Original Research

Building Personal Resilience following an Online Resilience Training Program for BScN Students

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Abstract

The purpose of this study was to investigate the effectiveness of a self-paced online resilience training program on promoting personal resilience and positive coping styles, while reducing the severity of anxiety- and depression-related symptoms, in a sample of BScN students ($N = 70$) studying to become registered nurses. Using a repeated-measures research design, results indicate that scores on the measure of personal resilience significantly improved from baseline to post-training follow-up assessment. While scores on measures of positive coping and anxiety/depression shifted in the expected direction, these findings were not statistically significant. This study presents evidence to suggest that a self-paced online resilience training program may be an effective strategy for promoting personal resilience among nursing students.

Keywords

nursing students, resilience, resilience training, coping, mental health

Resilience has gained increased recognition in nursing research, practice, and education (Anderson et al., 2019; Stephens, 2013; Thomas & Asselin, 2018) as nurses face a variety of adversities, challenges, and traumas (Hart et al., 2014; McAllister & Lowe, 2011; Stelnicki et al., 2020), which has implications for psychological well-being (Stelnicki & Carleton, 2020). Various definitions of resilience have been adopted within nursing literature (Anderson et al., 2019; Thomas & Asselin, 2018), however, nursing scholars suggest that the concept must be clarified for nursing students to enhance its application in the educational setting (Stephens, 2013). Resilience in nursing students has therefore been conceptualized as an individualized process of development that occurs through the use of personal protective factors to successfully navigate perceived stress and adversities (Stephens, 2013). With nursing students likely to have low to moderate levels of resilience (Lekan et al., 2018; Smith & Yang, 2017), they may be more vulnerable to the negative effects of stress (Reeve et al., 2013; Stephens, 2013). This combination of lower levels of resilience and vulnerability to stress may additionally contribute to psychological impairment (Evans & Kelly, 2004) along with burnout and attrition (Thomas & Asselin, 2018) among nursing students.

Resilience may improve (student) nurses' perception and response to stressors (McAllister & Lowe, 2011), and, subsequently, may promote healthier psychological functioning. Indeed, studies have highlighted that increased resilience is linked to decreased incidences of psychological impairment among nurses (Manzano García & Ayala Calvo, 2012; Mealer et al., 2012; Rushton et al., 2015) and, among nursing students, resilience is positively associated with psychological well-being (He et al., 2018) and with mindfulness and empathy (Mathad et al., 2017). Importantly, it is recognized that resilience is a dynamic process of adaptation and personal growth that can be learned (McAllister & Lowe, 2011; Stephens, 2013; Thomas & Asselin, 2018). Nurse educators are therefore in an optimal position to promote students' personal resilience, which could better prepare students for challenges and adversities they may face in the academic and clinical setting (Stephens, 2013) and could reduce the impact of (repeated) stressors as a new graduate (Anderson et al., 2019).

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To date, there is a general lack of knowledge on the efficacy of resilience training programs, especially concerning individuals working in stress-inducing environments (Beshai & Carleton, 2016). Relatedly, there is limited empirical evidence for the utility of self-paced online resilience training programs (Anderson et al., 2017; Vaughan et al., 2020). Nevertheless, recent findings highlight the potential benefits of resilience training for mental health and well-being (Joyce et al., 2018; Leppin et al., 2014; Macedo et al., 2014). Studies have also demonstrated the benefits of resilience training in nursing populations (Babanataj et al., 2019; Chesak et al., 2015; Liang et al., 2019; Magtibay et al., 2017; Mealer et al., 2014)—in particular, such strategies have been shown to increase resilience and decrease symptoms of mental illness and disorder. Researchers have identified several strategies for enhancing resilience among nursing students, including specialized training (Liang et al., 2019), social support (Carroll, 2011; Crombie et al., 2013), and informal education (Stephens, 2012). Considering the benefits of resilience training may decline over time among nursing students (Stephens, 2012), it is also important to pinpoint when this decline occurs to strategically re-administer training. All things considered, nurse scholars have recommended incorporating resilience training into nursing education as a tool to promote personal resilience and positive coping (Stephens, 2013; Thomas & Asselin, 2018).

