

# Characterizing burnout and resilience among nurses: A latent profile analysis of emotional exhaustion, emotional thriving and emotional recovery

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## Abstract

**Aims:** To identify subgroups of nurses with distinct profiles of burnout (emotional exhaustion) and resilience (emotional thriving and emotional recovery) and describe nurse characteristics associated with each profile.

**Design:** Cross-sectional, correlational design.

**Methods:** Data were collected via electronic survey from 2018 to 2019. Latent profile analysis was used to identify subgroups of nurses with distinct profiles of emotional exhaustion, emotional thriving and emotional recovery, with each measured on a 0–100 scale. Bivariate statistics were used to determine profile differences in nurse sociodemographic, professional and psychological characteristics.

**Results:** Four distinct profile subgroups were identified: (1) “exhausted” (14% with very high emotional exhaustion, low emotional thriving and moderate emotional recovery), (2) “exhausted with thriving” (6% with high emotional exhaustion, moderate-high emotional thriving and low emotional recovery), (3) “exhausted with thriving and recovery” (52% with moderate-high emotional exhaustion, emotional thriving and emotional recovery), and (4) “thriving and recovery” (27% with low emotional exhaustion and very high emotional thriving and emotional recovery). Nurses in the “exhausted” and “exhausted with thriving” profiles reported greater depression and poorer work-life integration. Nurses in “exhausted” profile were more likely to work in an inpatient setting. Nurses in the “exhausted with thriving and recovery” and “thriving and recovery” profiles reported more positive emotions, more well-being behaviours, and better work-life integration, with the “thriving and recovery” subgroup having the highest levels of these characteristics, lower depression scores and greater racial minority representation.

**Conclusion:** Approaches designed to improve nurse well-being should be tailored to the nurses' profile of emotional exhaustion, thriving and recovery to maximize effectiveness.

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**Impact:** Given the growing shortage of nurses in healthcare systems, it is critical that multilevel strategies be investigated to retain nursing staff that consider the intersectionality and complexity of the different aspects of burnout and resilience experienced by the nurse.

**No Patient or Public Contribution:** The aim was to assess burnout and resilience among nurses.

#### KEYWORDS

burnout, depression, nurses, positive emotions, resilience, well-being behaviours, work-life integration

## 1 | INTRODUCTION

Nurses are at the front lines of patient care and play a large role in improving outcomes and lowering costs of care for patients with acute and chronic conditions (National Academies of Sciences, Engineering, and Medicine [NAEM], 2021). However, nurses' ability to deliver high-quality patient care is hindered by burnout (Salyers et al., 2017), characterized as unresolved and ongoing stress that lead to emotional exhaustion, depersonalization, and a diminished sense of professional efficacy (World Health Organization, 2022). Prior to the COVID-19 pandemic nearly 35% of nurses reported burnout (Dyrbye et al., 2019) with rates of nurse burnout climbing to 49% in 2022 (American Nurses Foundation [ANF], 2022). Importantly, this compromised level of well-being has critical consequences for nurses, patients and healthcare organizations.

## 2 | BACKGROUND

U.S. nurses are experiencing high rates of psychological distress (ANF, 2022; Shechter et al., 2020). In a sample of healthcare workers that included 657 nurses in New York City, over 50% reported symptoms of acute stress, 48% reported depression, and 33% reported anxiety (Shechter et al., 2020). Similarly, an American Nurses Foundation survey of 11,964 nurses, 71% reported feeling stressed and 31% reported feeling depressed (ANF, 2022). Challenging psychological symptoms such as depression share a positive relationship with burnout (Chen & Meier, 2021; Rehder et al., 2020).

Nurse burnout also has significant clinical and operational consequences for patients and healthcare organizations. For instance, increased nurse burnout is related to higher rates of patient mortality and longer lengths of stay (Schlak et al., 2021). Additionally, burnout contributes to decreased patient satisfaction (Brooks Carthon et al., 2021), medical errors (Melnyk et al., 2018), and hospital-acquired infection rates (Cimiotti et al., 2012). Healthcare worker burnout is associated with higher levels of organizational nursing turnover (Kelly et al., 2021). Hospital nursing turnover rates in 2022 across the United States are 25.9%. Replacing one hospital nurse costs \$46,100, on average, which translates to a loss greater than \$5 million per hospital in the United States (Nursing Solutions Inc., 2022).

A positively framed approach to addressing these multifaceted vulnerabilities from nurse burnout is through resilience. Resilience has been defined as "a complex and dynamic process, which when present and sustained, enables nurses to positively adapt to workplace stressors, avoid psychological harm and continue to provide safe, high-quality patient care" (Cooper et al., 2020, p. 15). Resilience is preceded by an adversity or challenge (Cooper et al., 2020; Masten, 2014), which are abundant in the nursing work environment due to long shifts, complex patients, and significant charting requirements (NAESM, 2021). Resilience is also considered to be a protective factor against burnout (Guo et al., 2018; Rushton et al., 2015).

More specifically, two of the main paths towards improved resilience (positive adaptation) are [emotional] recovery and [emotional] thriving (Szanton & Gill, 2010). Emotional recovery begins with a challenge prior to the person recovering back to their baseline functioning (Adair et al., 2020; Szanton & Gill, 2010). Emotional thriving is similarly ignited by a challenge yet the person exceeds their baseline functioning (Adair et al., 2020; Szanton & Gill, 2010). Emotions are a core aspect in this process of recovery and thriving. Researchers have found that positive emotions help those with resilience recover from negative experiences (Tugade & Fredrickson, 2004).

Not surprisingly, nurses with high levels of resilience are best equipped to problem solve when limited resources are present to address adversities or challenges (Tubbert, 2016) and are more flexible in the face of a challenge (Matheson et al., 2016). While resilience is particularly important in the midst of high levels of burnout and psychological distress, the capacity to be resilient appears to be low among nurses as a survey of 22,316 nurses found only 20% of nurses in the sample reported feeling resilient (ANF, 2021). Against the backdrop of a global health crisis, there appears to be substantial room to enhance nurse resilience.

