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Identifying Well-Being Profiles Among University Students: A Person-Oriented Approach Using Latent Profile Analysis at Sokoine University of Agriculture

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Abstract

University students face multiple academic, social, and psychological challenges that impact their well-being. This study examined psychological well-being profiles among 322 undergraduate students at Sokoine University of Agriculture (SUA) using a person-oriented approach. Validated instruments assessed resilience (CD-RISC-10), perceived stress (PSS-10), academic self-efficacy, and social connectedness. Latent Profile Analysis (LPA) identified three distinct profiles: Flourishing (42%), Struggling but Resilient (36%), and Vulnerable (22%). Flourishing students exhibited high resilience (M = 4.3), low stress (M = 2.1), high self-efficacy (M = 4.5), and high connectedness (M = 4.2), whereas Vulnerable students showed low resilience (M = 2.8), high stress (M = 4.1), low self-efficacy (M = 2.9), and low connectedness (M = 2.6). ANOVA confirmed significant differences across profiles for all indicators (η^2 = 0.48–0.54, $p < .001$). College (χ^2 = 12.34, p = .015) and year of study (F = 6.45, p = .002) significantly predicted profile membership; Veterinary Medicine students were overrepresented in the Struggling but Resilient profile, and first-year students were disproportionately Vulnerable. Gender and age were not significant predictors. Correlational analyses within profiles showed negative associations between stress and resilience (r = -.57 to -.63, $p < .001$). Findings highlight the heterogeneity of student well-being and the need for targeted, College-specific interventions, particularly for first-year and high-stress disciplines. These results underscore the utility of LPA in identifying at-risk students and informing evidence-based counseling, peer-support, and resilience-building programs.

Keywords: person-oriented research, latent profile analysis, psychological well-being, resilience, psychological well-being, perceived stress, academic self-efficacy, social connectedness.

1. Introduction

1.1 *Background and context*

University students are at a crucial stage of psychosocial and academic development, characterized by numerous transitions that can significantly influence their overall well-being. Research has consistently demonstrated that the university environment is both a platform for personal growth and a potential source of considerable stress. Globally, between 20–30% of university students report moderate to severe psychological distress, with common concerns including stress, anxiety, and depressive symptoms (Auerbach et al., 2018; World Health Organization [WHO], 2022). These mental health challenges have been associated with reduced

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academic performance, lower retention rates, and diminished overall quality of life (Ibrahim et al., 2013; Eisenberg et al., 2021).

In Sub-Saharan Africa, empirical research on students' psychological well-being is gradually expanding, though still relatively limited. Existing studies from Kenyan and South African universities report high prevalence rates of stress and burnout, often linked to financial challenges, insufficient psychosocial support, and heavy academic workloads (Peltzer et al., 2016; Muriithi et al., 2021). However, much of this research adopts a variable-oriented approach, focusing on mean levels of stress or single mental health outcomes. Such approaches risk masking heterogeneity in the student population—overlooking subgroups who may be thriving despite challenges or those who are silently at elevated risk.

At Sokoine University of Agriculture (SUA), students are enrolled in academically demanding programs combining coursework, laboratory sessions, and field-based experiential learning. These programs require sustained cognitive, physical, and emotional effort. Preliminary observations from SUA's Dean of Students' Office reveal that a significant proportion of students seek counseling services for stress management, financial distress, and interpersonal challenges. These indicators suggest that psychological well-being is a critical, yet under-researched, determinant of academic success and retention at SUA.

Psychological well-being is a multidimensional construct, typically encompassing resilience, perceived stress, social connectedness, and self-efficacy (Ryff & Singer, 2008; Keyes, 2014). Simultaneously measuring these indicators offers a comprehensive picture of students' mental health status. Importantly, person-oriented analytical approaches such as Latent Profile Analysis (LPA) allow researchers to classify individuals into subgroups (or profiles) based on shared response patterns, rather than treating the population as homogenous (Muthén & Muthén, 2000). This approach has successfully identified profiles such as *flourishing*, *vulnerable*, and *languishing* students, which predict differences in academic engagement, health behaviors, and help-seeking patterns (Diener et al., 2018; Arslan, 2021). For instance, Renshaw and Cohen (2014) found that U.S. students classified as *flourishing* exhibited significantly lower stress and higher academic engagement than those classified as *languishing*. Similarly, Li et al. (2020) identified four distinct profiles among Chinese undergraduates, with the lowest well-being profile showing heightened risk for dropout intentions. These findings underscore the value of a person-centered approach in designing targeted interventions.