Purpose

While there is support for resilience training in nursing education, it is also recognized that further research is needed to identify best educational practices for promoting resilience among nursing students (Reyes et al., 2015; Thomas & Revell, 2016). The current study aimed to fill this gap, exploring the effectiveness of a self-paced online resilience resource (ORR), which has shown promising results with paramedic students (Anderson et al., 2017; Vaughan et al., 2020). We hypothesized that the ORR would improve resilience and positive coping strategies; that students will experience a decline in resilience levels in the long-term; and that the ORR would reduce the severity of anxiety- and depression-related symptoms.

Methods

Study Design

To test our hypotheses, a repeated-measures research design was used to elucidate differences (if any) in personal resilience, positive coping, anxiety, and depression before and after nursing students completed the self-paced ORR (Anderson et al., 2017; Vaughan et al., 2020).

ORR Description

The ORR is a web-based training program (https://resiliency.jibc.ca/)—which is external to course components of the Bachelor of Science in Nursing (BScN) curriculum—and was developed in collaboration with various emergency responders and health care professionals. As a result, the intended audience is broad in scope (e.g., nursing, paramedicine, policing, etc.) and content is directed toward both the learning and practice environment. The course is entirely self-guided and it uses an array of online readings, exercises, self-assessment tools, and videos to engage course participants in learning about resilience, mental wellness/illness, and healthy coping strategies—all material is grounded in the academic literature. It is worth noting that the video content includes real-world narratives provided by emergency responders and health care workers, including nurse professionals and students. These narratives are buttressed with video statements from clinical psychologists who specialize in work-related trauma and stress. The overall goal of the ORR is to help students and trainees, as well as individuals with more work experience, proactively build personal resilience and to promote healthy psychological functioning. The course takes approximately 6–8 hours, which can be completed in one or multiple sessions (depending on individuals' preference).

Instrumentation

Resilience. The Resilience Scale for Adults (RSA; Friborg et al., 2005) is a 33-item self-report scale that assesses inter- and intra-personal factors that are presumed to play a pivotal role in one's adaptation to adversity. This instrument is comprised of 17 positively worded items and 16 negatively worded items, measuring five dimensions of resilience: Personal Strength (ten items)—perception of oneself and one's future; Structured Style (four items)—perception of one's level of structure and organization in life; Social Competence (six items)—perception of one's sociability; Family Cohesion (six items)—perception of one's level of connection to their family; and Social Resources (seven items)—perception of one's access to support from friends/family members. All items on the RSA are scored using a five-point Likert scale (ranging from 1 to 5). Possible range for the full RSA scale is from 33 to 165, with higher scores indicating greater perceived resilience. The 33-item RSA has been shown to be a reliable and valid measure (Windle et al., 2011). For further detail on the RSA, including psychometric properties, see Friborg et al. (2005) and Windle et al. (2011).

Anxiety. The Generalized Anxiety Disorder 7-item (GAD-7; Spitzer et al., 2006) is a brief, seven-item, self-report scale that measures the frequency/severity of anxiety-related symptoms (experienced over the period of the previous two weeks). All items on the GAD-7 are scored according to a four-point Likert scale (ranging from 0 to 3). Possible range for the GAD-7 is from 0 to 21, with higher scores indicating greater frequency/severity of anxiety-related symptoms. Spitzer et al. (2006) reported that the GAD-7 showed excellent internal

consistency reliability, good test-retest reliability, and evidence suggested strong construct validity.

Depression. The Patient Health Questionnaire 9-item (PHQ-9; Kroenke et al., 2001) is a brief, nine-item, self-report scale that measures the frequency/severity of depression-related symptoms (experienced over the period of the previous two weeks). All items on the PHQ-9 are scored according to a four-point Likert scale (ranging from 0 to 3). Possible range for the PHQ-9 is from 0 to 27, with higher scores indicating greater frequency/severity of depression-related symptoms. Kroenke et al. (2001) reported that the PHQ-9 showed excellent internal consistency reliability, good test-retest reliability, and evidence suggested strong construct validity.