Although nurse burnout is a significant issue that has repercussions for nurse, patient and healthcare organization outcomes, the field is lacking evidence that uncovers different patterns of burnout (emotional exhaustion) and resilience (emotional recovery and emotional thriving) among nurses. For instance, research has shown that higher levels of resilience are associated with lower levels of burnout (Guo et al., 2018). However, the relationship between burnout and resilience may be more complex than previously thought, with new evidence showing that approximately one third of physicians with the highest levels of self-reported resilience still experience

symptoms of burnout (West et al., 2020). This relationship between high resilience and burnout is unknown in nurses. Evidence is also conflicting on nurse characteristics and their relationship with burnout and resilience, including sociodemographic characteristics such as gender and professional characteristics of professional experience (Yu et al., 2019). Future interventions may be more potent as we develop a more precise understanding of the association of nurse characteristics (sociodemographic, professional and psychological) with various patterns of burnout and resilience.

### 3 | THE STUDY

#### 3.1 | Aims

The aims of this study were to identify subgroups of nurses with distinct profiles of burnout (as measured by emotional exhaustion) and resilience (as measured by emotional thriving and emotional recovery) and determine the nurse characteristics associated with the identified profiles.

#### 3.2 | Design

This cross-sectional, descriptive, correlational study was a secondary analysis of existing data from Web-based Implementation of the Science for Enhancing Resilience longitudinal study (WISER) study. Using a latent profile analysis (LPA) approach, subgroups of nurses working in an inpatient or outpatient U.S. healthcare setting were first identified using indicators of burnout (emotional exhaustion) and resilience (emotional thriving and emotional recovery). Furthermore, nurse characteristics (sociodemographic, professional, and psychological) were assessed to determine which were associated with the identified subgroups based on their burnout and resilience profiles. Methods are reported in accordance with STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist (see Supplementary File 2; von Elm et al., 2008).

#### 3.3 | Sample/participants

The sample for this analysis was comprised of nurses who: (1) completed the baseline survey, (2) did not have missing emotional thriving, emotional recovery, and/or emotional exhaustion data, (3) enrolled after 1 June 2018, the time in which the final list of data collection elements were implemented; and before 24 April 2019, when the database was downloaded; (4) self-identified as Registered Nurses, nurse managers or charge nurses, and (5) provided patient care in a U.S. inpatient or outpatient setting. Non-nurses and nurse practitioners were excluded as nurse practitioners and physician assistants were grouped in the same category during data collection making this category impossible to separate. See Supplementary Materials (Figure S1) for flow diagram of final sample (N=683).

#### 3.4 | Data collection

The data source was the WISER study, funded by the National Institute of Child Health and Human Development (NICHD; redacted), which was originally developed to assess the effects of web-based resilience tools on HCW well-being. The WISER database is comprised of data from healthcare workers aged 18 or older who were recruited using convenience sampling from a broad range of U.S. healthcare systems, hospitals and clinics. Participants were recruited through presentations, educational webinars, web links (<https://www.hsqu.dukehealth.org/>, labelled bit.ly/3WISER) and promotion of the study at scientific meetings. Data were collected electronically using Qualtrics.

#### 3.5 | Ethical considerations

This study was approved by Duke University Health System Institutional Review Board. The database used for this project was fully de-identified and archived on a secure, password protective server. Informed consent was obtained from participants prior to the commencement of the study.

#### 3.6 | Measures

Table S1 details all key study measures.

##### 3.6.1 | Demographic and professional characteristics

Nurse sociodemographic characteristics were self-identified sex (male, female), race (collapsed into white vs. non-white) and ethnicity (Hispanic or Latinx vs. Non-Hispanic or Non-Latinx). Professional characteristics were the nurse's shift length, years of overall experience, years in current position, clinical population of care (practices with adults, paediatrics, or both, not applicable [not applicable excluded from sample]), and clinical work setting (inpatient, outpatient, not applicable [not applicable excluded from sample]). Shift length was collapsed into three categories: (1) 8 h, (2) 9–10 h; (3) 12 or more hours. Professional experience, including total years of overall experience and total years in current position was collapsed into two categories: (1) 0–10 years and (2) 11 or more years.

##### 3.6.2 | Psychological characteristics

The Center for Epidemiologic Studies Depression Scale-10 item version (CESD-10) was used, which is a common measure of depression (Andresen et al., 1994). The ten items assess symptoms of depression, such as feelings of hopelessness, fear, and issues with sleep (Andresen et al., 1994). The total score ranges from 0 to 30, with higher scores

indicating greater severity of depression (Andresen et al., 1994). The CESD-10 has been tested in the healthcare worker population with Cronbach's alpha in a recent WISER study of healthcare workers having high internal consistency (Cronbach  $\alpha=0.85$ ; blinded for review).

Positive emotions were assessed using a total of ten positive emotion items from the modified Differential Emotions Scale (mDES; Fredrickson et al., 2019). The ten items were designed to capture common positive emotions including amusement, awe, gratitude, hope, inspiration, interest, joy, love, pride and serenity (Fredrickson et al., 2019). Each item was rated using a 5-point Likert scale (1=Not at all; 2=A little bit; 3=Moderately; 4=Quite a bit; 5=Extremely). The items were recoded to transition the scale from 1-5 to a 0-4, as recommended by Fredrickson et al. (2019). The mean overall score for participants were derived from the ten items, with overall scores ranging from 0 to 4 and higher score indicating greater levels of positive emotions. Cronbach's alpha coefficient in a previous study was good among a sample of University students (Cronbach's alpha=0.86; Cohn et al., 2009).

Well-being behaviours were assessed using a questionnaire developed by the WISER team by asking respondents if they engaged in any of the following activities: (1) regular exercise, (2) yoga, (3) meditation, (4) spent time with a close friend, (5) vacation, and (6) other. These options were selected from previous exploratory research conducted by the last author who identified the five behaviours as most frequently reported in open-ended responses and has been tested in the healthcare worker population. Each well-being behaviour was coded as either no (0, not selected) or yes (1, selected). A total score, ranging from 0 to 5, was derived from the summation of each well-being behaviour selected.