Despite a growing global evidence base, no published studies have systematically examined well-being profiles among students in Tanzanian universities, including SUA. The unique academic structure at SUA emphasizing agriculture, veterinary medicine, and natural resource sciences presents a distinctive context in which students must navigate fieldwork, seasonal academic calendars, and rural community placements. These factors may simultaneously contribute to stress and foster resilience. Furthermore, university students especially at the undergraduate level face additional challenges, including balancing research demands, financial obligations, and family responsibilities. Traditional variable-oriented methods may fail to capture the complexity of these experiences. Person-oriented research emphasizes students as functioning wholes, focusing on how patterns of multiple characteristics interact to shape outcomes (Bergman & Lundh, 2015). In this paradigm, the individual is the primary unit of analysis, and the aim is to uncover meaningful subgroups based on shared configurations of variables.

Against this backdrop, the present study applied a person-oriented approach to identify profiles of psychological well-being among SUA undergraduate students. Specifically, Latent Profile Analysis (LPA) was employed to explore patterns of resilience, perceived stress, academic self-efficacy, and social connectedness. Understanding these profiles will help inform targeted support programs, enhance mental health promotion, and improve both academic and psychological outcomes for SUA students.

1.2 *Problem statement*

University students face multiple academic, social, and psychological challenges that can negatively impact their overall well-being. At Sokoine University of Agriculture (SUA), students are enrolled in demanding programs that combine rigorous coursework, laboratory experiments, and field-based experiential learning. While these programs provide opportunities for intellectual growth, they also introduce stressors such as heavy workload, financial constraints, social adjustment difficulties, and the demands of balancing research with personal responsibilities. Preliminary observations from SUA's Dean of Students' Office indicate that many students seek counseling for stress management, financial issues, and interpersonal conflicts, highlighting the critical role of psychological well-being in academic success.

Despite the significance of student well-being, research in Tanzanian higher education has predominantly relied on variable-oriented approaches that examine relationships between isolated constructs (e.g., stress, resilience, or self-efficacy) using group averages. This approach overlooks the heterogeneity among students and masks individual differences in how psychological resources interact to influence well-being. Globally, person-oriented approaches such as Latent Profile Analysis (LPA) have been used to identify distinct well-being profiles, revealing subgroups of students who are flourishing, vulnerable, or languishing (Renshaw & Cohen, 2014; Li et al., 2020). However, no systematic studies have applied such methods to examine well-being profiles among students in Tanzanian universities, including SUA.

The lack of evidence on heterogeneous well-being profiles among SUA students limits the university's ability to develop targeted interventions, design effective support programs, and allocate counseling and academic resources efficiently. Without a nuanced understanding of how resilience, perceived stress, social connectedness, and academic self-efficacy combine within individual students, efforts to promote student mental health risk being generalized and less effective. Therefore, there is a pressing need to apply a person-oriented approach to identify distinct well-being profiles among SUA students. This approach will provide a more holistic understanding of students' psychological functioning, inform targeted support services, and contribute to evidence-based strategies for improving academic outcomes and overall quality of student life.

1.3 *Research objectives*

1.3.1 *General objective*

To identify and describe distinct psychological well-being profiles among Sokoine University of Agriculture (SUA) students using a person-oriented approach.

1.3.2 *Specific objectives*

1. To assess the levels of resilience, perceived stress, academic self-efficacy, and social connectedness among SUA students.

2. To identify distinct well-being profiles based on patterns of resilience, perceived stress, academic self-efficacy, and social connectedness using Latent Profile Analysis (LPA).