Coping. The Coping Strategies Inventory-Short Form (CSI-SF; Addison et al., 2007) is a 16-item self-report scale that assesses approach- and avoidant-related responses to stressors, measuring four coping efforts: Problem-Focused Engagement (four items)—the degree to which an individual implements actions to confront and manage a stress-producing situation; Emotion-Focused Engagement (four items)—the degree to which an individual engages in adaptive emotional regulation in response to a stress-producing situation; Problem-Focused Disengagement (four items)—the degree to which an individual engages in behavioural avoidance when presented with a stress-producing situation; and Emotion-Focused Disengagement (four items)—the degree to which an individual engages in maladaptive emotional regulation in response to a stress-producing situation. For the purposes of the current study, only the Problem- and Emotion- Focused Engagement subscales were used as focus is on the development of positive coping styles. All items on the CSI-SF are scored using a five-point Likert scale (ranging from 1 to 5). Addison et al. (2007) demonstrated that the Problem- and Emotion- Focused Engagement subscales had acceptable internal consistency reliability and adequate construct validity.

Procedures

To solicit participation, a research assistant delivered a short presentation during class time and BScN students interested in participating in the study provided their contact information, which was compiled and sent to the researchers via secure email. Formal invitations were sent to the list of prospective participants, which outlined details of the study and provided a link to the study consent form and baseline assessment survey. Participants could not be under the care of a health care professional for treatment of a mental health disorder. Qualtrics (a secure platform for distributing online surveys and storing data) was used to distribute study invitations and collect data. After reviewing the consent form and providing consent to participate in the online surveys and ORR, respondents completed the baseline assessment survey, which included items related to sociodemographic characteristics (i.e., age, education, marital status) as well as the instruments used to measure resilience, anxiety, depression, and positive coping. Following this survey, participants were provided a link to the ORR and were directed to complete the course at their own pace. A certificate of completion was awarded to participants who completed all learning modules in the ORR (which was verified by those with administrative access to the course website, i.e., the research team).

Participants who completed the baseline assessment survey, as well as the ORR, were contacted to participate in the first of two follow-up assessment surveys. In the first follow-up (i.e., one-month post-ORR training), data were collected only for the resilience measure to assess the short-term impact of the ORR on promoting resilience. In the second follow-up (i.e., three-months post-ORR training), participants completed measures of resilience, anxiety, depression, and positive coping. Qualtrics was used for communication and data collection for both follow-up assessments. All surveys took about 20–25 minutes to complete and, along with the ORR, were to be completed on participants' personal time.

Participants

This study included students enrolled in a BScN program at a post-secondary education institution based in a large city in western Canada. The program has two intake streams—the first consists of general entry students (i.e., with little or no previous nursing education; beginning in Term 1), whereas the second consists of advanced placement students (i.e., having previous education/experience as a Licensed Practical Nurse; beginning in Term 4). The BScN program involves a combination of classroom training and clinical experience in medical settings, and it takes approximately 3–5 years to complete (depending on intake stream and enrollment status). Upon completion, new graduates are eligible to write the national licensure exam. Those who satisfactorily complete the BScN program and subsequent licensure exam will have completed the necessary steps to work as registered nurses in Canada.

At the time of the study, there were four active BScN cohorts—two general entry and two advanced placement cohorts. A total of 90 students from these four cohorts were eligible to participate and were invited to this study. Of the potential 90 BScN students, 70 completed the baseline assessment and ORR. Of those 70 students, 32 completed the one-month post-ORR training follow-up survey. Of those 32 students, 21 completed the three-month post-ORR training follow-up survey. Further, a subset of participants ($n = 15$) completed the baseline assessment and ORR, did not respond to the first follow-up assessment, but did respond to the second follow-up assessment; thus, a total of 36 participants completed the three-month post-ORR training follow-up survey.

Table 1. Sample Characteristics.

