): has future motivation; strives to achieve high standard of success; takes pride in accomplishments; thinks about their future and plans for it; has plans and goals relating to school and career.

- Autonomy: demonstrates independent, self-reliant, and self-governing behaviours; makes decisions and follows through on them; free from excessive need for approval.

- Adult Support: displays connectedness and close relationship with adults, outside of parents; has an adult they can turn to for support.

- Coping: has coping skills to manage stress; having the capacity to handle stress.
  (Resiliency Working Group, 2015, p. 3-4)

It is important to note that not all components of this model are universally and equally relevant to all post-secondary students. For instance, the capacity to form positive romantic relationships with a partner might not be particularly relevant to all students, and/or might not be relevant at this particular stage in their lives. However, the model presents distinct and subconstructs of resilience that reflect much of the research in the field including a multi-layered understanding of resilience (e.g., individual, familial and community) as well as having a positive orientation to cope with stressful events.

Scales to Measure Resilience

There are dozens of scales that already exist for measuring resilience. In a review of the resilience literature, Windle, Bennett and Noyes (2011) examined nineteen distinct resilience scales and rated them on the following properties: content validity, internal consistency, criterion validity, construct validity, as well as agreement and reliability for reproducibility. Although the authors were not able to find a single scale that was able to satisfy all these psychometric properties (Windle et al., 2011), there were a few that merit consideration for possible use in this study. Four scales are tied at the top of Windle et al.'s rating chart (2011). Two of them are variations of the same scale: 33-item and 37-item versions of the Resilience Scale for Adults (Friborg, Hjemdal, Rosenvinge, & Martinussen, 2003). These scales are based on a longitudinal study from which the authors hypothesize that certain intrapersonal and interpersonal factors such as personal strength, social competence, and family cohesion form key features of resilience (Friborg et al., 2003). The Resilience Scale for Adults, however, as the name implies, is designed to work best with adults (mean age 30 or higher) (Windle et al., 2011), rather than individuals at a post-secondary age (late teens and early 20s).

Another scale that is well known in the resilience literature is the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) which not only was rated highly by Windle et al. (2011), but also was reviewed by the Higher Education Quality Council of Ontario in their report "Measuring Resilience as an Education Outcome" (Patry & Ford, 2016). The items of this scale examine personal competence, trust and tolerance in response to stress, acceptance of change and secure relationships, control, and spiritual influences (Patry & Ford, 2016). While the Connor-Davidson Resilience Scale is designed to measure relevant constructs of resilience, the development process involved much older individuals (mean age 44) compared to our sample (Windle et al., 2011). Gaining permission to use this tool was also problematic as it involved a lengthy application process and a financial fee. The Brief Resilience Scale (BRS) by Smith et al. (2008) is the fourth scale at the top of Windle et al.'s list (2011). Unlike the previously-mentioned instruments, the BRS focuses on a single aspect of resilience, the ability to bounce back or recover from stress (Smith et al., 2008). This is one of the two scales chosen for this study; the other being Liebenberg, Ungar and LeBlanc's 12-item Child & Youth Resilience Scale (CYRM-12) (2013). These two scales were chosen for their brevity, ease of acquiring permission for use, because their content matched the subconstructs of resilience that we are interested in, and because they had been tested with populations similar to our target population.

The Child & Youth Resilience Measure (CYRM-12)

The first scale chosen for this study is the CYRM-12 created by Liebenberg, Ungar and LeBlanc (2013) (see section 1 in Appendix B). This 12-item version of the original 28-item scale (Liebenberg, Ungar, & Vijver, 2012; Ungar & Liebenberg, 2011) is intended to assess modifiable factors that contribute to resilience. These are factors pertaining to an individual's available resources, rather than personal traits. What sets the CYRM apart from other measures

is that it is one of the few measures of resilience that considered a wide range of cultural diversity in the development phase of the original 28-item scale. The authors examined existing resilience scales from different cultures and contexts, as well as using an exploratory mixed methods approach with a group of culturally-diverse young people in order to identify common factors of resilience in an effort to identify a universal measure of resilience (Ungar & Liebenberg, 2011; Windle et al., 2011). This is particularly relevant to our context because Canadian universities – and the University of Toronto (UofT), in particular – host students from numerous distinct cultures and tend to promote multiculturalism as a cornerstone of Canadian values.

The 12-item variant of the scale (CYRM-12) was tested by the original authors with two distinct populations: a group of youth (mean age 18) who had been exposed to adversity and who had accessed some sort of health or community service, as well as a non-specific school-based sample (mean age 15) (Liebenberg, Ungar, & LeBlanc, 2013). To choose the final 12 items, three iterations of a multi-step procedure (review of non-response rates, investigation of item variance and Exploratory Factor Analysis (EFA)) were conducted, followed by a Confirmatory Factor Analysis (CFA) (Liebenberg et al., 2013). EFA with varimax rotation resulted in a four-factor solution with 10 items loading well and a Cronbach's alpha score of .754 (Liebenberg et al., 2013). These results do in fact show the potential of the CYRM-12 in capturing the socio-ecological aspect of resilience and assessing the resources available to and accessible by students in post-secondary education. As can be seen in Appendix B, the CYRM-12 asks respondents to rate the extent to which each item describes them on a 5-point Likert-type scale with the following response categories: Not at All, A Little, Somewhat, Quite a Bit, and A Lot. A simple summation of all item scores (ranging from 1 to 5) for each respondent is used to calculate a total

CYRM-12 score (Ungar, 2016). It is important to note that while the original 28-item CYRM provides a more comprehensive view of resilience, the 12-item variant is more suitable to accompany larger omnibus studies (Liebenberg et al., 2013). This is important for this study because it is the intention of UofT to add an instrument to measure student resilience at the end of a larger annual health assessment survey administered to students. In a study investigating the effects of questionnaire length and item placement in surveys, results suggest that the longer the survey, the lower the response rate, and the lower the quality of answers (Galesic & Bosnjak, 2009). Brevity is thus a priority.

The Brief Resilience Scale (BRS)

The second scale adopted for this study is the BRS by Smith et al. (2008) (see section 2 in Appendix B). The main intent of the BRS is not to measure availability and accessibility of resources associated with resilience like the CYRM-12 (Liebenberg et al., 2013), but rather to measure the "ability to bounce back or recover from stress, to adapt to stressful circumstances … and to function above the norm in spite of stress or adversity" (Smith et al., 2008, p.194). The BRS contains six items (three positively-worded and three negatively-worded to reduce effects of social desirability bias and positive response bias) all measuring one factor of resilience.

The BRS was tested by the original authors with four separate samples (two undergraduate student samples, and two behavioural medicine patient samples). The test demonstrated good internal consistency (Cronbach's alpha ranging from .91-.98), and test-retest reliability (ICC = .69 for one month in 48 participants in one sample, and .62 for three months in 61 participants in another sample) (Smith et al., 2008). BRS items are also used with a 5-point Likert-type scale with the following response categories: Strongly Disagree, Disagree, Neutral,

Agree and Strongly Agree. To calculate total BRS score, all responses for an individual are summed and then divided by the number of items answered (Smith et al., 2008).

The BRS was also found to be positively correlated with certain aspects of resilience such as optimism, social support, purpose in life, and negatively correlated with negative social interactions, self-blame, anxiety and depression (Smith et al., 2008). Therefore, the BRS naturally presented itself as a viable and appropriate candidate to be tested to measure student resilience at UofT. Together, the CYRM-12 and the BRS were deemed to be two of the more appropriate scales to test for this study.

Mapping Scale Items onto Resilience Subconstructs

As described in the previous section, the CYRM-12 and the BRS are designed to measure distinct aspects of resilience. Table 1 maps the items of these two scales onto our working framework of resilience. This mapping provides initial validity evidence for the use of the scales. The *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014) organizes types of validity evidence according to sources: test content, response processes, internal structure, and relations to other variables. The mapping is evidence based on test content; using a validity argument approach (Kane, 2013), evidence from this and other sources (for example, factor analyses providing evidence based on internal structure) are intended to be considered together when assessing the validity of the use of the scales.

The mapping in Table 1 is our own interpretation of how the items of the two scales map onto the subconstructs of resilience in our framework. It is important to note that although the CYRM-12 authors found four factors using EFA and CFA while developing the scale (Liebenberg et al., 2013), their manual for external use of their scale states that "no sub-scales have been identified for the CYRM-12" (Ungar, 2016, p.26), perhaps indicating that, for the time

being, the CYRM-12 should be treated as a one-factor scale. Smith et al. (2008) on the other hand explicitly state that the 6-item BRS is a one-factor scale.

Table 1

Mapping Items from the Child & Youth Resilience Measure and the Brief Resilience Scale onto the Resilience Framework

Item	Resilience								
	Competence Domains					Adaptive Resources			
	Academic Competence	Social Competence	Work Competence	Romantic Relationships	Conduct	Achievement Orientation	Autonomy	Coping Skills	Adult Support
CYRM-12 Items									
1 I have people to look up to.									x
2 Getting an education is important to me.	x					x			
3 My parent(s)/caregiver(s) know a lot about me.									x
4 I try to finish what I start.	x					x	x		
5 I am able to solve problems without hurting myself or others (e.g. by using drugs and/or being violent).					x			x	
6 I know where to go in my community to get help.		x						x	x
7 I feel I belong at my school.		x							
8 My family stands by me during difficult times.									x
9 My friends stand by me during difficult times.		x							x
10 I am treated fairly in my community.					x		x		

Item	Academic Competence	Social Competence	Work Competence	Romantic Relationships	Conduct	Achievement Orientation	Autonomy	Coping Skills	Adult Support
			Resilience						
	Competence Domains					Adaptive Resources			
11 I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for others).	x		x	x					
12 I enjoy my community's traditions.									
BRS Items									
1 I tend to bounce back quickly after hard times.								x	
2 I have a hard time making it through stressful events.								x	
3 It does not take me long to recover from a stressful event.								x	
4 It is hard for me to snap back when something bad happens.								x	
5 I usually come through difficult times with little trouble.								x	
6 I tend to take a long time to get over set-backs in my life.								x	

Methods

Cognitive Interviews and Question Adaptation

Cognitive interviews were used to test the clarity of the items chosen for this instrument, as well as to identify possible misconceptions with our target population. The use of cognitive interviews to test the validity of student surveys in higher education is not uncommon and has in fact been shown to provide insights into how students understand and interpret different items

(Ouimet, Bunnage, Carini, Kuh, & Kennedy, 2004). This becomes particularly relevant when adopting existing scales into new contexts since it allows the researcher to identify items that are misinterpreted by participants in that environment.