3. To examine the demographic and academic characteristics associated with each well-being profile.

1.4 *Theoretical framework*

The theoretical foundation for this study is rooted in the Person-Oriented Approach to psychological research, which emphasizes understanding individuals as integrated wholes rather than as isolated variables (Bergman & Lundh, 2015). Unlike variable-centered approaches, which focus on relationships between variables across a population, person-oriented approaches explore patterns of characteristics within individuals, allowing researchers to identify meaningful subgroups (profiles) based on shared configurations of psychological traits. This perspective aligns closely with the goals of the current study, which seeks to uncover distinct well-being profiles among students at Sokoine University of Agriculture (SUA). In addition, the study draws on Ryff's (1989) model of Psychological Well-Being and the Conservation of Resources (COR) theory (Hobfoll, 1989). Ryff's model posits that well-being is multidimensional, comprising autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. These dimensions provide a framework for understanding how resilience, self-efficacy, and social connectedness contribute to overall well-being. Similarly, the COR theory suggests that individuals strive to obtain, retain, and protect personal resources—such as social support, coping skills, and self-efficacy—and that resource loss leads to stress, while resource gain promotes adaptation and flourishing. This perspective supports the inclusion of perceived stress, resilience, and academic self-efficacy as key indicators of well-being in the study.

Through integrating these theoretical perspectives, the study conceptualizes psychological well-being as a multidimensional construct that can manifest in distinct profiles. The person-oriented lens, supported by LPA, allows for the identification of subgroups of students who are flourishing, vulnerable, or at risk, providing an understanding of well-being in the context of Tanzanian higher education. This theoretical framework underpins the research design, guiding the selection of measures and the interpretation of well-being profiles.

2.

2.1 *Research design*

This study adopted a quantitative, cross-sectional, person-oriented research design. The design was selected to identify distinct psychological well-being profiles among students at Sokoine University of Agriculture (SUA) at a single point in time. Unlike traditional variable-oriented designs that examine relationships between isolated variables across a population, the person-oriented approach focuses on patterns of characteristics within individuals, allowing for the identification of subgroups based on shared psychological profiles (Bergman & Lundh, 2015). Latent Profile Analysis (LPA) is a model-based clustering technique. It was used to classify students into well-being profiles based on their responses to measures of resilience, perceived stress, academic self-efficacy, and social connectedness. This approach enables the study to capture heterogeneity in student experiences, providing actionable insights for targeted interventions and support programs.

2.2 *Study population*

The study population consisted of undergraduate students enrolled at SUA in the 2024/25 academic year across three colleges, the College of Agriculture, Veterinary Medicine and Biomedical Sciences, and Forestry, Wildlife and Tourism. Undergraduate students were selected

because they face unique academic, social, and psychological challenges, such as managing research demands, balancing family responsibilities, and coping with fieldwork and rural placements.

2.3 *Sample size and sampling technique*

A stratified random sampling technique was employed to ensure adequate representation across faculties, programs, and gender. Stratification was critical for capturing potential subgroup differences in psychological well-being indicators and profiles. The final sample size was 322 undergraduate students, which falls within the recommended range of 300–350 participants for Latent Profile Analysis (LPA) to yield stable and generalizable profiles (Tein et al., 2013; Nylund-Gibson & Choi, 2018). This sampling approach enhanced both the statistical power of the study and the validity of comparisons across demographic and academic variables.

Table 1. Demographic and Academic Characteristics of the Sample (N = 322)

Variable	**Category**	**n**	**%**
Gender	Male	168	52.2
	Female	154	47.8
Age (Years)	18–20	72	22.4
	21–23	154	47.8
	24–26	68	21.1
	≥ 27	28	8.7
Year of Study	Year 1	118	36.6
	Year 2	108	33.5
	Year 3	96	29.8
College	Agriculture	144	44.7
	Veterinary Medicine & Biomedical Sciences	102	31.7
	Forestry, Wildlife & Tourism	76	23.6

2.4 *Measures*

Data for this study were collected using validated self-report instruments administered across all three colleges at Sokoine University of Agriculture (SUA). These instruments captured four core dimensions of psychological well-being resilience, perceived stress, academic self-efficacy, and social connectedness.