The Work-Life Integration (WLI) Scale (blinded for review) was used to assess eight work-life integration behaviours among healthcare workers: (1) "worked through a shift/day without any breaks," (2) "skipped a meal," (3) "ate a poorly balanced meal," (4) "changed personal/family plans because of work," (5) "had difficulty sleeping," (6) "slept less than 5 hours in a night," (7) "arrived home late from work," and (8) "felt frustrated by technology." Each item was rated using the following four-point Likert scale: 1=rarely or none of the time (less than 1 day); 2=some or a little of time (1-2 days); 3=occasionally or a moderate amount of time (3-4 days); 4=all of time (5-7 days). As recommended by (blinded for review), each item response was then reverse coded and an overall score for each participant was generated by calculating the mean score of the eight items. The overall score was then converted to a 0-100 scale (blinded for review), with higher scores indicating better work-life integration (e.g. 0=poor WLI=all of the time (5-7 days) and 100=optimal WLI=rarely or none of the time (less than 1 day). Cronbach's alpha coefficient for healthcare workers in a previous study was good (Cronbach's alpha=0.81; blinded for review).

### 3.6.3 | Latent profile analysis indicators

The WISER database included 13 items to assess burnout and resilience (see Table S2). Five items were designed to evaluate the

emotional exhaustion component of burnout (Q1-Q5). The remaining eight items assessed two aspects of resilience, with four items evaluating emotional thriving (Q6-Q9) and four items examining emotional recovery (Q10-Q13). Each item was rated using a 5-point Likert scale (1=Disagree Strongly; 2=Disagree Slightly; 3=Neutral; 4=Agree Slightly; 5=Agree Strongly). An overall score for each participant was generated from the respective mean score of the specified scale items (Q1-Q5 for emotional exhaustion; Q6-Q9 for emotional thriving; Q10-Q13 for emotional recovery). The overall scores were then converted to a 0-100 scale, with higher scores indicating a greater level of each construct (blinded for review). The missing rate for items at the item level was low (<0.7%). When an item was missing, the median item score for the sample was imputed.

Emotional exhaustion, defined as "wearing out, loss of energy, depletion, debilitation, and fatigue" (Leiter & Maslach, 2016), and represents a key aspect of burnout. Emotional exhaustion was measured using a 5-item derivative from the 9-item Emotional Exhaustion subscale of the Maslach Burnout Inventory scale (Maslach & Jackson, 1981), which has been used extensively in healthcare, and has excellent psychometric reliability (Cronbach's alpha=0.93; blinded for review).

Emotional thriving was measured with four items from the emotional thriving subscale developed by the WISER investigators. Emotional thriving, indicative of "level of flourishing," and emotional recovery, defined as the ability to bounce back from difficulties represent two aspects of resilience (blinded for review).

### 3.6.4 | Factor structure for emotional exhaustion, emotional thriving, and emotional recovery

The WISER study team conducted psychometric testing of the two resilience scales. Their unpublished confirmatory factor analysis (CFA) findings indicated a two-factor structure, representing separate factors for emotional thriving and emotional recovery. The resulting 4-item scale for each construct had good internal consistency (emotional thriving: Cronbach  $\alpha=0.84$ ; emotional recovery: Cronbach  $\alpha=0.78$ ) among healthcare workers (blinded for review). These results supported that emotional thriving and emotional recovery are two distinct resilience constructs.

We conducted a CFA on the analysis sample ( $N=683$ ) of nurses to confirm that 13 items comprising the scales designed by the WISER study to measure emotional exhaustion, emotional thriving and emotional recovery yielded a three-factor orthogonal solution for the nurses in our sample. A three-factor solution was determined, with covariance structure results indicating a good fit of the model. The online Supplementary Materials (see Table S3) presents the three factors and their corresponding item factor loadings. Factor 1 was comprised of five items assessing emotional exhaustion. Factor 2 included four items measuring emotional thriving, while Factor 3 was composed of four items addressing emotional recovery. The Goodness-of-Fit index was 0.95 (possible range 0-1);

Adjusted Goodness-of-fit index was 0.93 (possible range 0–1); Root Mean Square Error of Approximation was 0.06 (possible range 0–1); and the Comparative Fit Index was 0.96 (possible range 0–1). Cronbach's alpha was good among the nurses in our sample (Cronbach  $\alpha$ : emotional exhaustion=0.85, emotional thriving=0.80, emotional recovery=0.83).

### 3.7 | Data analysis

Nondirectional statistical tests were performed using SAS 9.4 for all analyses, except for Mplus statistical software version 7.4 (Muthén & Muthén, 1998–2015) was used for the LPA. The level of significance was set at 0.05 per statistical test. Effect sizes and their 95% confidence intervals addressed clinical significance. Analyses were not adjusted for multiple outcomes or tests for this initial study.

The overall scores for each of the three scales (emotional exhaustion, emotional thriving and emotional recovery) were used in the analysis. This LPA method was used to classify nurses into subgroups based on their profiles of emotional exhaustion, emotional thriving, and emotional recovery. The best fitting model and number of profiles was determined by considering the following statistical fit indices: Akaike information criterion (AIC), Bayesian information criteria (BIC), parametric bootstrapped likelihood ratio test (BLRT), and Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR). The best fitting model included consideration of the lowest AIC and BIC (Spurk et al., 2020). Additionally, the optimal solution contained a BLRT and VLMR with a statistically significant  $p$ -value ( $p < 0.05$ ) immediately followed by the subgroup with one additional profile and a non-statistically significant  $p$ -value ( $p > 0.05$ ; Spurk et al., 2020). Entropy reflects class separation and ranges from 0–1 with 1 representing groups that are perfectly distinct and separate from other groups (Tein et al., 2013). Entropy is best for describing class separation of the model chosen rather than for selecting the best model (e.g. class enumeration; Curran & Bauer, 2021). Optimal entropy values are  $\geq 0.80$  (Muthén, 2017) and entropy values above 0.70 were considered adequate in a previous LPA study on burnout (Leiter & Maslach, 2016). Each subgroup of nurses with a distinct profile of burnout and resilience was referred to as a "profile."