Four cognitive interviews were conducted to analyze and critique the items of the Child & Youth Resilience Measure (CYRM-12) and the Brief Resilience Scale (BRS). All four interviewees were current Canadian post-secondary students; two were graduate students with a good knowledge base of survey design while two were undergraduate students with no experience in survey research. This sample consisted of three female students and one male student between the ages of 19 and 23. This demographic was chosen to mimic the intended demographic for this study. Appendix C contains all feedback obtained during the four cognitive interviews.

Due to restrictions associated with the CYRM-12 (Liebenberg et al., 2013) and the BRS (Smith et al., 2008), users are encouraged not to make changes to the items. Therefore, the feedback obtained from the cognitive interviews was simply used to check whether the items were interpreted in a consistent way, and whether the scales demonstrated good face validity with the target population – that is to say, whether the items were understood by the participants as intended by the original authors of the scales to assess resilience. Some items, such as the 3rd, 4th, 7th, 8th and 9th CYRM-12 statements and the 1st, 3rd and last items on the BRS, were straightforward and did not require further clarification. Other items, such as ones using the word *community*, did seem to create confusion among interviewees. However, we chose to make only one clarification by adding a note to Item 5 from the CYRM-12 stating that *drugs* refers to illicit drugs.

Target Population and Sampling Plan

While one of the goals of developing and testing this instrument is to investigate whether a standardized measure of student resilience can be adopted for any institute of higher education, that was seen as too large and undefined a target population for this study. Therefore, the undergraduate student population at the University of Toronto is used instead as the target population for this study because the created instrument is principally intended to inform services at this institution. The sampling plan for this study aims to reflect as closely as possible the sampling procedure used by the University of Toronto (UofT) for selecting individuals for many of the university wide surveys, including the National College Health Assessment (NCHA) survey (ACHA, 2016). Inclusion criteria used by UofT for NCHA include the following:

1) Participants must be current undergraduate UofT students studying full-time or part-time at the St. George downtown Toronto campus

2) Participants must have agreed to receive invitations from the university to random surveys and studies if they satisfy the inclusion criteria.

Because another university-wide survey was being administered to first- and fourth-year students at the same time as ours, we were only allowed to contact second- and third-year students. Random sampling was used to select participants eligible to take part in this study and 1000 invitational emails were sent out from an official university email account.

Survey Administration and Ethical Considerations

An application was filed with the authors of the CYRM-12 to request permission to use their scale (Liebenberg et al., 2013). Permission was granted to use the 12-item tool provided that no modifications were made to the scale including any changes to item wording, item ordering or response categories. The authors of the BRS (Smith et al., 2008) grant free access to

their tool without an application process. After acquiring access to both tools, a research ethics protocol was filed with and approved by the University of Toronto Research Ethics Board.

Surveys were administered online through one of UofT's official survey administration tools, CampusLabs (University of Toronto, 2015), which was also used for UofT's NCHA survey. Access to the survey was open for the last three weeks of April 2017. Responses are both anonymous and confidential as outlined in the information letter/consent form. Anonymity was achieved by stripping the data of any identification markers such as student emails before being accessed by the research team. Data are stored on an online server approved by UofT and are only accessible to the investigators to ensure confidentiality.

Data Collection Instrument

The data collection materials were organized into three distinct sections. The first is the information letter/consent form that can be found in Appendix D, which clearly outlines the purpose of the research study, associated benefits and risks, along with contact information for the principal researchers and the associated ethics board. This was presented to the participant in the invitation email. Participants were directed to an online welcome page where they could consent to participate and were then presented with the items of the CYRM-12 and the BRS. The two scales comprise the second section. The third section contains relevant demographic questions (gender, year and program of study, distance from campus, and commuting time). On the concluding page, students are invited to participate in a raffle to win a gift card to the local university student bookstore as outlined in the information letter/consent form as compensation for participation in the study.

Data Analysis Plan

All responses were collected in one dataset and imported into the SPSS Statistics software

package Version 23 for all analyses conducted in this study. Descriptive statistics are used to describe the general demographic structure of the sample including gender, year and program of study as well as information about the student's commute to campus. Summed scores for the CYRM were calculated as outlined by Ungar (2016) in the CYRM user's manual, and the appropriate scoring formula was used to calculate total BRS scores (Smith et al., 2008). Total scores for both scales can be compared to other CYRM-12 and BRS scores found in the literature. If tracked longitudinally, CYRM-12 and BRS scores can also serve as useful indicators of improvement or deterioration for the various aspects of student resilience in a particular institution over time.

Scale reliability was assessed through the Cronbach's alpha measure of internal consistency. Maximum Likelihood Exploratory Factor Analysis (EFA) was used to investigate the internal structure of the scales, providing additional evidence for inclusion in a validity argument for use of the scales. Confirmatory Factor Analysis (CFA), while appropriate to test our proposed model of how items from both scales map onto our framework, was not performed because the sample size was too small. Independent sample *t*-tests (two tailed with 95% confidence intervals) were used to compare score means between sample sub-groups. Because these sub-group comparisons are not intended to test for specific hypotheses but are simply for exploratory purposes, an adjustment for family-wise error was not made. The results, therefore, should be interpreted with caution.

Results

Sample Demographics

Eighty-seven respondents accessed the data collection instrument and individual items had between 78 - 81 responses constituting an approximate 8% response rate. Over two thirds of all

participants identified as female, and over half of the sample were in second year. Over fifty

percent of all participants were in the Faculty of Arts & Science, 12% in Applied Science &

Engineering, and the rest from other faculties at the university. The majority of the sample either

lived within the downtown core (47%) or in the surrounding cities of the Greater Toronto Area

(41%), with only 10% living further than 30 kilometers from campus. Time taken to complete a

one-way trip to or from campus was quite evenly distributed amongst the four choices: 33%

commuted less than 15 minutes, 22% 15 – 30 minutes, 21% 31 - 60 minutes and 24% reported

over an hour of commuting time. An examination of the two questions about commuting

revealed how commuting time relates to distance from campus as can be seen in Figure 1.

Table 2

Demographic Data for Respondents (N = 81)

Group	Frequency (*N*)	Percentage (%)
Gender		
Male	21	25.93
Female	58	71.60
Transgender	0	0.00
Other identification	0	0.00
Undeclared	2	2.47
Year of study		
Second	45	55.56
Third	33	40.74
Other	3	3.70
Program of study		
Arts & Science	59	72.84
Applied Science & Engineering	10	12.35
Kinesiology & Physical Education	3	3.70
Music	3	3.70
Architecture	2	2.47
Education	1	1.23
Forestry	1	1.23
Pharmacy	1	1.23
Program not listed	1	1.23
Other (grouped together for this table)	0	0.00
Distance from campus		
Less than 3 kms	38	46.91
3 – 30 kms	33	40.74
Over 30 kms	10	12.35
Commuting time (one way)		
Less than 15 mins	27	33.33
15 – 30 mins	18	22.22
31 – 60 mins	17	20.99
Over 60 mins	19	23.46
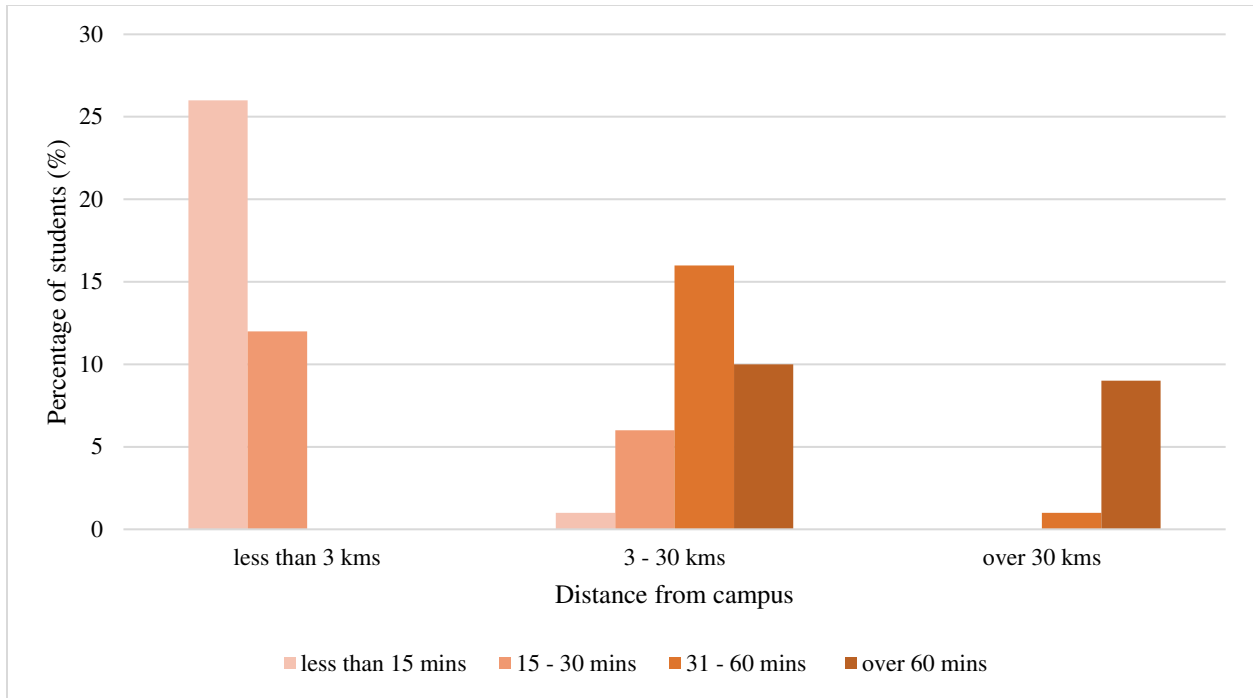
Figure 1. Relationship between commuting time and distance from campus.