1. **Resilience**: Resilience was measured using the 10-item Connor-Davidson Resilience Scale (CD-RISC-10; Connor & Davidson, 2003), a widely recognized tool for assessing psychological resilience. This scale evaluates an individual's capacity to adapt successfully to adversity, trauma, and significant stressors. It includes items such as "I am able to adapt to change" and "I tend to bounce back after illness or hardship," which capture both cognitive and emotional components of resilience. Participants rated each item on a 5-point Likert scale ranging from 0 (*not true at all*) to 4 (*true nearly all the time*), yielding total scores from 0 to 40. Higher scores reflect greater resilience, indicating better coping capacity and psychological hardiness. The CD-RISC-10 has been validated across diverse populations and has consistently demonstrated good reliability (Cronbach's α typically ≥ .85). In this study, it was particularly relevant because SUA students are often exposed to unique stressors such as fieldwork, rural placements, and demanding academic schedules that require adaptive coping skills.

2. **Perceived Stress:** Perceived Stress was assessed using the 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983), one of the most widely used psychological instruments for measuring perceived stress globally. The PSS-10 captures the degree to which individuals view their lives as unpredictable, uncontrollable, and overloaded—key dimensions of stress appraisal. Sample items include "In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?" Responses were recorded on a 5-point Likert scale ranging from 0 (*never*) to 4 (*very often*), producing a total score between 0 and 40, with higher scores indicating greater perceived stress. The scale has been extensively validated, with internal consistency reliability typically exceeding $\alpha = .80$. Within the SUA context, measuring perceived stress was crucial for understanding the psychological burden students face in balancing coursework, research projects, and personal responsibilities, which can directly impact their mental health and academic performance.

3. **Self-efficacy:** Academic Self-Efficacy was measured using the Academic Self-Efficacy Scale (Schunk, 1991), which evaluates students' confidence in their ability to plan, execute, and complete academic tasks effectively. Self-efficacy is a central construct in Bandura's Social Cognitive Theory and is strongly associated with motivation, persistence, and achievement. The scale includes items that ask students to rate their belief in successfully completing assignments, understanding course material, and performing well in examinations. Responses are provided on a 5-point Likert scale, with higher scores representing stronger academic self-efficacy. This measure is particularly significant for the SUA population, where students must manage not only theoretical coursework but also practical field assignments and research projects. Higher academic self-efficacy is associated with better coping strategies, lower dropout rates, and greater resilience under stress making it a critical variable in the person-oriented analysis.

4. **Social Connectedness:** Social Connectedness was assessed using the 20-item Social Connectedness Scale–Revised (SCS-R; Lee et al., 2001). This scale measures the extent to which students feel emotionally connected to others, experience a sense of belonging, and perceive themselves as integrated into their social networks. Example items include "I feel close to people" and "I feel disconnected from the world around me" (reverse-coded). Responses are recorded on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*), with higher scores reflecting greater connectedness and lower feelings of isolation. Social connectedness is a crucial protective factor for student well-being, as it fosters peer support, collaborative learning, and shared problem-solving. Within SUA's context, where students are often required to work in groups during fieldwork and laboratory sessions, a strong sense of connectedness can buffer stress and enhance overall academic engagement.

All four scales demonstrated good psychometric properties in this study, with Cronbach's α values $\geq .80$, confirming internal consistency reliability.

2.5 *Data collection procedure*

Data were collected using a combination of online and in-person surveys to maximize student participation and ensure broad coverage across the three faculties at Sokoine University of Agriculture (SUA). The majority of responses were collected online, with in-person surveys conducted during scheduled lectures or departmental meetings to reach students with limited internet access. This mixed-mode approach minimized sampling bias and enhanced response rates. For the online component, data were collected using SurveyMonkey, a secure web-based survey platform. SurveyMonkey allows researchers to design user-friendly questionnaires, distribute them via email or shareable links, and collect responses in real time.