One-way analysis of variance (ANOVA) methods using a General Linear Model (due to expected unequal sample sizes per LPA profile) was conducted to test for LPA profile differences in overall scores for emotional exhaustion, emotional thriving, and emotional recovery. A posteriori pairwise contrast was performed using least squares  $t$ -tests when there is a significant overall profile effect to further determine which profile differed from one another on these three measures. Eta-squared ( $\eta^2$ ) values and their 95% CIs were used to estimate effects size.

We used chi-square/Fisher's exact tests to determine LPA profile differences in sociodemographic and professional characteristics. Cramer's  $V$  values were used to estimate effect sizes. A one-way ANOVA using a GLM approach was performed to test for profile differences in psychological characteristics. Eta-squared values

and their 95% CIs were used to estimate effects size. A posteriori pairwise contrasts were conducted using chi-square tests for categorical characteristics and least square means  $t$ -tests for scalar characteristics.

#### 3.7.1 | Statistical power

As a general rule, a sample size of 300 (Sinha et al., 2021) to 500 (Spurk et al., 2020) is recommended for LPA methods. Our sample of 683 nurses, thus, was sufficiently large to identify latent profiles of nurses. Furthermore, the sample also provided at least 80% power for the chi-square and one-way ANOVAs to test for profile differences in nurse characteristics, assuming (1) two-tailed tests with significance set at 0.05 per test; (2) small effects sizes (e.g., eta-squared of 0.01, Cramer's  $V$  of 0.06; Cohen, 1988).

## 4 | RESULTS/FINDINGS

### 4.1 | Sample characteristics

Table 1 details the descriptive statistics for the sample characteristics and latent profile measures for the 683 nurses. The nurses were primarily female (95%), white (91%), non-Hispanic/non-Latinx (96%) and worked 12h or more shifts (55%). Nurses were generally more experienced with 33% having 21 or more years of service followed by 28% with 11–20 years. Nurses had 1–4 years in their current position (39%), worked with an adult clinical population (49%) and worked in the inpatient setting (74%). The mean summary score for well-being behaviours was 1.8 (range: 0–5), 9.5 for CESD-10 depression (range: 0–26), and 1.9 for positive emotions (range: 0–4), and 57.4 for work-life integration (range 0–100).

### 4.2 | LPA: Identified profiles

The LPA was conducted to identify the best possible number of profiles. Three LPA indicators were included in the models: (1) emotional exhaustion, (2) emotional thriving, and (3) emotional recovery. Fit statistics used to determine the optimal number of profiles are summarized in Table 2. We assessed four different profile options starting with a two-profile solution following an iterative process that advanced to a five-profile solution. The four-profile solution was best as evidenced by a statistically significant VLMR  $p$ -value ( $p = 0.0188$ ) with the following five-profile solution yielding a non-statistically significant VLMR  $p$ -value ( $p = 0.1525$ ). Entropy was highest in the three and four-profile models (Entropy=0.742 and 0.738 respectively). Although the entropy of 0.738 for the best fitting model is slightly below the often recommended cutoff of 0.80 (Muthén, 2017; Spurk et al., 2020), the value indicates adequate separation between the profiles. Thus, the optimal model was the four-profile solution.

TABLE 1 Sample characteristics (N=683).

Characteristics	Statistics
Self-reported gender	
Female	646 (94.9%)
Male	35 (5.1%)
Race	
White	615 (90.6%)
Black or African American	22 (3.2%)
Other minorities	42 (6.2%)
Ethnicity	
Hispanic or Latinx	28 (4.1%)
Non-Hispanic or Non-Latinx	650 (95.9%)
Shift length	
8h	178 (26.7%)
9–10h	122 (18.3%)
12 or more hours	367 (55%)
Total years of experience (year)	
<1	13 (1.9%)
1–4	97 (14.3%)
5–10	155 (22.9%)
11–20	188 (27.7%)
21+	225 (33.2%)
Years in current position (year)	
<1	94 (13.8%)
1–4	269 (39.4%)
5–10	153 (22.4%)
11–20	112 (16.4%)
21+	54 (7.9%)
Clinical population	
Practices with adults	337 (49.3%)
Practices with paediatrics	243 (35.6%)
Practices with both	103 (15.1%)
Clinical setting	
Inpatient	506 (74.1%)
Outpatient	177 (25.9%)
CESD-10 Depression Score	9.5 ± 5.4
Positive emotions score	1.9 ± 0.8
Well-being behaviours score	1.8 ± 1.1
Work-life integration score	57.4 ± 21
Latent profile indicators	
Burnout: Emotional exhaustion score (Q1–Q5)	56.2 ± 26.4
Resilience: Emotional thriving score (Q6–Q9)	67.5 ± 21.9
Resilience: Emotional recovery score (Q10–Q13)	67.2 ± 21.3

Note: N = Available Data; n of N (%) reported for categorical measures. Mean ± Standard Deviation reported for continuous scores. Race: Other Minorities = Asian, Native Hawaiian or Pacific Islander, American Indian or Alaska Native.

### 4.3 | Description of latent profiles

The four profiles of nurses represent four distinct subgroups (see Figure 1a). Table 3 presents the descriptive statistics for each latent profile. The four profiles were labelled to capture the essence of the three indicators (e.g., emotional exhaustion, emotional thriving, and emotional recovery) based on their respective levels. The mean overall score for each indicator had a possible range of 0 to 100, with higher scores indicating higher level of the indicator. For each indicator, the following descriptors were used to classify the mean overall scores: very low (0–20), low (21–30), low-moderate (31–40), moderate (41–60), moderate-high (61–70), high (71–79), and very high (80–100).