Reliability Testing

Internal consistency reliability was examined for both the CYRM-12 and BRS scales. The former had a Cronbach's alpha of .821 (valid cases = 79, number of items = 12) and the latter, .834 (valid cases = 78, number of items = 6), indicating good overall reliability.

Table 3

Item Statistics for the Child & Youth Resilience Measure

Item	Response rate (*N*)	Scale mean if item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
1. I have people to look up to	81	42.71	.476	.808
2. Getting an education is important to me	80	41.82	.253	**.823**
3. My parent(s)/caregiver(s) know a lot about me	81	42.68	.574	.799
4. I try to finish what I start	81	42.18	.307	.820
5. I am able to solve problems without hurting myself or others (e.g. by using drugs and/or being violent)	80	41.78	.522	.808
6. I know where to go in my community to get help	81	43.10	.518	.805
7. I feel I belong in my school	81	43.25	.580	.798
8. My family stands by me during difficult times	81	42.42	.601	.796
9. My friends stand by me during difficult times	81	42.35	.408	.813
10. I am treated fairly in my community	81	42.69	.474	.808
11. I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for others)	81	42.72	.401	.814
12. I enjoy my community's traditions	81	42.97	.562	.800

Note. **Bolded** indicates a higher overall Cronbach's alpha value if the item is deleted.

Table 4

Item Statistics for the Brief Resilience Scale

Item	Response rate (*N*)	Scale mean if item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
1. I tend to bounce back quickly after hard times	80	15.54	.622	.804
2. I have a hard time making it through stressful events.	80	16.14	.587	.811
3. It does not take me long to recover from a stressful event.	80	15.62	.634	.802
4. It is hard for me to snap back when something bad happens.	80	15.96	.715	.784
5. I usually come through difficult times with little trouble.	78	15.94	.427	**.842**
6. I tend to take a long time to get over set-backs in my life.	81	15.92	.668	.794

Note. **Bolded** indicates a higher overall Cronbach's alpha value if the item is deleted.

Only one item on the CYRM-12 scale ("Getting an education is important to me") was shown to increase the overall Cronbach's alpha score slightly for that scale from .821 to .823 if deleted. Likewise, there was only one item on the BRS scale ("I usually come through difficult times with little trouble") that seemed to increase the overall BRS reliability from .834 to .842 if deleted.

Exploratory Factor Analysis

As previously mentioned, because our sample size is not large enough to confidently perform a confirmatory factor analysis and because data are relatively normally distributed, a maximum likelihood extraction method was chosen for Exploratory Factor Analysis (EFA) in this study. A direct oblimin rotation method was chosen for both scales because the factors under question (competence domains and adaptive resources of resilience) are believed to be related to each other in real life.

For the CYRM-12, multiple EFA tests were conducted to investigate what number of extracted factors was most appropriate. We decided that a 3-factor solution was the most stable, accounting for the most variance while still producing factors with common themes among their items. Eleven out of twelve items correlated at least .3 with at least one other item on this scale suggesting reasonable factorability (Streiner, 1994). The Kaiser-Meyer-Olkin measure of sampling adequacy, which compares magnitudes of zero-order correlations to partial correlations after controlling for all other items, was .734, above the usual recommended value of .6 (Kaiser & Rice, 1974). Moreover, Barlett's test of sphericity was also found to be significant (χ^2 (66) = 268.16, p < .01), indicating that we can reject the null hypothesis that no item is correlated with any other item. Eight out of twelve items produced communalities above .3. A communality reflects the variance in a variable that is shared with other variables through a common factor or common variance. Moreover, the pattern matrix in Table 5 depicts the loadings of each item on each factor. Three distinct factors are apparent, with Items 3 and 8 loading on Factor 1, Items 5, 9 and 7 loading on factor 2, and Items 1, 2, 6, 7, 10, 11, and 12 loading on Factor 3. Item 4, "I try to finish what I start," does not load sufficiently on any of the factors.

Table 5

Factor Loadings, Communalities and Variance for Items of the Child & Youth Resilience Measure

	Item	Factor Loading			Communalities	
		1	2	3	Initial	Extraction
3.	My parent(s)/caregiver(s) know a lot about me	**1.058**	-.159	-.018	.603	.999
8.	My family stands by me during difficult times	**.641**	.191	.088	.633	.613
5.	I am able to solve problems without hurting …	.204	**.354**	.245	.426	.378
9.	My friends stand by me during difficult times	.017	**.798**	.031	.368	.663
7.	I feel I belong in my school	-.040	**.323**	**.553**	.441	.479
1.	I have people to look up to	.212	.078	**.348**	.388	.270
6.	I know where to go in my community to get help	.091	.031	**.560**	.354	.383
2.	Getting an education is important to me	-.067	-.253	**.554**	.290	.276
10.	I am treated fairly in my community	.048	.165	**.424**	.283	.274
11.	I have opportunities to develop skills that …	-.016	.043	**.487**	.260	.243
12.	I enjoy my community's traditions	.094	.093	**.549**	.432	.403
4.	I try to finish what I start	.125	.010	.265	.230	.120
	Eigenvalue	4.130	1.304	1.052		
	% of Variance	34.41	10.87	8.77		

Note. Extraction method: Maximum Likelihood. Rotation method: Oblimin with Kaiser

Normalization (rotation converged in 15 iterations). **Bolded** indicates item loading well on factor

with a value of .3 or more.

The factor correlation matrix found in Appendix E indicates that Factor 1 is moderately

correlated the two other extracted factors, sharing 15% of its variance with Factor 2 and 23% of

its variance with Factor 3. However, Factors 2 and 3 are weakly correlated, sharing only 8% of

their variance.

For the BRS, a one-factor solution was extracted through EFA. Six out of six items

correlated at least .3 with at least one other item suggesting adequate factorability as can be seen

in Appendix E. The Kaiser-Meyer-Olkin measure of sampling adequacy was .818, well above

the recommended value of .6. Similarly, Barlett's test of sphericity was found to be significant

(χ^2 (15) = 172.21, p < .01), indicating that we can reject the null hypothesis that no item is

correlated with any other item. All but one of the BRS items produced communalities above .3

and factor loadings above .6 (see Table 6). The first extracted factor on its own explains 55% of

the overall variance with a .904 eigenvalue score, while the second factor explains only 15% of

the variance with a .694 eigenvalue. A complete variance table for the BRS scale can be found in

Appendix E.

Table 6

Factor Matrix and Communalities for Items of the Brief Resilience Scale

Item	Factor Loading	Communalities	
	1	Initial	Extracted
1. I tend to bounce back quickly after hard times	**.717**	.476	.514
2. I have a hard time making it through stressful events	**.653**	.405	.426
3. It does not take me long to recover from a stressful event	**.655**	.465	.429
4. It is hard for me to snap back when something bad happens	**.813**	.547	.661
5. I usually come through difficult times with little trouble	**.435**	.291	.189
6. I tent to take a long time to get over set-backs in my life	**.775**	.520	.601

Note. Extraction method: Maximum Likelihood. One factor extracted with 4 iterations required. **Bolded** indicates item loading well on factor with a value of .3 or more.

All but one item on the BRS scale had .6 or higher loadings on the extracted factor; Item 5, however, had a loading of .435.