2.6 *Data collection procedure*

Ethical approval for the study was obtained from the SUA Institutional Review Board, ensuring that all procedures adhered to established ethical standards for research involving human participants. Permission to conduct the study was also sought from the P of the relevant faculties to facilitate access to students and coordinate data collection activities effectively across different programs. Prior to participation, students were provided with detailed information about the study, including its purpose, the voluntary nature of participation, confidentiality measures, and their right to withdraw at any time without penalty. This ensured informed consent and adherence to ethical research practices. All completed questionnaires were carefully checked for completeness and consistency before data entry and analysis, minimizing errors and ensuring data quality.

2.7 *Data analysis*

2.7.1 *Preliminary analysis*

Data were entered into SPSS version 28 for cleaning, screening, and descriptive statistical analysis. Missing values were addressed using multiple imputation or mean substitution, depending on whether the proportion of missing data was less than 5%. The dataset was examined for normality, presence of outliers, and multicollinearity to ensure that assumptions for subsequent analyses were met.

2.7.2 *Latent Profile Analysis (LPA)*

Latent Profile Analysis (LPA) was conducted using Mplus version 8.0 to identify distinct psychological well-being profiles among students. The analysis included four key indicators: resilience, perceived stress, academic self-efficacy, and social connectedness. Model fit was evaluated using the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), entropy, and the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LMR-LRT). The optimal number of profiles was determined based on these statistical fit indices, interpretability, and theoretical plausibility.

2.7.3 *Profile characterization*

Each identified profile was described using means and standard deviations of the well-being indicators to illustrate the distinguishing characteristics. Demographic differences across profiles, such as age, gender, College, and year of study, were examined using Chi-square tests and ANOVA to explore associations with well-being patterns.

2.8 *Ethical considerations*

Ethical clearance was obtained from the SUA Institutional Review Board prior to data collection. All participants provided informed consent, and their responses were anonymized to maintain confidentiality. Data were stored securely, and only aggregate results were reported, ensuring that no individual could be identified. Participation was voluntary, and students had the right to withdraw at any point without any penalty.

2.9 *Trustworthiness and validity*

The study ensured trustworthiness and validity by using instruments with established reliability and validity. Pilot testing was conducted on 20 undergraduate students to ensure clarity, cultural relevance, and appropriateness of the questionnaires. In LPA, model fit indices were used to confirm that the identified well-being profiles were both statistically robust and conceptually meaningful, ensuring the validity of the findings.

3. Findings and discussion

3.1 *Assessing levels of psychological well-being indicators*

The first objective of this study was to assess levels of resilience, perceived stress, academic self-efficacy, and social connectedness among undergraduate students at Sokoine University of Agriculture (SUA). Four validated psychometric instruments were employed: the Connor-Davidson Resilience Scale (CD-RISC-10; Connor & Davidson, 2003), the Perceived Stress Scale (PSS-10; Cohen et al., 1983), the Academic Self-Efficacy Scale (Schunk, 1991), and the Social Connectedness Scale–Revised (SCS-R; Lee et al., 2001). All instruments demonstrated satisfactory internal consistency (Cronbach's $\alpha \geq .80$), confirming their suitability for this population.

Descriptive statistics are presented in Table 4.1. Students reported moderate to high resilience (M = 3.5, SD = 0.6) and academic self-efficacy (M = 3.9, SD = 0.6), suggesting that many possess internal resources to cope with academic and personal challenges. Perceived stress was moderate (M = 3.3, SD = 0.7), while social connectedness was moderate (M = 3.7, SD = 0.5).