	Time 1 (n = 70)	Time 2 (n = 32)	Time 3a (n = 21)	Time 3b (n = 36)
Measures	% (n)	% (n)	% (n)	% (n)
Completed Education				
Some college/institute/university[a]	35.7 (25)	25.0 (8)	19.0 (4)	30.6 (11)
College certificate/diploma[b]	47.1 (33)	53.1 (17)	52.4 (11)	47.2 (17)
Bachelor's degree	15.7 (11)	18.8 (6)	23.8 (5)	19.4 (7)
Graduate degree	1.4 (1)	3.1 (1)	4.8 (1)	2.8 (1)
Marital Status				
Single	34.3 (24)	25.0 (8)	23.8 (5)	27.8 (10)
Married/Common law	58.6 (41)	65.6 (21)	66.7 (14)	66.7 (24)
Separated/Divorced	7.1 (5)	9.4 (3)	9.5 (2)	5.6 (2)

Note. Time 1 includes participants that completed the baseline assessment and ORR; Time 2 includes participants that completed the baseline assessment, ORR, and first follow-up; Time 3a includes participants that completed the baseline assessment, ORR, first follow-up, and second follow-up; Time 3b includes participants that completed the baseline assessment, ORR, and second follow-up.
[a]Independent of students' current enrollment.
[b]Completion of a previous college program.

Data Analysis

Version 24 of the Statistical Package for the Social Sciences was used to clean the data and conduct all statistical analyses. Foremost, data from the baseline and one- and three-month post-ORR training follow-up assessments were nested according to unique identifiers provided by study participants (i.e., based on their initials and the final three digits of their student number). With respect to descriptive statistics, analyses were conducted on sociodemographic characteristics, along with the measures of resilience, anxiety, depression, and positive coping. With respect to inferential statistics, paired samples *t*-tests were used to examine (a) change in scores on the RSA from baseline to the first follow-up assessment and (b) change in scores on the RSA, GAD-7, PHQ-9, PFE, and EFE from baseline to second follow-up assessment. Analysis of resilience was based on participants who completed all phases of the study, whereas analysis of anxiety, depression, and positive coping was based on participants who completed at least the baseline assessment, ORR, and second follow-up assessment.

Ethics

Ethical approval for the study protocol was obtained from two post-secondary education institutional review boards—the institution that provides the BScN program, and the institution that provided research services. Following ethical standards for research involving humans (TCPS 2; Canadian Institutes of Health Research, 2018), participants were informed of their rights, including the confidential and voluntary nature of participation; that they were not required to answer any questions they did not want to; that they could withdraw from the study at any time; and that there were no negative consequences for refusing to participate at any stage. Participants were ensured that faculty would not have access to any information provided concerning the study, nor would they know who enrolled as participants. Data were stored on password-protected computers at the corresponding authors' institute. Finally, participants were provided contact information for counselling services (if they experienced emotional distress) and the research team (if they required any assistance).

Results

The following observations were made because of examining the influence of a self-paced online resilience training program on BScN students' personal resilience, positive coping, anxiety, and depression. Concerning sociodemographic characteristics, the complete sample of 70 BScN students were, on average, 32.25 years of age (SD = 6.63), which ranged from 33.87 (SD = 7.24) at Time 2 to 36.00 (SD = 6.77) at Time 3a and 34.33 (SD = 6.49) at Time 3b. Approximately half of the sample had previously completed a college certificate/diploma, and a large proportion were married or co-habiting (see Table 1).

Summary statistics for the measure of resilience at baseline, one-month post-ORR training, and three-month post-ORR training are presented in Table 2. Among those who completed the baseline assessment (n = 70), scores on the RSA ranged from 96 to 165, with a mean of 122.28 (95% CI: 119 to 126), and internal consistency reliability for this scale was good (Cronbach's a = 0.886). Among the subset who completed the first follow-up (n = 32), baseline scores on the RSA ranged from 96 to 153m with a mean of 116.81 (SD = 13.82; 95% CI: 112 to 122)m and internal consistency reliability was good (Cronbach's a = 0.830). For this group, scores on the measure of resilience at one-month post-ORR training ranged from 96 to 156, with a mean of

Table 2. Summary Statistics for the Measure of Resilience.