CYRM-12 and BRS scores

Using list-wise deletion as the method to treat missing data resulting in a decrease from 87 to 80, we analyzed responses from eighty students who responded to all 12 items of the Child & Youth Resilience Measure (CYRM-12). The lowest total score was 30 (12 is the lowest possible score) and 60 was the highest recorded total score (out of a possible 60). The mean total CYRM-12 score is 46.14 with a standard deviation of 6.84. The overall distribution of total scores, as illustrated in Figure 2, shows a bimodal distribution. Figure 3 also shows how the distribution of scores in some items (e.g., 2, 4, 5, 8, 9 and 10) is skewed towards positive responses (Quite a bit and A lot).
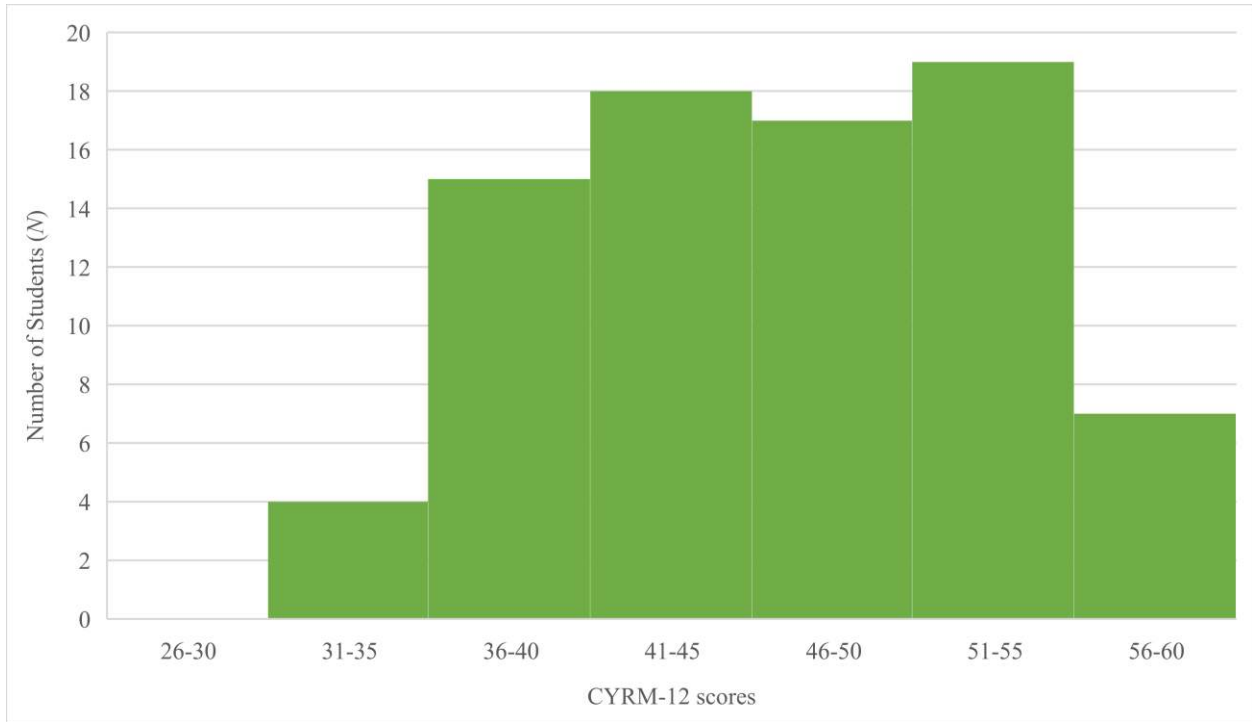
Figure 2. Distribution of total scores for the Child & Youth Resilience Measure (Valid *N* = 80).
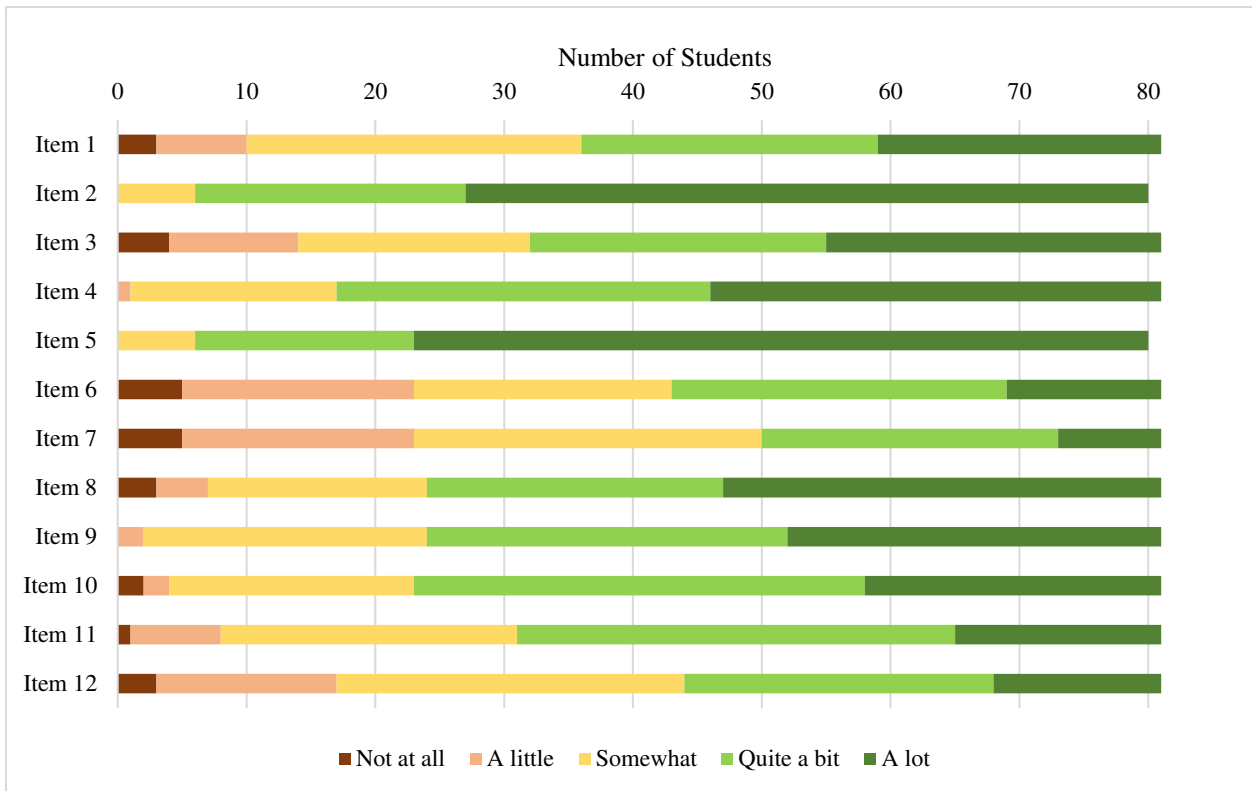

Figure 3. Distribution of responses for items of the Child & Youth Resilience Measure.

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Seventy-eight students answered all six items of the Brief Resilience Scale (BRS), with a minimum recorded score of 1.17 (1 is the lowest possible score), and a maximum recorded total score of 4.83 out of a possible 5. The mean total score is 3.17 with a standard deviation of 0.72. The distribution of total BRS scores also shows slight negative skewness (Skewness = -.108) (see Figure 4), but are not heavily in favour of agreement or disagreement with responses (see Figure 5).
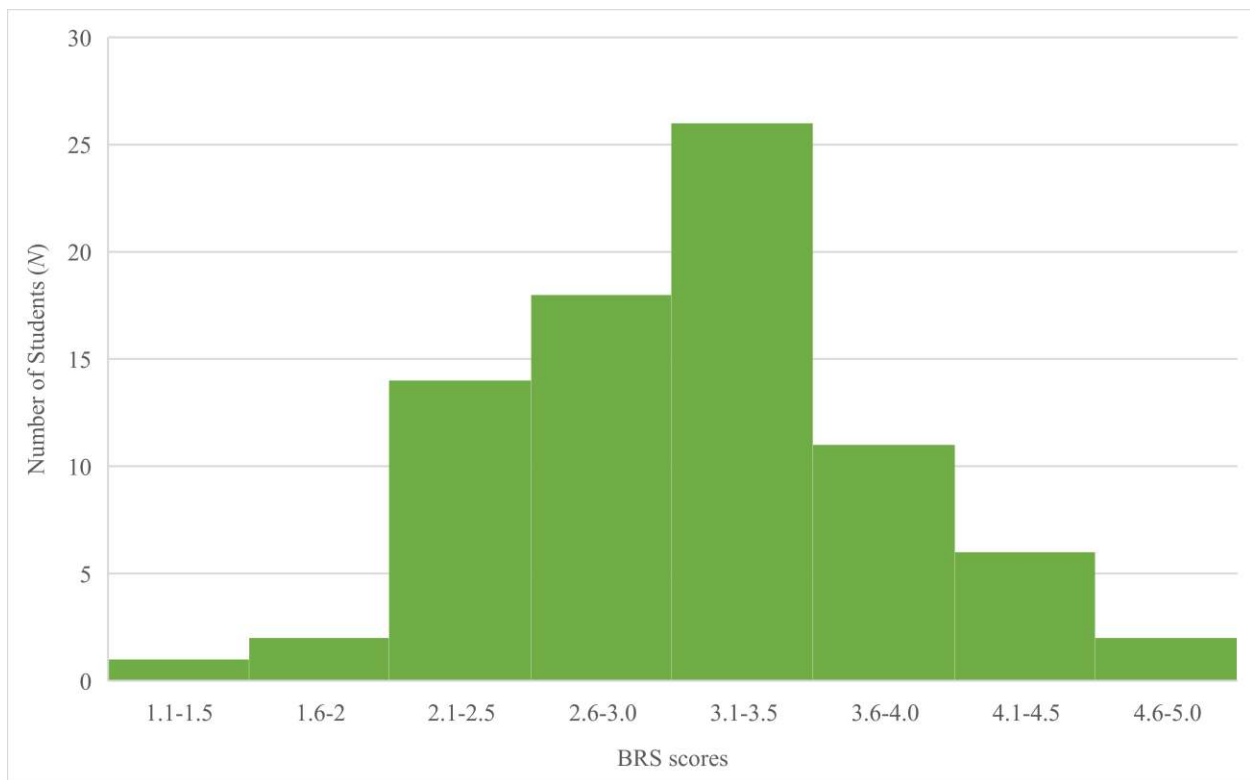