The first profile (“exhausted,” N=96, 14.1%) included those with very high emotional exhaustion, low emotional thriving, and moderate emotional recovery. The second profile (“exhausted with thriving,” N=43, 6.3%), was the smallest subgroup and represented nurses with high emotional exhaustion, moderate-high emotional thriving and low emotional recovery. The third profile (“exhausted with thriving and recovery,” N=358, 52.4%) was the largest subgroup and included nurses with moderate-high levels of emotional exhaustion, emotional thriving and emotional recovery. The fourth profile (“thriving and recovery,” N=186, 27.2%) represented nurses with low emotional exhaustion, very high emotional thriving and very high emotional recovery. Table 3 provides descriptive statistics for emotional exhaustion, emotional thriving, and emotional recovery within each profile.

ANOVA results demonstrated statistically significant profile differences in the mean overall scores for each LPA indicator (all profile effects:  $p < 0.0001$ , Table 3). Eta-squared ( $\eta^2$ ) for each ANOVA model indicated large effects (all profile effects:  $\eta^2 > 0.14$ , range of 0.46 to 0.70). Emotional exhaustion was statistically significantly higher in the “exhausted” profile, followed by “exhausted with thriving,” “exhausted with thriving and recovery” and “thriving and recovery” (all contrasts,  $p \leq 0.05$ ). Emotional thriving was significantly highest in the “thriving and recovery” profile, followed by the “exhausted with thriving and recovery” and “exhausted with thriving” profiles, and “exhausted” (all contrasts,  $p \leq 0.05$ , except both “exhausted with thriving and recovery” and “exhausted with thriving” profiles had moderate-high levels of thriving and did not statistically differ from each other). Emotional recovery was also significantly higher in the “thriving and recovery” profile, followed by the “exhausted with thriving and recovery,” “exhausted” and “exhausted with thriving” profile (all contrasts,  $p \leq 0.05$ ).

### 4.4 | LPA profile differences in nurse characteristics

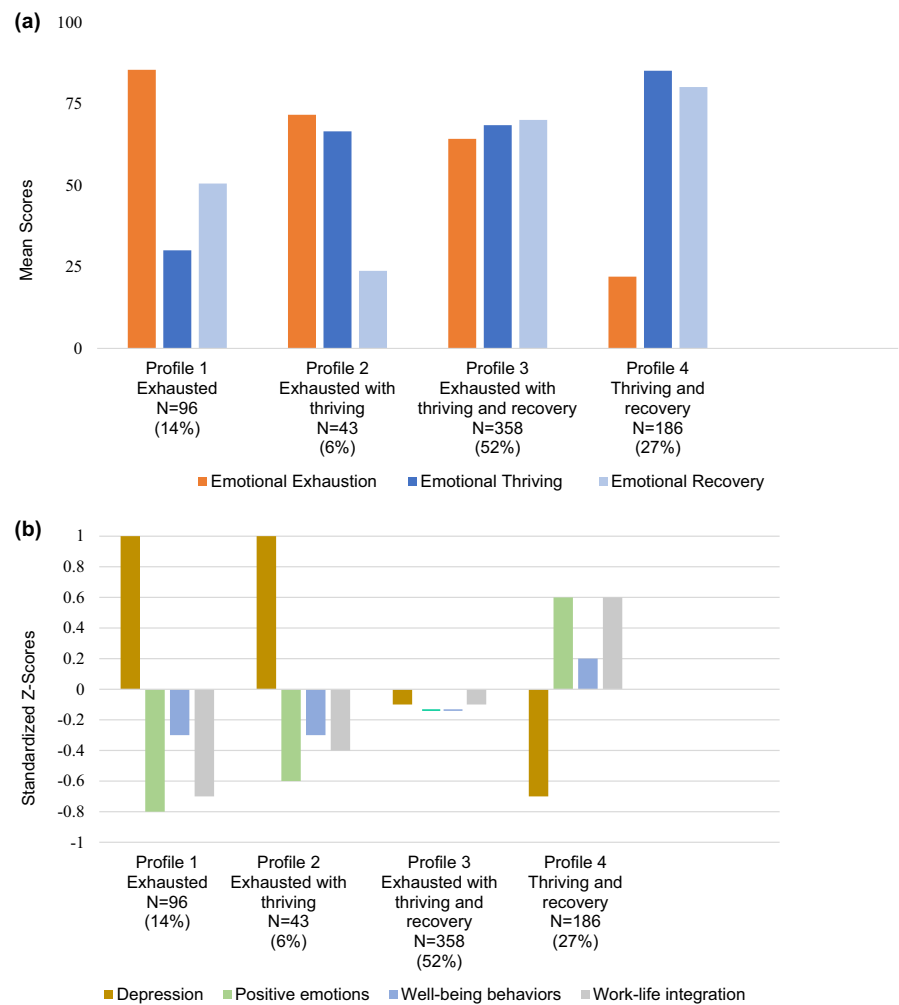
Figure 1b and Table 4 presents the profile differences in nurse characteristics (see also Figure S2). The latent profile was associated with race ( $p = 0.0467$ , Cramer's  $V = 0.11$ , small effect) and clinical

TABLE 2 Latent profile analysis (LPA): model fit information for the number of specified latent profile.

Profiles	Number of parameters	Log-likelihood	AIC	BIC	ssBIC	Entropy	VLMR	BLRT	Size of smallest profile, n (%)
2	10	-9180.690	18,381.381	18,426.646	18,394.894	0.636	$p=0.1173$	$p=0.0000$	340 (49.8%)
3	14	-9105.415	18,238.829	18,302.200	18,257.748	0.742	$p=0.0000$	$p=0.0000$	103 (15.1%)
4	18	-9086.735	18,209.470	18,290.947	18,233.794	0.738	$p=0.0188$	$p=0.0000$	43 (6.3%)
5	22	-9072.357	18,188.715	18,288.298	18,218.445	0.678	$p=0.1525$	$p=0.0000$	48 (7.0%)

Abbreviation: AIC, Akaike information criteria; BIC, Bayesian information criteria; BLRT, parametric bootstrapped likelihood ratio test; ssBIC, sample size adjusted Bayesian information criteria; VLMR, Vuong-Lo-Mendell-Rubin likelihood ratio test.