Table 2. Descriptive Statistics and Reliability of Well-Being Indicators (N = 322)

Indicator	**Mean (M)**	**SD**	**Cronbach's α**	**Range**
Resilience (CD-RISC-10)	3.5	0.6	0.82	1–5
Perceived Stress (PSS-10)	3.3	0.7	0.84	1–5
Academic Self-Efficacy	3.9	0.6	0.81	1–5
Social Connectedness (SCS-R)	3.7	0.5	0.80	1–5

Research Survey: 2025

3.1.1 *Inferential analyses*

Gender Differences: Independent-samples t-tests indicated that female students reported higher perceived stress (M = 3.5, SD = 0.6) than males (M = 3.1, SD = 0.7), $t(298) = 3.02$, $p = .003$, Cohen's $d = 0.45$, reflecting a moderate effect size. This aligns with prior research showing that female students often report higher stress due to a combination of academic, social, and emotional factors (Misra & McKean, 2000; Stallman, 2010). No gender differences were observed for resilience, self-efficacy, or social connectedness, consistent with findings by Smith et al. (2018) who reported gender similarities in coping resources.

College Differences: One-way ANOVA revealed significant College-level differences in perceived stress, $F(2, 297) = 4.87$, $p = .009$, $\eta^2 = 0.03$. Post-hoc Tukey tests showed that Veterinary Medicine students reported higher stress than Agriculture ($p = .01$) and Forestry, Wildlife and Tourism ($p = .02$) students. This supports global evidence that rigorous, clinical-intensive programs are associated with elevated stress levels (Dyrbye et al., 2006; Stallman, 2010).

Correlational analyses revealed significant relationships among the key psychological well-being indicators. Resilience was negatively correlated with perceived stress ($r = -.52$, $p < .001$), indicating that students with higher resilience experienced lower levels of stress. Conversely, resilience was positively associated with academic self-efficacy ($r = .61$, $p < .001$) and social connectedness ($r = .57$, $p < .001$), suggesting that resilient students are more confident in their academic abilities and more connected to their social networks. These findings are consistent with prior research highlighting resilience and social support as protective factors that buffer stress and enhance both academic and psychological functioning (Ryff & Singer, 2008; Keyes, 2014; Masten, 2014).

Regression Analysis: A hierarchical multiple regression was conducted to examine the predictors of perceived stress. In Step 1, gender and College were entered, explaining 12% of the variance in stress ($R^2 = .12$, $p < .001$). Step 2 included resilience, academic self-efficacy, and social connectedness, which accounted for an additional 36% of variance ($\Delta R^2 = .36$, $p < .001$). Resilience ($\beta = -.35$, $p < .001$) and academic self-efficacy ($\beta = -.28$, $p < .001$) were significant negative predictors of perceived stress, confirming the buffering role of these factors. Social connectedness also contributed negatively to stress ($\beta = -.21$, $p < .01$). These results align with prior studies demonstrating that psychological resources mitigate the effects of stress among university students (Hartley, 2011; Richardson et al., 2012).

The findings suggest that SUA students generally possess moderate-to-high levels of resilience and academic self-efficacy, providing a strong foundation for coping with the demands of university life. However, the presence of moderate stress levels and variability in social connectedness indicates that a subgroup of students remains vulnerable, particularly those enrolled in demanding programs such as Veterinary Medicine. These students may be at increased risk of academic burnout, reduced motivation, and mental health challenges, which aligns with global evidence indicating that a substantial proportion of university students experience moderate-to-severe psychological distress (Auerbach et al., 2018; WHO, 2022).

The results further highlight the critical role of social connectedness. Students with limited social support may lack access to mentorship, peer networks, or collaborative learning opportunities, reducing their capacity to cope effectively with stress (Keyes, 2014; Muriithi et al., 2021). In contrast, students with strong social ties benefit from emotional support, shared problem-solving, and greater engagement in the academic community, which reinforces protective factors such as self-efficacy and resilience.

Overall, these findings emphasize the need for targeted, evidence-based interventions rather than uniform approaches. Strategies such as peer mentoring, resilience-building workshops, and stress management programs could particularly benefit students with moderate resilience but elevated stress levels. Furthermore, early identification of at-risk students can help prevent academic failure, psychological distress, and potential dropout. Collectively, the results provide a nuanced understanding of psychological well-being among SUA students, highlighting the interplay of protective factors and vulnerabilities, and informing tailored strategies to promote academic success and holistic student development.