Figure 4. Distribution of total scores for the Brief Resilience Scale (Valid N=80)
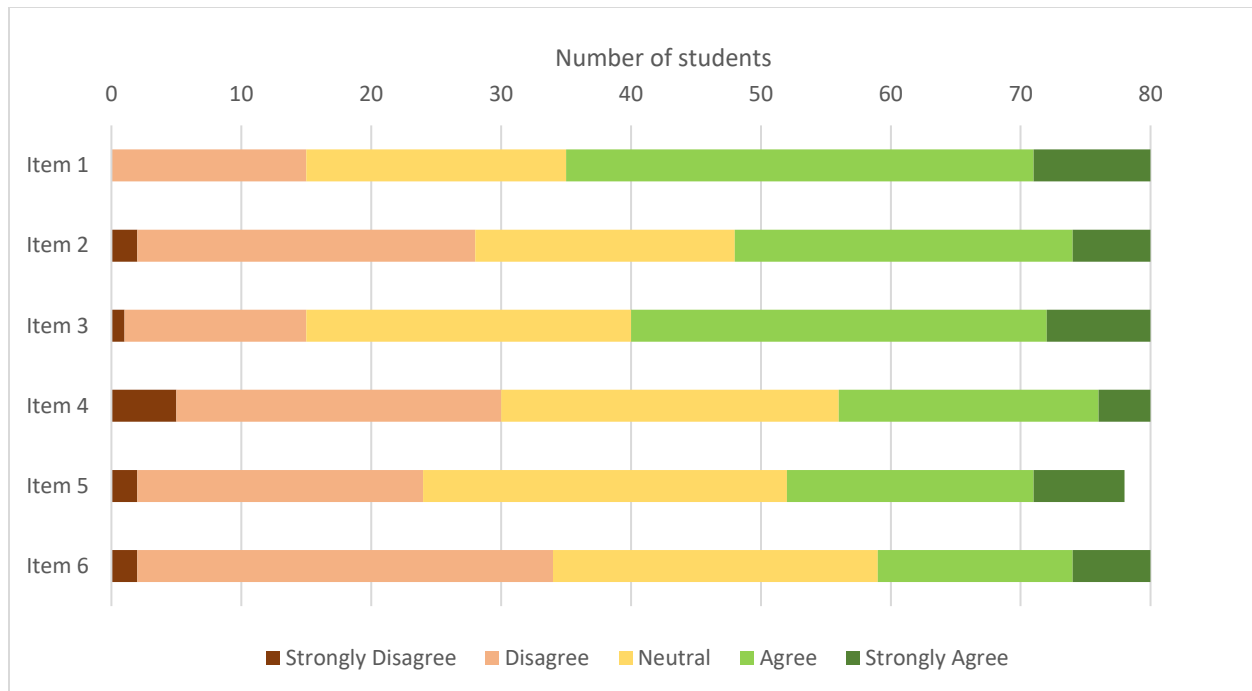
Figure 5. Distribution of responses for items of the Brief Resilience Scale

Independent sample *t*-tests were conducted for exploratory purposes to test for any significant subgroup differences in CYRM-12 and BRS scores. Looking at gender, no significant differences were found between males (*N* = 21, *M* = 45.43, *SD* = 7.51) and females (*N* = 46.66, *SD* = 6.57) for total CYRM-12 scores; *t*(df = 77) = -0.705 (*p* = .483). Similarly, there were also no significant differences found between males (*N* = 21, *M* = 3.03, *SD* = 0.790) and females (*N* = 57, *M* = 3.21, *SD* = 0.706) for total BRS scores; *t*(df = 76) = -0.976 (*p* = .332). It is a similar story when comparing year of study. Ignoring the "other" group (students who, according to the university's records were in their second or third year, but did not report being in either year) due to low response rate, no significant differences were found between second-year students (*N* = 45, *M* = 45.38, *SD* = 6.690) and third-year students (*N* = 33, *M* = 47.55, *SD* = 6.974) for total CYRM-12 scores; *t*(df = 76) = -1.400 (*p* = .165). Total BRS scores were also not significantly

different between second-year students ($N = 45$, $M = 3.21$, $SD = 0.625$) and third-year students ($N = 32$, $M = 3.182$, $SD = 0.773$); t(df $= 75$) $= 0.181$ ($p = .857$).

There was a significant difference in total CYRM-12 scores when comparing those who live in downtown Toronto (within 3 kilometers of campus) ($N = 38$, $M = 47.79$, $SD = 6.134$) to those who live outside of downtown (either 3-30 kilometers to the Greater Toronto Area, or over 30 kilometers) who had a slightly lower score ($N = 43$, $M = 44.67$, $SD = 7.154$), t(df $= 79$) $= 2.090$ ($p = .040$) with an effect size of .23. There was, however, no significant difference found in total BRS scores between those who live downtown ($N = 38$, $M = 3.22$, $SD = 0.6889$) and those who live outside of downtown ($N = 42$, $M = 3.12$, $SD = 0.7538$); t(df $= 78$), $= 0.619$ ($p = .538$). Examining the relationship between CYRM-12 and BRS total scores, a bivariate correlation test revealed that the two scores are moderately correlated with a Pearson value of .405 ($p < .01$).

Discussion

We believe both scales used in this study were originally developed through sufficient testing with samples quite similar to our sample and target population. Moreover, together, the Child & Youth Resilience Scale (CYRM-12) and the Brief Resilience Scale (BRS) are designed to target relevant subconstructs of resilience: largely modifiable factors that contribute to resilience (Liebenberg et al., 2013) and the capacity to bounce back and recover from stress (Smith et al., 2008). Similarly, Garmezy and Masten's framework of resilience adopted by the University of Toronto's (UofT) Working Group also views resilience as a multi-dimensional construct with factors pertaining to resources available to the individual to promote resilience as well as individual characteristics (Garmezy, 1985; Resiliency Working Group, 2015).

However, both our working framework as well as the two scales appear to present certain caveats that we must acknowledge in terms of compatibility and relevance to a post-secondary student population. For example, as mentioned earlier, certain subconstructs of the resilience framework do not appear directly relevant to most students. Not all students will view professional work and/or involvement in a romantic relationship for instance as meaningful or important at that stage in their lives. Similarly, certain items on the CYRM-12, such as the ones referencing *community* may have confused some respondents and can be difficult to relate to as seen in the cognitive interviews. Neither of the scales provide an option for *don't know* or *not applicable*, which may jeopardize the validity of our instrument especially with items that students find confusing.

Resilience Scores

Nevertheless, the CYRM-12 and the BRS, we feel, have the potential to be strong tools to assess resilience. Our study presents with some interesting findings. Firstly, the majority of respondents responded positively to most statements on the CYRM-12 scale. All or almost all participating students reported that to some degree getting an education is important to them (100%), they try to finish what they start (99%), they have opportunities to develop skills useful later in life (90%), during difficult times, they have friends that support them (91%) and that they are able to solve problems safely (100%). If taken to be representative of the general population, this is a good indicator that current students are quite motivated and have positive outlooks with respect to academics, skill development and achievement orientation. The responses do not suggest that students lack peer support or that illicit drugs are used as a coping mechanism during stressful events. It is possible, however, that students who are better adjusted are more likely to respond to a survey on health and wellness.

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There was more variability, however, regarding familial support (about 10% indicating lack of support), and having a close relationship with family members (over 15% indicating parent(s)/caregiver(s) know little about them). While most students appear to have strong supportive relationships with peers, the same cannot be said about their relationships with family. We attempted to further understand the variability in responses to these two items. Looking at year of study, distance from campus and commuting time, chi-square tests and independent sample *t*-tests did not indicate any significant differences and we could not observe any discernible trends. Perhaps as students spend less time at home (especially for those who move away for schooling) and more time on campus amongst their peers, their social interactions and close relationships naturally transition to the spaces and people they spend more time around.

To make matters more challenging, our data show that almost a third of the students report that they do not feel that they belong at the school and/or they do not know where to access resources if they need help. A fifth of our sample also indicates that, to some degree, they do not enjoy their community's traditions. While no significant differences could be found between subpopulations of our sample, this is perhaps an indication that the institution itself needs to focus more on fostering a sense of community, raising awareness and increasing accessibility to its resources. Overall, our sample's mean CYRM-12 score of 46.14 falls within the lower end of the moderate resilience category as per the guidelines of the scale authors at the Resilience Research Centre (compare to general population comparison group in Appendix E).

Responses to items on the BRS were much more normally distributed, with a quarter or more of the sample indicating that they neither agree nor disagree with the statements in each item. Consistency in distribution between the items is expected because all 6 items are similarly

worded and are meant to measure the same construct of resilience. It is difficult to determine

whether our mean BRS score of 3.17 (*SD* = 0.72) falls within the expected range because we

could not find published scores for this scale other than what is mentioned in Smith et al.'s

(2008) original study. In their study, two of the four samples used were undergraduate student

samples with *M* = 3.53 (*SD* = 0.68) and *M* = 3.57 (*SD* = 0.76). Relative to these two samples,

ours falls slightly on the lower end. In her Bachelors Thesis discussing the psychometric

properties of the Dutch version of the BRS (BRSnl) – the only other study we found using this

scale – Consten (2016) does not report mean BRS scores.

Reliability and Validity of the Two Scales

Overall, caution should be taken when interpreting reliability and validity scores for the

CYRM-12 and BRS. We believe our sample size is not large enough to confidently draw

conclusions regarding the psychometric properties of the two scales. Moreover, our sample only

represents second- and third-year students and, thus, our data may not adequately represent the

potential of these scales to capture resilience of students from all years of study. Nevertheless,

data from the two scales present promising results and highlight areas where future testing may

be necessary to confidently determine how the CYRM-12 and BRS assess post-secondary

student resilience.

Both scales have Cronbach's alphas that suggest good internal consistency. "Getting an

education is important to me" was the only item on the CYRM-12 scale that would increase the

overall Cronbach's alpha – and only by a mere .002 – if deleted. Because the overall reliability

score would not significantly increase, and "Getting an education is important for me" is one of

the items that assesses achievement orientation, we would not suggest removing it from the

scale. The item's relatively lower item-total correlation may be attributed to the low variability in

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the distribution of its responses (66% a lot, 26% quite a bit, and 8% somewhat). Similarly, only one item on the BRS scale, "I usually come through difficult times with little trouble," would increase the overall Cronbach's alpha by .008 if deleted. The distribution of responses for this item was normally distributed and resembled the distribution seen in the rest of the BRS items. There was also no indication in the cognitive interviews that this item was particularly confusing or difficult to interpret.

When performing factor analysis, the conservative recommendation for item-to-respondent ratio is 5-10 respondents per item (Zurbriggen, n.d.) which does apply in the case of the BRS scale with over 10 respondents for each item. However, the ratio does not hold for the CYRM-12 and thus analysis of results is not conclusive. While the original authors of the CYRM-12 developed the scale as a 4-factor solution (Liebenberg et al., 2013), in its current state, they identify no subscales in the tool (Ungar, 2016). Our examination of the factor loadings indicates that a 3-factor solution is the most stable model, explaining 54.05% of the overall variance. There are also common themes that can be drawn from each factor and its items. The two items that load well on Factor 1 are "My parent(s)/caregiver(s) know a lot about me" and "My family stands by me during difficult times." Moreover, the item with the third highest loading on this factor (although not high enough for statistical significance) is "I have people to look up to" with a loading of .212. This leads us to believe that Factor 1 presents a theme of familial support or family relations.