FIGURE 1 (a) Emotional exhaustion, emotional thriving and emotional recovery for the four latent profiles. (b) Characterization of the latent profiles: psychological measures.



setting ( $p=0.0501$ , Cramer's  $V=0.11$ , small effect). Specifically, a posteriori contrasts to test for profile differences in race indicated that the "thriving and recovery" profile relative to the "exhausted with thriving" profile had a significantly higher percent of racial minorities groups (14.1% vs. 2.4%, Fisher's exact,  $p=0.0345$ ), while the other profiles did not differ from one another. Furthermore, the "exhausted" profile (83.3%) had a significantly higher percent of nurse working in an inpatient clinical setting compared to "exhausted with thriving" (65.1%,  $\chi^2=5.69$ ,  $df=1$ ,  $p=0.0171$ ) and "exhausted with thriving and recovery" (71.5%,  $\chi^2=5.50$ ,  $df=1$ ,  $p=0.0190$ ).

Latent profile was associated with psychological characteristics, namely depression, positive emotions, well-being behaviours and work-life integration (all  $p<0.0001$ , Table 3). The  $\eta^2$  for each model indicated large effects for each characteristic ( $\eta^2>0.14$ , range of 0.18 to 0.34), with the exception that a small effect was observed for the well-being behaviours ( $\eta^2=0.03$ ). Higher mean depression scores were observed in "exhausted" profile and "exhausted with thriving" profiles, followed by the "exhausted with thriving and recovery" and "thriving and recovery" (all contrasts,  $p\leq 0.05$ , except "exhausted" and "exhausted with thriving" profiles did not differ). The mean positive emotions, well-being behaviours, and work-life

TABLE 3 Latent profile analysis indicators.

Indicator	Profile 1 Exhausted	Profile 2 Exhausted with thriving	Profile 3 Exhausted with thriving and recovery	Profile 4 Thriving and recovery	
	N = 96 (14%)	N = 43 (6%)	N = 358 (52%)	N = 186 (27%)	
Emotional Exhaustion	Very high	High	Moderate-high	Low	
Emotional Thriving	Low	Moderate-high	Moderate-high	Very high	
Emotional Recovery	Moderate	Low	Moderate-high	Very high	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Emotional exhaustion	85.5 ± 12.9	71.7 ± 17.3	64.3 ± 15.1	22.0 ± 13.1	
Emotional thriving	30.1 ± 13.8	66.6 ± 12.6	68.5 ± 14.8	85.2 ± 12.9	
Emotional recovery	50.6 ± 19.6	23.8 ± 10.6	70.1 ± 14.8	80.2 ± 16.3	
	$F_{(df1, df2)}$	p-value	$\eta^2$	$\eta^2$ 95% CI	A posteriori pairwise contrasts
Emotional exhaustion	534.56 <sub>(3, 679)</sub>	<0.0001	0.70	0.67, 0.73	p1 > p2 > p3 > p4
Emotional thriving	328.50 <sub>(3, 679)</sub>	<0.0001	0.59	0.55, 0.63	p4 > (p3 = p2) > p1
Emotional recovery	190.58 <sub>(3, 679)</sub>	<0.0001	0.46	0.40, 0.50	p4 > p3 > p1 > p2

Note: M = mean; SD = standard deviation.  $\eta^2$  = eta-squared effect size; cutoff for  $\eta^2$  effect sizes: 0.01 = small, 0.06 = medium, and 0.14 = large effects, CI = confidence interval. F-value for one-way ANOVAs using General Linear Models; Pairwise contrasts: p1, p2, p3, p4 indicate profile number.

integration scores were all significantly higher in the “thriving and recovery” profile, followed by the “exhausted with thriving and recovery” (all  $p < 0.05$ ) and both profiles significantly differed from “exhausted with thriving” and “exhausted” (all  $p < 0.05$ ). However, the latter two profiles did not differ from one another on the latter characteristics.

## 5 | DISCUSSION

The purpose of this study was to move beyond current dominant thinking of burnout and resilience as being opposite experiences of well-being. We identified four distinct subgroups of nurses based on their levels of burnout (emotional exhaustion) and resilience (emotional thriving and emotional recovery) that included: “exhausted,” “exhausted with thriving,” “exhausted with thriving and recovery” and “thriving and recovery.” Importantly, our study also identified unique features of nurses associated with each profile.

The “exhausted” profile and “thriving and recovery” profile reflected inverse scores between burnout (emotional exhaustion) and resilience (emotional thriving and emotional recovery) with higher burnout/lower resilience and higher resilience/lower burnout respectively. Consistent with the burnout and resilience literature (Adair et al., 2020; Antonsdottir et al., 2022; Guo et al., 2018), findings from the present study demonstrate the intuitive co-occurrence of burnout and resilience. Our findings showed the “exhausted” profile is representative of nurses with more severe burnout who might not have the resources to thrive and are only moderately able to recover from challenges. Nurses with high burnout and low resilience might benefit from bite-sized well-being interventions designed to be simple, easy to do and accessible (Adair et al., 2020). Alternatively,

nurses who have higher resilience and lower burnout could serve as well-being ambassadors, offering social, emotional and logistical support around well-being interventions for their fellow nurses who are struggling with burnout. Although the “exhausted” and “thriving and recovery” profiles represent predominant thinking around the inverse relationship between burnout and resilience, these profiles collectively only represented 41% of the sample.

Our findings demonstrated that emotional exhaustion can co-occur with other aspects of resilience. For instance, 52% of our sample resided in the “exhausted with thriving and recovery” profile, where nurses had moderate-high levels of emotional exhaustion, emotional thriving and emotional recovery. These findings, though less common in the nursing literature, were similar to findings from recent study where 29% of the physicians who had top resilience scores also had burnout (West et al., 2020). At this stage in the research, there is much that we do not know about the overlap between burnout and resilience across healthcare workers. Additional research is needed to determine the degree to which resilience is protective against burnout and if so, inform development and testing of interventions designed to increase resilience rather than solely decrease burnout. Moreover, interventions should simultaneously target the reduction of burnout and the improvement of resilience—in other words, improve well-being overall.