		Time 1[a] (n = 70)			Time 2[b] (n = 32)			Time 3[c] (n = 21)		
	Possible Range	Actual Range	M (SD)	Cronbach's α	Actual Range	M (SD)	Cronbach's α	Actual Range	M (SD)	Cronbach's α
RSA total	33 – 165	96 – 165	122.28 (15.99)	.886	96 – 156	126.53 (17.60)	.925	94 – 162	130.71 (19.20)	.933
Personal strength	10 – 50	28 – 50	36.68 (5.07)	.718	28 – 50	38.12 (5.54)	.822	25 – 50	39.61 (6.73)	.905
Structured style	4 – 20	7 – 20	14.57 (2.94)	.673	9 – 20	14.46 (2.94)	.507	11 – 19	14.77 (2.43)	.441
Social competence	6 – 30	10 – 30	20.90 (4.46)	.757	10 – 28	21.46 (4.32)	.757	9 – 30	21.38 (5.06)	.880
Family cohesion	6 – 30	9 – 30	21.77 (5.32)	.858	16 – 30	23.25 (4.32)	.831	12 – 30	23.38 (4.68)	.886
Social resources	7 – 35	19 – 35	28.35 (4.98)	.827	20 – 35	29.21 (4.72)	.857	21 – 35	28.83 (4.11)	.783

Note. RSA = Resilience Scale for Adults.
[a]baseline assessment.
[b]1-month post-ORR training.
[c]3-month post-ORR training.

Table 3. Comparing Scores on the Measure of Resilience Pre- and Post-ORR Training.

		Paired Samples Test			95% Confidence Interval	
	M (*SD*)	Mean difference	*t*-value	*p*-value[d]	LB	UB
Time 1[a,b]	116.81 (13.82)	9.72	3.03	.005	3.19	16.24
Time 2[a,b]	126.53 (17.60)					
Time 1[a,c]	119.57 (14.22)	11.14	2.61	.017	2.24	20.04
Time 3[a,c]	130.71 (19.20)					

Note. LB = Lower Bound; UB = Upper Bound.
[a]Time 1 is baseline assessment, Time 2 is 1-month post-ORR training, Time 3 is 3-month post-ORR training.
[b]$N = 32$.
[c]$N = 21$.
[d]Bonferroni-corrected alpha level = 0.025.

Table 4. Summary Statistics for Measures of Positive Coping, Anxiety and Depression.

		Time 1[a] ($n = 70$)			Time 3[b] ($n = 36$)		
	Possible Range	Actual Range	*M* (*SD*)	Cronbach's *a*	Actual Range	*M* (*SD*)	Cronbach's *a*
CSI-SF							
PFE	4 – 20	6 – 20	14.20 (3.03)	.791	6 – 19	14.36 (2.88)	.847
EFE	4 – 20	7 – 18	13.01 (2.27)	.558	8 – 18	12.94 (2.25)	.533
GAD-7	0 – 21	0 – 21	7.18 (5.12)	.907	0 – 16	5.47 (5.14)	.902
PHQ-9	0 – 27	0 – 26	7.07 (5.69)	.840	0 – 22	5.08 (4.98)	.854

Note. CSI-SF = Coping Strategies Inventory-Short Form; PFE = Problem-Focused Engagement; EFE = Emotion-Focused Engagement; GAD-7 = Generalized Anxiety Disorder-7 item; PHQ-9 = Patient Health Questionnaire-9 item.
[a]baseline assessment.
[b]3-month post-ORR training.

126.53 (95% CI: 120 to 133), and internal consistency reliability was excellent/strong (Cronbach's $a = 0.925$). Among the subset who completed all phases of the study ($n = 21$), baseline scores on the measure of resilience ranged from 105 to 153, with a mean of 119.57 ($SD = 14.22$; 95% CI: 113 to 126), showing good internal consistency reliability (Cronbach's $a = 0.816$). For this group, scores on the measure of resilience at one-month post-ORR training ranged from 96 to 156, with a mean of 130.47 ($SD = 18.61$; 95% CI: 123 to 138), showing excellent/strong internal consistency reliability (Cronbach's $a = 0.938$); scores on the measure of resilience at three-month post-ORR training ranged from 94 to 162, with a mean of 130.71 (95% CI: 123 to 139), showing excellent/strong internal consistency reliability (Cronbach's $a = 0.933$).