Interpreting Factor 2 is less obvious in that its well-loading items reflect solving problems safely without harming oneself or others, the strength of one's peer support circle and one's sense of belongingness at school. Therefore, while there may be a few possible themes to extract, we feel this factor best reflects a student's immediate social environment focusing on social

support and inclusion during times of stress. Lastly, examining the items that loaded well on

Factor 3, a common theme that be immediately drawn is *community*. Therefore, the three factors

(themes) that can be extracted can be summed up as family (familial support), friends (social

support), and community (community support). Family appears to be moderately correlated with

friends and community, while friends and community share a weak correlation between them.

This is surprising because we would expect that having a strong social support system would

immediately translate into a strong community. But perhaps this draws us back to one of our

previous interpretations that the role of the community (academic institutions in this case) cannot

be ignored, and that there is a responsibility on the part of the community to promote a healthy

and supportive environment. It is also worth noting that the use of the term *community* may have

caused confusion amongst respondents (as seen in our cognitive interviews).

Conducting the Exploratory Factor Analysis on the BRS items was much more

straightforward and interpreting the factor was clear. One factor was extracted as expected and in

line with the original authors' results of a one-factor solution (Smith et al., 2008). The drastic

drop from 55.29% of variance explained by Factor 1 to 15.07% explained by Factor 2 also re-

affirms a 1-factor solution. Although all items produced factor loadings of .3 or higher, the same

item that would produce a higher reliability score if deleted, "I usually come through difficult

times with little trouble," also had a lower factor loading of .435 compared to other items, which

had loadings between .655 and .815. It should also be noted that the ecological validity of this

study is quite high because our study mimics the same environment and setting that students

would be in when completing the larger health assessment survey accompanying this resilience

instrument if implemented by the institution.

Looking back at our working framework of resilience and how we predicted the items would map onto this framework, we are unable to definitively determine whether this map is accurate or not since we were not able to conduct a Confirmatory Factor Analysis. However, there are some indications that some of our hypotheses are correct. For example, we predicted that CYRM-12 Items 3 and 8 (pertaining to family relations) will map together onto the adaptive resource adult support. This was in fact at least partly confirmed by our factor analysis in one extracted factor representing family. All items of the BRS were also predicted to map together onto coping skills. We were able to confirm that all items result in a 1-factor solution that, as outlined by the original authors, is the ability to recover from stress, which is synonymous with our description of coping skills in our framework.

Limitations

The Working Group's interpretation of Garmezy and Masten's Project Competence framework includes work and romantic relationships as two out of the five competence domains that demonstrate achievement in age-relevant domains. These two domains, however, do not apply to all students, and lack of achievement in them may not necessarily indicate a lack of resilience. Moreover, there were no items from either the CYRM-12 nor the BRS that were hypothesized to directly assess competence in romantic relationships. Likewise, our Exploratory Factor Analysis indicates that only two items on the CYRM-12 assess the first factor, family. Ideally, a test-retest design would provide stronger evidence of the reliability of the two scales; this was not feasible in our study but is encouraged for future similar studies. Lastly, the small sample size of this study may be the biggest limitation, preventing us from accurately determining the representativeness of the sample and application of results to the larger population.

Conclusion

Measuring student resilience not only provides institutions of higher education a more comprehensive assessment of student health, but can also inform the development of required services or programs to support student health and success. Overall, we feel that both the Child & Youth Resilience Measure (CYRM-12) by Liebenberg et al. (2013), and the Brief Resilience Scale by Smith et al. (2008) complement each other well to form an appropriate instrument to measure student resilience. This instrument, as illustrated in our study, can be quite comprehensive, assessing both the modifiable factors that contribute to resilience and the core capacity of an individual to recover from stress and adapt positively to circumstances. These aspects of resilience are quite relevant to post-secondary students and institutions alike.

References

American College Health Association (ACHA). (2016). *National College Health Assessment:*

    Canadian Reference Group (Executive Summary) (pp. 1–19). Hanover, MD: Author.

    Retrieved from http://www.acha-ncha.org/docs/NCHA-

    II%20SPRING%202016%20CANADIAN%20REFERENCE%20GROUP%20EXECUTI

    VE%20SUMMARY.pdf

American Educational Research Association (AERA), American Psychological Association

    (APA), & National Council on Measurement in Education (NCME). (2014). *Standards*

    for educational and psychological testing. Washington, DC: AERA.

Andrews, B., & Wilding, J. M. (2004). The relation of depression and anxiety to life-stress and

    achievement in students. *British Journal of Psychology*, *95*(4), 509–521.

    https://doi.org/10.1348/0007126042369802

Bartram, M., Chodos, H., Gosling, S., Hardie, S. L., Knoops, F., Lapierre, L., … Proulx, M.

    (2012). *Changing Directions, Changing Lives: The Mental Health Strategy for Canada*.

    Calgary, AB: Mental Health Commission of Canada. Retrieved from

    http://strategy.mentalhealthcommission.ca/pdf/strategy-images-en.pdf

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American*

    Psychologist, *32*(7), 513–531. https://doi.org/10.1037/0003-066X.32.7.513

Byrd, R. D., & McKinney, K. J. (2012). Individual, interpersonal, and institutional level ractors

    associated with the mental health of college students. *Journal of American College*

    Health, *60*(3), 185–193. https://doi.org/10.1080/07448481.2011.584334

Canadian Association of College & University Student Services, & Canadian Mental Health

    Association. (2013). *Post-secondary student mental health: Guide to a systemic*

approach. Vancouver, BC: Authors. Retrieved from https://healthycampuses.ca/wp-content/uploads/2014/09/The-National-Guide.pdf

Choi, K.-H., Buskey, W., & Johnson, B. (2010). Evaluation of counseling outcomes at a university counseling center: The impact of clinically significant change on problem resolution and academic functioning. *Journal of Counseling Psychology*, *57*(3), 297–303. https://doi.org/10.1037/a0020029

Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, *18*(2), 76–82. https://doi.org/10.1002/da.10113

Consten, C. P. (2016, June). *Measuring resilience with the brief Resilience Scale: Factor Structure, Reliability and Validity of the Dutch Version of the BRS (BRSnl)*. (Master's thesis) University of Twente, Netherlands. Retrieved from http://essay.utwente.nl/70095/

Flynn, R. J., Ghazal, H., Legault, L., Vandermeulen, G., & Petrick, S. (2004). Use of population measures and norms to identify resilient outcomes in young people in care: An exploratory study. *Child & Family Social Work*, *9*(1), 65–79. https://doi.org/10.1111/j.1365-2206.2004.00322.x

Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *International Journal of Methods in Psychiatric Research*, *12*(2), 65–76. https://doi.org/10.1002/mpr.143

Galesic, M., & Bosnjak, M. (2009). Effects of questionnaire length on participation and indicators of response quality in a web survey. *Public Opinion Quarterly*, *73*(2), 349–360. https://doi.org/10.1093/poq/nfp031

Garmezy, N. (1985). Stress-resistant children: The search for protective factors. In *Recent research in developmental psychopathology* (pp. 213–233).

Gewirtz, A., Forgatch, M., & Wieling, E. (2008). Parenting practices as potential mechanisms for child adjustment following mass trauma. *Journal of Marital and Family Therapy*, *34*(2), 177–192. https://doi.org/10.1111/j.1752-0606.2008.00063.x

Hunt, J., & Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health*, *46*(1), 3–10. https://doi.org/10.1016/j.jadohealth.2009.08.008

Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and psychological measurement*, *34*(1), 111-117.

Kane, M. T. (2013). Validating the interpretations and uses of test scores. *Journal of Educational Measurement*, *50*, 1-73. https://doi.org/10.1111/jedm.12000

Keyes, C. M. L. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist*, *62*(2), 95–108. https://doi.org/10.1037/0003-066X.62.2.95

Kirsch, D. J., Pinder-Amaker, S. L., Morse, C., Ellison, M. L., Doerfler, L. A., & Riba, M. B. (2014). Population-based initiatives in college mental health: Students helping students to overcome obstacles. *Current Psychiatry Reports*, *16*(12), 525. https://doi.org/10.1007/s11920-014-0525-1

Lee, D., Olson, E. A., Locke, B., Michelson, S. T., & Odes, E. (2009). The effects of college counseling services on academic performance and retention. *Journal of College Student Development*, *50*(3), 305–319. https://doi.org/10.1353/csd.0.0071

Liebenberg, L., Ungar, M., & LeBlanc, J. C. (2013). The CYRM-12: A brief measure of resilience. *Canadian Journal of Public Health*, *104*(2), 131–135.

Liebenberg, L., Ungar, M., & Vijver, F. V. de. (2012). Validation of the child and youth resilience measure-28 (CYRM-28) among Canadian youth. *Research on Social Work Practice*, *22*(2), 219–226. https://doi.org/10.1177/1049731511428619

Lockard, A. J., Hayes, J. A., McAleavey, A. A., & Locke, B. D. (2012). Change in academic distress: Examining differences between a clinical and nonclinical sample of college students. *Journal of College Counseling*, *15*(3), 233–246. https://doi.org/10.1002/j.2161-1882.2012.00018.x

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, *71*(3), 543–562. https://doi.org/10.1111/1467-8624.00164

Lynch, M., & Cicchetti, D. (1998). An ecological-transactional analysis of children and contexts: The longitudinal interplay among child maltreatment, community violence, and children's symptomatology. *Development and Psychopathology*, *10*(2), 235–257.