While mean emotional thriving and emotional recovery scores tended to track closely with one another in most profiles, there is a notable difference between emotional thriving and emotional recovery scores in the “exhausted with thriving” profile. This small subgroup of nurses ( $N = 43$ , 6%) had both high levels of emotional exhaustion coupled with moderate-high levels of emotional thriving and low emotional recovery. These findings emphasize the unique features of emotional thriving and emotional recovery (i.e.,



TABLE 4 Latent profile differences in nurse characteristics: bivariate relationships (N = 683).

Characteristics	Exhausted	Exhausted with thriving	Exhausted with thriving and recovery	Thriving and recovery	p-value	Cramer's V	A posteriori Pairwise contrasts
<b>Sociodemographic and professional characteristics</b>	<b>Profile 1 N = 96 (14%) n (%)</b>	<b>Profile 2 N = 43 (6%) n (%)</b>	<b>Profile 3 N = 358 (52%) n (%)</b>	<b>Profile 4 N = 186 (27%) n (%)</b>			
Male gender	4 (4.2%)	2 (4.7%)	17 (4.8%)	12 (6.5%)	0.8187*	0.04	
Minority race	6 (6.3%)	1 (2.4%)	31 (8.7%)	26 (14.1%)	<b>0.0467*</b>	0.11	p4 > p2
Hispanic/Latinx	3 (3.2%)	4 (9.3%)	13 (3.7%)	8 (4.4%)	0.3332*	0.07	
Adult clinical population	46 (47.9%)	23 (53.5%)	182 (50.8%)	86 (46.2%)	0.7027	0.05	
Paediatric clinical population	35 (36.5%)	16 (37.2%)	116 (32.4%)	76 (40.9%)	0.2700	0.08	
Adult and paediatric population	15 (15.6%)	4 (9.3%)	60 (16.8%)	24 (12.9%)	0.4916*	0.06	
Inpatient clinical setting	80 (83.3%)	28 (65.1%)	256 (71.5%)	142 (76.3%)	<b>0.0501</b>	0.11	p1 > (p2 = p3)
Shift length: 12+h	54 (56.8%)	21 (51.2%)	188 (53.7%)	104 (57.5%)	0.7909	0.04	
11+ years of current experience	23 (24%)	15 (34.9%)	79 (22.1%)	49 (26.5%)	0.2539	0.08	
11+ years of professional experience	56 (59%)	26 (60.5%)	209 (58.9%)	122 (66%)	0.4324	0.06	
<b>Psychological characteristics</b>	<b>M ± SD</b>	<b>M ± SD</b>	<b>M ± SD</b>	<b>M ± SD</b>	<b>p-value</b>	<b><math>\eta^2</math> (95% CI)</b>	
CESD-10 depression score	14.9 ± 5.5	15.0 ± 5.0	9.2 ± 4.4	5.9 ± 3.5	<0.0001	0.34 (0.28, 0.39)	(p1 = p2) > p3 > p4
Positive emotion score	1.2 ± 0.6	1.4 ± 0.5	1.9 ± 0.7	2.3 ± 0.8	<0.0001	0.20 (0.15, 0.25)	p4 > p3 > (p2 = p1)
Well-being behaviours score	1.5 ± 1.2	1.4 ± 1.1	1.8 ± 1.1	2.0 ± 1.2	<0.0001	0.03 (0.01, 0.06)	p4 > p3 > (p1 = p2)
Work-life integration score	42.4 ± 20.2	48.6 ± 20.1	56.1 ± 19.7	69.5 ± 17.0	<0.0001	0.18 (0.12, 0.22)	p4 > p3 > (p2 = p1)

Note: For sociodemographic and professional characteristics, 4 × 2 chi-square tests performed, except for Fisher's Exact Test denoted by \*. For years of current and professional experience, 11+ = 11 years or greater. For psychological characteristics, a one-way ANOVA using a GLM approach was performed. Cramer's V effect sizes cutoffs for df = 3: 0.06 = small, 0.17 = medium, 0.29 = large effects.  $\eta^2$  = eta-squared effect size: 0.01 = small, 0.06 = medium, 0.14 = large effects; CI = confidence interval. A posteriori pairwise contrasts using chi-square tests for categorical measures and least squares means t-tests for continuous measures.

Bold values indicates two-tailed tests with significance set at 0.05 per test.

the presence of strong thriving does not ensure the presence of strong recovery; Adair et al., 2020). One possibility of this profile is that nurses who are passionate about their work and thus thriving, may also be drained and unable to recovery efficiently without the appropriate organizational supports in place. If this is correct, this subgroup may benefit from interventions targeting the cause of emotional exhaustion, which is often at the system-level such as high workload (NASEM, 2019). Additionally, simple brief interventions targeting well-being such as those designed to enhance gratitude and other positive emotions (Adair et al., 2020) could be prioritized to prevent nurses from diminishing further in their recovery or their thriving.

Nurses in our sample exhibited unique psychological characteristics across each profile including depression. Higher depression scores in the profiles with higher emotional exhaustion relative to emotional thriving and emotional recovery (profiles 1 and 2). These

findings are similar to other studies that have found a positive correlation between burnout and depression (Rehder et al., 2020, 2021). Positive psychology tools are a promising intervention for nurses experiencing depression. In a study of HCWs who engaged in positively reflecting forward (the looking forward tool), there were clinically important improvements in depression and emotional recovery scores observed between baseline and 1 week and at 28 days (Adair et al., 2020). Another study of healthcare workers who reflected back on three good things daily over 15 days found clinically important improvements in depression across 1, 6 and 12 months (Sexton & Adair, 2019).