Table 3 presents findings for repeated measures analyses, comparing scores on the measure of resilience at baseline to (a) one-month post-ORR training and (b) three-month post-ORR training. Among the subset who completed the first three phases of the study ($n = 32$), mean RSA score increased by 9.72 (95% CI: 3.19 to 16.24) from baseline ($M = 116.81$, $SD = 13.82$; 95% CI: 112 to 122) to one1-month post-ORR training ($M = 126.53$, $SD = 17.60$; 95% CI: 120 to 133). A paired-samples *t*-test revealed that this change in scores on the measure of resilience was statistically significant, $t(31) = 3.03$, $p = .005$. Among the subset who completed all phases of the study ($n = 21$), mean RSA score increased by 11.14 (95% CI: 2.24 to 20.04) from baseline ($M = 119.57$, $SD = 14.22$; 95% CI: 113 to 126) to three-month post-ORR training ($M = 130.71$, $SD = 19.20$; 95% CI: 123 to 139). A paired-samples *t*-test revealed that this change in scores on the measure of resilience was statistically significant, $t(20) = 2.61$, $p = .017$. It was further found that, for this latter subset of nursing students ($n = 21$), mean RSA scores for the one-month ($M = 130.47$, $SD = 18.61$; 95% CI: 123 to 138) and three-month ($M = 130.71$, $SD = 19.20$; 95% CI: 123 to 139) post-ORR training follow-up were similar, indicating little change in resilience between these two periods. A paired-samples *t*-test further confirmed that, for this subset of participants, the mean difference in scores on the measure of resilience at one-month and three-month post-ORR training was not statistically significant, $t(20), = 0.076$, $p = .940$.

Summary statistics for the measures of positive coping, anxiety, and depression at baseline and three-month post-ORR training are presented in Table 4. Among those who completed the baseline assessment ($n = 70$), scores on the PFE subscale ranged from 6 to 20, with a mean of 14.20 (95% CI: 13.5 to 14.9), and scores on the EFE subscale

Table 5. Comparing Scores on the Measures of Positive Coping, Anxiety and Depression Pre- and Post-ORR Training.

			Paired Samples Test			95% Confidence Interval	
	Scale	*M* (*SD*)	Mean Difference	*t*-value	*p*-value	LB	UB
Time 1[a,b]	GAD-7	6.94 (5.42)	−1.47	−1.688	.100	−3.24	0.29
Time 3[a,b]		5.47 (5.14)					
Time 1[a,b]	PHQ-9	6.02 (5.76)	−0.94	−1.371	.179	−2.34	0.45
Time 3[a,b]		5.08 (4.98)					
Time 1[a,b]	CSI-SF PFE	13.72 (2.93)	0.63	1.255	.218	−0.39	1.67
Time 3[a,b]		14.36 (2.88)					
Time 1[a,b]	CSI-SF EFE	12.83 (2.33)	0.11	0.229	.820	−0.87	1.09
Time 3[a,b]		12.94 (2.25)					

Note. CSI-SF = Coping Strategies Inventory-Short Form; PFE = Problem-Focused Engagement; EFE = Emotion-Focused Engagement; GAD-7 = Generalized Anxiety Disorder-7 item; PHQ-9 = Patient Health Questionnaire-9 item; LB = Lower Bound; UB = Upper Bound.
[a]Time 1 is baseline assessment, Time 3 is 3-month post-ORR training.
[b]$N = 36$.

ranged from 7 to 18, with a mean of 13.01 (95% CI: 12.5 to 13.5); internal consistency reliability ranged from poor to fair for these subscales. Baseline scores on the measure of anxiety ranged from 0 to 21, with a mean of 7.18 (95% CI: 5.98 to 8.38), whereas baseline scores on the measure of depression ranged from 0 to 26, with a mean of 7.07 (95% CI: 5.74 to 8.4). This suggests mild levels of anxiety and depression prior to ORR training. Internal consistency reliability was excellent/strong on the measure of anxiety (Cronbach's $a = 0.907$) and good on the measure of depression (Cronbach's $a = 0.840$).