MacKean, G. (2011). *Mental health and well-being in postsecondary education settings* (A literature and environmental scan) (p. 59). Retrieved from https://pdfs.semanticscholar.org/8c24/28f276e643d92a0937f3251617ddec46b5f9.pdf

Marsh, C. N., & Wilcoxon, S. A. (2015). Underutilization of mental health services among college students: An examination of system-related barriers. *Journal of College Student Psychotherapy*, *29*(3), 227–243. https://doi.org/10.1080/87568225.2015.1045783

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*(3), 227–238. https://doi.org/10.1037/0003-066X.56.3.227

Masten, A. S., Burt, K. B., Roisman, G. I., Obradović, J., Long, J. D., & Tellegen, A. (2004).

    Resources and resilience in the transition to adulthood: Continuity and change.

    Development and Psychopathology, *16*(4), 1071–1094.

    https://doi.org/10.1017/S0954579404040143

Masten, A. S., Hubbard, J. J., Gest, S. D., Tellegen, A., Garmezy, N., & Ramirez, D. M. (1999).

    Competence in the context of adversity: Pathways to resilience and maladaptation from

    childhood to late adolescence. Retrieved June 15, 2017, from

    https://www.cambridge.org/core/services/aop-cambridge-

    core/content/view/S0954579499001996

Masten, A. S., & Obradović, J. (2006). Competence and resilience in development. *Annals of the*

    New York Academy of Sciences, *1094*(1), 13–27. https://doi.org/10.1196/annals.1376.003

Masten, A. S., & Tellegen, A. (2012). Resilience in developmental psychopathology:

    Contributions of the project competence longitudinal study. *Development and*

    Psychopathology, *24*(2), 345–361. https://doi.org/10.1017/S095457941200003X

Ouimet, J. A., Bunnage, J. C., Carini, R. M., Kuh, G. D., & Kennedy, J. (2004). Using focus

    groups, expert advice, and cognitive interviews to establish the validity of a college

    student survey. *Research in Higher Education*, *45*(3), 233–250.

    https://doi.org/10.1023/B:RIHE.0000019588.05470.78

Patry, D., & Ford, R. (2016). *Measuring resilience as an education outcome*. Toronto, Canada:

    Higher Education Quality Council of Ontario. Retrieved from

    http://www.voced.edu.au/content/ngv:74019

Peter Gray. (2015, September 22). Declining student resilience: A serious problem for colleges. Retrieved October 16, 2016, from https://www.psychologytoday.com/blog/freedom-learn/201509/declining-student-resilience-serious-problem-colleges

Provostial Advisory Committee. (2014). *Report of the Provostial Advisory Committee on Student Mental Health* (pp. 1–62). Toronto, Canada: University of Toronto. Retrieved from http://www.provost.utoronto.ca/Assets/Provost+Digital+Assets/REPORT+OF+THE+PROVOSTIAL+ADVISORY+COMMITTEE+ON+STUDENT+MENTAL+HEALTH.pdf

Resiliency Working Group. (2015). *Student Life Resilience Project* (p. 17). Toronto, Canada: University of Toronto.

Roisman, G. I., Masten, A. S., Coatsworth, J. D., & Tellegen, A. (2004). Salient and emerging developmental tasks in the transition to adulthood. *Child Development*, *75*(1), 123–133. https://doi.org/10.1111/j.1467-8624.2004.00658.x

Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Annals of the New York Academy of Sciences*, *1094*(1), 1–12. https://doi.org/10.1196/annals.1376.002

Salzer, M. S. (2012). A comparative study of campus experiences of college students with mental illnesses versus a general college sample. *Journal of American College Health*, *60*(1), 1–7. https://doi.org/10.1080/07448481.2011.552537

Schulenberg, J. E., Bryant, A. L., & O'malley, P. M. (2004). Taking hold of some kind of life: How developmental tasks relate to trajectories of well-being during the transition to adulthood. *Development and Psychopathology*, *16*(04), 1119–1140.

Skorton, D. J. (2012, September 7). Promotion of Student Health and Wellbeing on College Campuses. [Web log post]. Retrieved from http://www.huffingtonpost.com/david-j-skorton/student-health-_b_1862344.html

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief

    resilience scale: Assessing the ability to bounce back. *International Journal of*

    Behavioral Medicine, *15*(3), 194–200. https://doi.org/10.1080/10705500802222972

Snyder, & Dillow. (2013). *Digest of education statistics 2012* (Digest) (p. 801). Washington,

    District of Columbia: National Center for Education Statistics. Retrieved from

    http://www.voced.edu.au/content/ngv:61563

Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *The Canadian*

    Journal of Psychiatry, *39*(3), 135-140. https://doi.org/10.1177/070674379403900303

U. S. Government Accountability Office. (2009). Higher education and disability: Education

    needs a coordinated approach to improve its assistance to schools in supporting students,

    (GAO-10-33). Retrieved from http://www.gao.gov/products/GAO-10-33

Ungar, M. (2008). Resilience across cultures. *The British Journal of Social Work*, *38*(2), 218–

    235. https://doi.org/10.1093/bjsw/bcl343

Ungar, M. (2016). Child & Youth Resilience Measure (CYRM) Youth Measure: User's Manual.

    Resilience Research Centre.

Ungar, M., & Liebenberg, L. (2011). Assessing resilience across cultures using mixed methods:

    Construction of the child and youth resilience measure. *Journal of Mixed Methods*

    Research, *5*(2), 126–149. https://doi.org/10.1177/1558689811400607

University of Toronto. (2015). Campus Labs: Baseline | Student Life. Retrieved June 14, 2017,

    from https://www.studentlife.utoronto.ca/bts/labs-baseline

Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience

    measurement scales. *Health and Quality of Life Outcomes*, *9*(1), 1.

Wong, A. H. C. (2013). *Exploratory study of resilience in refugee post-secondary students*. (Doctoral dissertation). University of Alberta, Edmonton, Alberta, Canada. Retrieved from https://era.library.ualberta.ca/files/vm40xs971/Wong_Andrew_Fall%202013.pdf

Zivin, K., Eisenberg, D., Gollust, S. E., & Golberstein, E. (2009). Persistence of mental health problems and needs in a college student population. *Journal of Affective Disorders*, *117*(3), 180–185. https://doi.org/10.1016/j.jad.2009.01.001

Zurbriggen, E. (n.d.). *Exploratory Factor Analysis II*. Presentation, University of California Santa Cruz. Retrieved from https://people.ucsc.edu/~zurbrigg/psy214b/09SEM2a.pdf

Appendices

Appendix A

Recommendations in the Report of the Provostial Committee on Student Mental Health (2014)

1.0 Institutional Commitment

1.1 Mental health is identified as a priority through the University's value statements and strategic goals, with a focus on creating sustainable mental health initiatives.

1.2 The University adopts a systems approach in creating supportive and inclusive conditions for students to flourish, involving all stakeholders including the health- care system, the wider community, and the Government.

2.0 Education, Training, Awareness & Anti-stigma

2.1 Develop and implement ongoing, sustainable student mental health education programming, which includes a focus on positive mental health and is designed to meet the specific needs of our diverse student populations. This programming is based on best practices and focused on developing psychological resilience, personal skill development (including self-care practices) and de-stigmatizing mental health problems. Design all mental health education and training to be inclusive, sustainable and measurable; include ongoing assessment and evaluation.

2.2 As a community, promote help-seeking as a positive strategy for personal, academic and career success by establishing initiatives (e.g., communication strategies) that encourage help-seeking by students, especially for those who may be at higher risk.

2.3 Create a "roadmap" to facilitate student navigation of services and programs that begins with enhanced programming at orientation and continues throughout the academic year, delivering education and information to the University community, including staff,

faculty and students.

2.4 Develop communication tools and systems that students find credible and relevant (e.g., messages embedded in faculty communication to students, such as course syllabi, and easy-to-navigate content on the institutional website).

3.0 Inclusive Curriculum & Pedagogy

3.1 Create conditions inside and outside the classroom that support students' overall well-being by providing opportunities for students to build community, especially within large classes. Identify existing best practices and highlight them.

3.2 Expand academic peer support/mentorship programming; consider ways of making peer mentoring/tutoring programs universal, with an "opt-out" option.

3.3 Create programming for graduate students that will foster a greater sense of community within and across departments and faculties, and enhance support for graduate students in their interactions with their supervisors.

3.4 Clearly articulate course goals and expectations and promote best practices in assessment and timely feedback. Curriculum Committees and Teaching and Learning Committees in each Division or Faculty should initiate discussions with faculty about the relationship between student stress and course and curriculum design.

4.0 Mental Health Services & Programs

4.1 Enhance programming for students that has a focus on personal skill development, including individual resilience, coping skills, problem solving, and self-advocacy. Position psycho-educational groups and workshops as a first line of support and best practice for many mental health issues.

4.2 Expand peer support programs focused on mental health for students in which peer

mentors are linked directly to mental health professionals for training, support and consultation; consider creating community-specific peer support, for example, graduate student peer support, or peer support for students who identify as lesbian, gay, bisexual, trans and queer (LGBTQ).

4.3 Expand embedded services across Faculties, colleges and departments to de-stigmatize help-seeking behaviour and create services that have a deeper connection to the local experience.

4.4 Enhance education/information that provides a greater understanding of professional mental health care and services, as well as their necessary limitations within the university context.

4.5 Enhance case management models of care for students with complex needs, connecting them to appropriate resources

4.6 Enhance education opportunities for all staff, and in particular for those who provide front line services such as campus community police.

4.7 Expand partnerships with community-based health resources to support students with complex mental health needs or students who may need long-term support, and   facilitate pathways for students between these community resources and University resources.

5.0 Policies & Procedures

5.1 University policy initiatives should be viewed with an equity and diversity lens that accounts for how individuals with mental health needs are affected by such policies while engaging in University activities.

5.2 Develop policy, in accordance with best practice policies and protocols in place at other Canadian universities, to establish pathways to support student needs in cases where the primary issues are related to mental health.