We found the nurses with profiles having higher levels of both emotional thriving and emotional recovery reported significantly higher levels of positive emotions than those with lower levels of either emotional thriving and/or emotional recovery, consistent with prior research (Cohn et al., 2009). One possible mechanism

to explain how positive emotions relate to resilience is through the notion that positive emotions encourage the building of resources (Fredrickson et al., 2008; Fredrickson & Joiner, 2018; Tugade & Fredrickson, 2004). Positive emotions have been demonstrated to be an important component in facilitating cardiovascular recovery from a negative experience among resilient individuals (Tugade & Fredrickson, 2004). A recent randomized controlled trial designed to increase positive emotions using a brief intervention among healthcare workers demonstrated clinically meaningful improvements in emotional exhaustion, depression and work-life balance (Profit et al., 2021). Given the utility of positive emotions, nurses may benefit from brief interventions that have been tested among healthcare workers and designed to cultivate various positive emotions such as gratitude, compassion, hope and social connection (Profit et al., 2021; Rehder et al., 2021).

Nurses who reported more well-being behaviours were in the profiles with higher emotional thriving and emotional recovery which is consistent with recent research that found healthcare workers who engage in more well-being behaviours also have greater levels of emotional thriving and emotional recovery (Rink et al., 2022). These findings can be used to create tailored interventions that aim to boost emotional thriving and emotional recovery for nurses.

Nurses had poorer work-life integration scores in the profiles with higher levels of emotional exhaustion and better work-life integration scores in the profiles with lower emotional exhaustion. Research has identified that healthcare workers with poorer work-life balance also report burnout (Schwartz et al., 2019). More research is needed to determine the best approach to address poor work-life integration. Potential interventions must include system-level changes that address nurse patient ratios and inefficient work processes such as burdensome charting requirements. However, recent evidence shows that work culture, including the domains of commitment, belonging, safety, teamwork and work-life integration is more closely associated with burnout than electronic health record (EHR) usage, by a wide margin (McPeck-Hinz et al., 2021). To this end, interventions should also address unhealthy work cultures that perpetuate nurses providing patient care at the expense of their own well-being (e.g., skipping meals and not taking breaks). Providing excellent patient care and maintaining well-being need not be mutually exclusive.

The profile subgroups also included distinct sociodemographic of race. Despite the small effect sizes for profile differences in race, these findings are clinically important for tailoring interventions designed to focus on racial minority groups. Our finding that the “thriving and recovery” profile had a higher percentage of racial minority groups relative to the “exhausted with thriving” profile is consistent with research that observed Black/African American HCWs had significantly higher scores of emotional thriving and emotional recovery than White healthcare workers while all racial minorities groups had higher scores of emotional recovery scores compared to White healthcare workers (Rink et al., 2022) and where racial minority groups of medical students reported lower burnout compared to nonracial minority groups of students (Dyrbye et al., 2007). Notably,

however, racial minority groups of medical students who reported challenges in medical school related to their race were more likely to experience burnout than those racial minority groups of students who did not report these challenges (Dyrbye et al., 2007). Similarly, Byers et al. (2021) found that nurses with higher perceived race-related stress had lower resilience. Future study should continue assessing nurses' experience of race and race-related stress in the workplace and its relationship to burnout and resilience.

Our findings that the ‘exhausted’ profile had a higher percentage of nurses working in the inpatient setting relative to the “exhausted with thriving” and “exhausted with thriving and recovery” profiles is consistent with a recent study that found nurse attrition was more likely due to burnout if the nurses had worked in the hospital setting or other inpatient setting rather than the clinic setting (Shah et al., 2021). Future studies should target the challenging aspects of inpatient nurses' work environment given the findings of another study regarding the influence of various aspects of the hospital work environment (i.e. leadership and nurse management capability and support, staffing and resource availability, relationships with physicians and care quality) and poor patient outcomes (i.e. mortality and length of stay; Schlak et al., 2021).

## 5.1 | Limitations

This study is among the first to examine profiles of burnout and resilience among nurses using the LPA approach, which allowed us to look for meaningful patterns among nurses rather than looking at patterns across variables (Ferguson et al., 2020). Additional strengths include a large sample size, a diverse set of well-being correlates and robust set of nurse characteristics to assess relationships with identified subgroups. However, this study is not without limitations. Using convenience sampling, the WISER study has recruited a large sample of HCWs representing a wide range of healthcare positions and work settings. However, the representativeness of nurses and other HCWs in the WISER study should be further examined to ensure generalizability. Larger sample sizes could be used to assess whether similar profiles are replicated. Additionally, due to the small sample size of 43 in the second profile, years of current experience and years of professional experience were collapsed into two categories spanning less than 6 months to 21 years or more thus limiting our ability to assess experience at a more detailed level across the profiles. Finally, our study used prepandemic data; however, nurse burnout rates were at already high levels prior to the start of the Covid-19 pandemic (Dyrbye et al., 2019), and the generalizability of the related pandemic events may be limited (Munn et al., 2022).

## 6 | CONCLUSION

Burnout and resilience are not mutually exclusive characteristics as nurses in this sample had co-occurring emotional exhaustion,

emotional thriving, and emotional recovery at varying levels. Importantly, nurses with greater resilience (emotional thriving and emotional recovery), in the setting of both moderate-high and low burnout (emotional exhaustion), had favourable psychological characteristics (e.g. low depression, high positive emotions, more well-being behaviours and high work-life balance scores) suggesting that strategies to increase well-being that include thriving and recovery will play an important role in the armamentarium of nurse well-being interventions.

## AUTHOR CONTRIBUTIONS

LCR, SGS, KCA, TOO, JCH, JBS: Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; LCR, SGS, KCA, TOO, JCH, JBS: Involved in drafting the manuscript or revising it critically for important intellectual content; LCR, SGS, KCA, TOO, JCH, JBS: Gave final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; LCR, SGS, KCA, TOO, JCH, JBS: Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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## CONFLICT OF INTEREST STATEMENT

Dr. John Bryan Sexton and Dr. Kathryn Adair reported receiving honoraria for giving talks on the topic of well-being.

## ETHICS STATEMENT

This study was approved by Duke University Health System Institutional Review Board. The database used for this project was fully de-identified and archived on a secure, password protective server. Informed consent was obtained from participants prior to the commencement of the study.

## DATA AVAILABILITY STATEMENT

Data are available from corresponding author upon reasonable request.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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