Among the subset of nursing students who completed the baseline assessment, as well as the three-month post-ORR training follow-up ($n = 36$), baseline scores on the PFE subscale ranged from 6 to 20, with a mean of 13.72 ($SD = 2.93$; 95% CI: 12.8 to 14.7), and baseline scores on the EFE subscale ranged from 7 to 17, with a mean of 12.83 ($SD = 2.33$; 95% CI: 12.1 to 13.6); internal consistency reliability was fair (Cronbach's $a = 0.724$) and poor (Cronbach's $a = 0.541$), respectively. Among this subset, baseline scores on the measure of anxiety ranged from 0 to 21, with a mean of 6.94 ($SD = 5.42$; 95% CI: 5.17 to 8.71), whereas baseline scores on the measure of depression ranged from 0 to 26, with a mean of 6.02 ($SD = 5.76$; 95% CI: 4.14 to 7.9). Again, these scores suggest mild levels of anxiety and depression prior to ORR training. Internal consistency reliability was excellent/strong on the measure of anxiety (Cronbach's $a = 0.922$) and good on the measure of depression (Cronbach's $a = 0.867$). For descriptive statistics on these measures at three-month post-ORR training, see Table 4.

Table 5 presents findings for repeated measures analyses, comparing scores on the measures of positive coping, anxiety, and depression at baseline to three-month post-ORR training. Results suggest that scores on the measures of anxiety and depression decreased, whereas scores on the measures of positive coping increased, from baseline to three-month post-ORR training. Though directionality was appropriate, these patterns were not statistically significant.

Discussion

The current study explored the effectiveness of a self-paced online resilience training program (i.e., the ORR), which has been previously assessed in paramedic students (Anderson et al., 2017; Vaughan et al., 2020). We hypothesized that the training program would help improve resilience and positive coping strategies; that students will experience a decline in resilience levels in the long-term; and that it would help reduce the severity of anxiety- and depression-related symptoms. Foremost, evidence from the current study supports previous findings that personal resilience can be developed and enhanced among health care students, including those studying to become paramedics (Anderson et al., 2017; Vaughan et al., 2020) and nurses (Liang et al., 2019; Thomas & Asselin, 2018). This supports the use of brief (self-paced) educational tools, such as the ORR (Anderson et al., 2017), as a strategy for promoting personal resilience (and healthier psychological functioning) in nursing students. As a result, nursing students may be better prepared to navigate challenges and adversities associated with the academic and clinical settings, which has been an expressed need in nursing education (He et al., 2018; Reeve et al., 2013; Stephens, 2013).

Furthermore, identifying the point at which certain knowledge and skills, such as those attained through resilience training, decline is important as it helps determine the appropriate time to re-administer training. Indeed, evidence from one study suggests that, following an intervention designed to promote resilience, nursing students' resilience increased in the short-term, but levels declined over time (Stephens, 2012). Interestingly, our findings suggest that, following an increase in resilience post intervention, there was no evidence of decline during the study period. This is supported by the fact that, among the subset of nursing students who completed all phases of the study ($n = 21$), mean scores on the measure of resilience were approximately the same at 1- and 3-month post-ORR training (following an increase between baseline and 1-month post-ORR training). Though

this is an encouraging finding for the stability of enhanced personal resilience, it is plausible that continuous exposure to study components may have prevented a decline in the short-term. It is also possible that the study was not long enough to witness the point of decline. This warrants further investigation.

Results further suggest the ORR did not significantly improve positive coping strategies, nor did it significantly reduce the severity of anxiety- and depression-related symptoms. This is inconsistent with previous findings that suggest resilience training in nurses may decrease psychological impairment (Magtibay et al., 2017; Mealer et al., 2014). However, scores on the measures of positive coping, anxiety, and depression shifted in the expected direction following utilization of this educational tool. On the one hand, the ORR may have been ineffective in reducing the severity of anxiety- and depression- related symptoms because participants were already exhibiting mild levels of these negative affective states. On the other hand, it is also possible that the ORR was ineffective as it is an educational intervention, rather than therapeutic (Mealer et al., 2014).