Appendix B

Survey items of the resilience instrument

Section 1 – Items adapted from the CYRM-12 (Lienbenberg, Ungar & LeBlanc, 2013)

To what extent do the sentences below describe you? Please respond to each item by marking one box per row.

Item	Not at all	A little	Somewhat	Quite a bit	A lot
1. I have people to look up to					
2. Getting an education is important to me					
3. My parent(s)/caregiver(s) know a lot about me					
4. I try to finish what I start					
5. I am able to solve problems without hurting myself or others (e.g. by using drugs and/or being violent)					
6. I know where to go in my community to get help					
7. I feel I belong in my school					
8. My family stands by me during difficult times					
9. My friends stand by me during difficult times					
10. I am treated fairly in my community					
11. I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for others)					
12. I enjoy my community's traditions					

Section 2 – Items adapted from the BRS (Smith et al., 2008)

To what extent do the sentences below describe you? Please respond to each item by marking one box per row

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I tend to bounce back quickly after hard times.					
2. I have a hard time making it through stressful events.					
3. It does not take me long to recover from a stressful event.					
4. It is hard for me to snap back when something bad happens.					
5. I usually come through difficult times with little trouble.					
6. I tend to take a long time to get over set-backs in my life.					

Section 3 – Demographic questions

Please answer the following demographic questions *(these questions are accompanied with dropdown boxes with appropriate answer options)*

1. What is your gender?
2. What is your year of study?
3. What is your program of study?
4. How far do you live from campus?
5. On average, how long is your commute to campus (one way)?

Appendix C

Cognitive Interview Results for Items from the Child & Youth Resilience Measure and the Brief

Resilience Scale

Item	Comments from expert interviews		Comments from non-expert interviews	
	Expert Interview 1	*Expert Interview 2*	*Non-expert Interview 1*	*Non-expert interview 2*
I have people to look up to.	The scale *could* be interpreted differently for this item	-	Personally? Academically?	-
Getting an education is important to me.	-	-	Institutional or personal development?	-
My parent(s)/caregiver(s) know a lot about me.	Scale & terminology in the item is confusing for this statement	-	-	-
I try to finish what I start.	-	-	-	-
I am able to solve problems without hurting myself or others (e.g. by using drugs and/or being violent).	What kind of problems?	-	-	This question was a bit confusing
I know where to go in my community to get help.	Help with what?	Specify help with what, or which resources in the community	-	Help with something specific?

Item	Comments from expert interviews		Comments from non-expert interviews	
	Expert Interview 1	*Expert Interview 2*	*Non-expert Interview 1*	*Non-expert interview 2*
I feel I belong in my school.	-	May require a little clarification	-	-
My family stands by me during difficult times.	-	-	-	-
My friends stand by me during difficult times.	-	-	-	-
I am treated fairly in my community.	Seems out of context (maybe specify community means school)	Which community? Adding "academic community"	Subjective; *community* can be confusing	-
I have opportunities to develop skills that will be useful later in life (like job skills and skills to care for others).	Both job skills and skills to care for others? Or either?	-	Soft skills or field-specific skills?	-
I enjoy my community's traditions.	vague	Which community?	School or cultural?	-
I tend to bounce back quickly after hard times.	-	-	-	-
I have a hard time making it through stressful events.	Maybe add examples of stressful events	-	-	Can be subjective
It does not take me long to recover from a stressful event.	-	-	-	Stressful event can be vague

	Comments from expert interviews		Comments from non-expert interviews	
Item	*Expert Interview 1*	*Expert Interview 2*	*Non-expert Interview 1*	*Non-expert interview 2*
It is hard for me to snap back when something bad happens.	-	Question difficult to understand (maybe provide examples)	Same as the first one	Same (oppositely worded) of the first one
I usually come through difficult times with little trouble.	-	-	-	-
I tend to take a long time to get over set-backs in my life.	-	Questions seem to be repetitive	-	"I promise you all these questions are asking the same thing"

Note. Items 1-12 are obtained from CYRM-12 (Liebenberg et al., 2013) in order, while items 13-18 are obtained from BRS (Smith et al., 2008) in order. "-" is used where interviewees felt items were easy to understand and required no further clarification.

Appendix D

Information Letter/Consent Form

You are invited to participate in a research study conducted by Hany Soliman, under the supervision of Professor Ruth Childs of the University of Toronto, Canada (contact information is provided at the end of this form). The objectives of the research study are (1) to define and understand student resilience in the context of post-secondary education, and to (2) create an instrument to measure student resilience in this context. This study is for a Master's thesis at the Ontario Institute for Studies in Education at the University of Toronto (UofT), and is implemented with the help of *Student Life Division* at UofT.

You have been randomly chosen from the group of current full-time or part-time second or third year undergraduate students at the University of Toronto, St. George campus to receive an invitation to participate in this study.

This survey takes less than 10 minutes to complete, and participation is completely voluntary. **You may decline to answer any of the questions and/or may withdraw from the survey at any time without reprisal**. If you choose to withdraw from the survey at any time, all your responses will be removed. If participants would like to communicate their withdrawal reasoning please contact either myself or my Faculty Supervisor.

The survey begins with some demographic questions. Then you will be asked a few questions regarding resilience. Lastly, open ended questions will be presented to obtain your feedback on the survey. Please note answers are completely confidential.

There are no direct benefits to the participant resulting from participating in this study. Financial compensation will be in the form of a raffle in which the prizes are one $100 gift card, two $50 gift cards and five $10 gift cards for the University of Toronto bookstore. There are also no known anticipated risks resulting from participating in this survey. If you have concerns regarding the nature or content of any of the questions in this survey, please do not hesitate to contact either myself or my Faculty Supervisor.

At the end of the survey, contact information for the student investigator and faculty supervisor is provided if you would like to obtain a summary concerning the results of the survey and the overall study.

Data from this survey will be retained in digital form for a maximum of 3 years beginning in June 2017. During that time, only the student investigator and the Faculty Supervisor will have access to the data. Please note that the *Student Life* will have access to data from this study. Data disposal will be through a hard drive wipe.

Only the student investigator and the faculty supervisor have access to the data.
(i) the data collected will not be linked to any other dataset.
(ii) the data will not be sent outside the institution where it is collected, nor will it be received

from any other sites.

The research study you are participating in may be reviewed for quality assurance to make sure that the required laws and guidelines are followed. If chosen, (a) representative(s) of the Human Research Ethics Program (HREP) may access study-related data and/or consent materials as part of the review. All information accessed by the HREP will be upheld to the same level of confidentiality that has been stated by the research team.

This study has been reviewed by, and received ethics clearance through a University of Toronto Research Ethics Committee. If you have any concerns regarding your participation in this study, or if you have questions about your rights as participants, please do not hesitate to contact the Research Oversight and Compliance Office – Human Research Ethics Program at or 416-946-3273.

For additional questions or comments, please contact myself or my Faculty Supervisor, Ruth Childs:

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I, hereby, understand the aforementioned
information, and give consent to participate in this study.

Appendix E

Additional psychometric data for the Child & Youth Resilience Measure and the Brief Resilience

Scale

Table E1

Correlation Matrix for Items for the Child & Youth Resilience Measure

Item	1	2	3	4	5	6	7	8	9	10	11	12
I have people to look up to	-											
Getting an education is important to me	0.17	-										
My parent(s)/ caregiver(s) know a lot about me	0.38	0.12	-									
I try to finish what I start	0.20	0.32	0.24	-								
I am able to solve problems without hurting …	0.08	0.16	0.50	0.25	-							
I know where to go in my community to get help	0.25	0.18	0.35	0.20	0.28	-						
I feel I belong in my school	0.34	0.23	0.29	0.18	0.37	0.47	-					
My family stands by me during difficult times	0.32	0.05	0.72	0.17	0.45	0.29	0.45	-				
My friends stand by me during difficult times	0.27	-0.10	0.23	0.17	0.44	0.19	0.38	0.37	-			
I am treated fairly in my community	0.36	0.20	0.28	0.12	0.27	0.31	0.32	0.29	0.28	-		
I have opportunities to develop skills that …	0.20	0.10	0.21	0.22	0.26	0.37	0.28	0.16	0.15	0.32	-	
I enjoy my community's traditions	0.43	0.29	0.39	0.08	0.38	0.38	0.36	0.41	0.24	0.28	0.34	-

Table E2

Factor Correlation Matrix for Items of the Child & Youth Resilience Measure items

Factor	1	2	3
1	-	.388	.476
2		-	.275
3			-

Extraction method: Maximum Likelihood.
Rotation method: Oblimin with Kaiser Normalization

Table E3

Correlation Matrix for Items of the Brief Resilience Scale

Item	1	2	3	4	5	6
I tend to bounce back quickly after hard times	-					
I have a hard time making it through stressful events	0.38	-				
It does not take me long to recover from a stressful event	0.54	0.37	-			
It is hard for me to snap back after something bad happens	0.57	0.58	0.50	-		
I usually come through difficult times with little trouble	0.25	0.35	0.50	0.33	-	
I tend to take a long time to get over set-backs in my life	0.60	0.53	0.47	0.64	0.25	-

Table E4

Eigenvalues, Percentages of Variance, and Cumulative Percentages for Factors of the Brief Resilience Scale

Factor	Eigenvalue	% of Variance	Cumulative %
1	3.317	55.29	55.29
2	.904	15.07	70.36
3	.694	11.57	81.93
4	.379	6.31	88.24
5	.356	5.94	94.18
6	.349	5.82	100.00

Extraction method: Maximum Likelihood

Table E5

Resilience Categories based on Total CYRM-12 Scores

| | Comparison Group | |
Resilience Category	Service Users	General Population
Low Resilience	<44	<45
Moderate Resilience	44 – 48	45 – 50
High Resilience	49 – 53	51 – 55
Exceptional Resilience	>54	>56

Note. Based on email communication with staff of the Resilience Research Centre