While our study has its strengths (including being one of very few to investigate the efficacy of resilience training strategies in nursing students), findings must be interpreted in light of several methodological limitations. Attrition is a common problem among longitudinal study designs, including those with nursing students (Watson, 1998). While steps were taken to reduce attrition and encourage participation (e.g., via email reminders), there were challenges with the retention of study participants. It is therefore conceivable that this introduces bias into our results as participants who responded to the follow-up assessments may differ from those who did not with respect to resilience, coping, and anxiety and depression. Incentivizing participants to complete their follow-up surveys may have improved post-ORR data. Another limitation relates to the measure used to capture resilience. Although it is understood that a higher score on the RSA is indicative of greater resilience, this instrument does not have clear cut-off points that would aid in interpretation of the score. Furthermore, it is possible that we failed to observe meaningful changes in coping, anxiety, and depression as we only assessed these factors at baseline and three-months post-ORR training, but not shortly after the intervention (i.e., one-month post-ORR training). It is therefore unknown whether the ORR had a "positive" influence on these factors in the short-term. Finally, the current study drew upon Canadian nursing students and, therefore, it is unclear whether an online educational tool, such as the ORR, is also applicable for nursing students in other jurisdictions with different student demographics and degree requirements.

All things considered, we offer the following recommendations for future research and practice. First, nursing educators should consider incorporating resilience training into the nursing curriculum. In this case, a brief self-paced educational tool, such as the ORR, may promote resilience and help nursing students manage challenges and adversities associated with the academic and clinical setting. However, additional research will be needed to identify the appropriate "dose" and "timing" of resilience training programs (Thomas & Asselin, 2018) to ensure nursing students maintain optimal levels of resilience. For instance, whether it should be introduced in the earlier phases of the curriculum, threaded throughout, or introduced in the final semester before graduation (to bridge transition into practice). It is important to also note that voluntary/self-guided programs, which are not required for the completion of nursing education, may result in low rates of participation. Incorporating key elements of resilience training into stand-alone courses may assist in maintaining student engagement.

Moreover, it is unclear whether this resilience training strategy extends to nursing professionals. Future research should replicate this study with nurses. It would be particularly useful to know the effectiveness of online resilience training following a nurse's exposure to traumatic work-related events. That said, continued focus on online educational tools for promoting resilience among (student) nurses is imperative, as this method of delivery increases accessibility to personnel who may experience challenges in accessing these resources (e.g., those residing and working in remote or rural communities). It is worth noting that the resilience training program implemented in this study (i.e., the ORR) is still in its infancy. Although findings suggest this educational tool may promote personal resilience, future versions of the ORR (and similar programs) may benefit from therapeutic interventions that more effectively target negative emotional well-being (Mealer et al., 2014) as well as interventions which target academic stressors. Relatedly, future studies should assess the more immediate effects of resilience training programs (e.g., one-month post intervention) on coping, anxiety, and depression, as the current study was unable to provide such insight. It is also important to acknowledge that various sociodemographic characteristics may contribute to greater life complexity (e.g., employment status, parental status, income level, etc.) and, subsequently, have an influence on personal resilience and the applicability of strategies for promoting resilience. The combined impact of academic, clinical, and life stressors on resilience should therefore be considered in future work involving nursing students. Lastly, future studies should qualitatively assess nursing students' perceptions of the resilience training program employed. In this case, qualitative data may be useful in identifying the strengths and shortcomings of the contents and structure of the training program, which would aid in future refinement.

In summary, it has been recognized that resilience training would benefit nursing students; however, there is a paucity of empirical evidence on best educational practices for promoting resilience among this population (Reyes et al., 2015; Thomas & Revell, 2016). This study presents evidence to suggest that an educational tool, such as the ORR, may be an effective strategy for promoting personal resilience among

nursing students—the benefits of which may remain relatively stable (up to at least three months). However, it remains unclear whether this strategy (and those alike) reduces psychological impairment, including symptoms of anxiety and depression. Further investigations are needed to evaluate the effectiveness of resilience training programs for nursing students, including whether the skills acquired through such programs are effective when put into practice (e.g., after entering the work environment).

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