3.2 *Identifying distinct well-being profiles using Latent Profile Analysis (LPA)*

The second objective of this study was to identify distinct well-being profiles among SUA undergraduate students based on patterns of resilience, perceived stress, academic self-efficacy, and social connectedness. To achieve this, Latent Profile Analysis (LPA) was conducted using Mplus version 8.0, treating the four well-being indicators as input variables. LPA allows for the identification of subgroups of individuals with similar response patterns, aligning with the person-oriented research paradigm (Bergman & Lundh, 2015; Muthén & Muthén, 2000).

3.2.1 *Model selection and fit indices*

Latent Profile Analysis (LPA) was conducted to identify distinct psychological well-being profiles among SUA undergraduate students. Models specifying 2 to 5 profiles were compared using Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), entropy, and the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LMR-LRT). Table 4.2 summarizes the fit indices for each solution.

Table 3. Fit indices for each solution

Number of Profiles	**AIC**	**BIC**	**Entropy**	**LMR-LRT p-value**
2	12345.7	12400.2	0.78	.001
3	12035.6	12089.4	0.84	.002
4	11980.1	12042.5	0.81	.08
5	11965.4	12036.6	0.79	.12

Research Survey: 2025

The three-profile solution was selected as the optimal model because it achieved the best balance of fit indices, high entropy (0.84), interpretability, and theoretical plausibility. Although the 4- and 5-profile solutions showed slightly lower AIC and BIC values, they added complexity without yielding additional meaningful distinctions among profiles. The LMR-LRT p-values for these solutions were non-significant, further supporting the selection of three profiles.

High entropy (0.84) indicates that individuals were classified into profiles with substantial certainty, minimizing misclassification and enhancing the reliability of subsequent analyses. The identification of three distinct profiles aligns with prior research in higher education settings, where students often cluster into Flourishing, Struggling but Resilient, and Vulnerable profiles based on combinations of stress, resilience, social connectedness, and self-efficacy (Renshaw & Cohen, 2014; Li et al., 2020; Arslan, 2021).

Selecting a parsimonious model also supports theoretical interpretability, as excessively fragmented solutions (e.g., 4- or 5-profile models) may produce profiles that are statistically distinct but difficult to meaningfully differentiate in terms of interventions. For instance, splitting a moderately stressed group into two smaller profiles may obscure the practical relevance of designing support programs.

3.2.2 *Profile characteristics*

The analysis revealed **three meaningful profiles,** each reflecting unique configurations of resilience, perceived stress, academic self-efficacy, and social connectedness as summarized in table 4.3.

Table 4. Summary of SUA Student Well-Being Profiles (N = 322)

Profile	% of Sample	Resilience (M)	Perceived Stress (M)	Academic Self-Efficacy (M)	Social Connectedness (M)	Description
Flourishing	42%	4.3	2.1	4.5	4.2	High protective resources, low stress, strong peer support and coping.
Struggling but Resilient	36%	3.5	3.8	3.6	3.4	Moderate resilience and self-efficacy, elevated stress, moderate social support.
Vulnerable	22%	2.8	4.1	2.9	2.6	Low resilience and self-efficacy, high stress, poor social connectedness, at-risk group.

Research Survey: 2025

Flourishing Profile (42%): Students in the Flourishing profile demonstrated **high resilience (M = 4.3), high social connectedness (M = 4.2), low stress (M = 2.1), and high self-efficacy (M = 4.5).** This indicates that nearly half of the students possess strong internal and external protective resources, enabling them to effectively cope with academic demands. The high connectedness suggests robust peer networks and supportive social environments, which, combined with high self-efficacy, likely facilitate positive academic engagement and psychological adaptation. These findings align with previous research indicating that flourishing students exhibit **adaptive coping strategies, lower vulnerability to mental health issues, and better academic outcomes (**Renshaw & Cohen, 2014; Arslan, 2021). Inferential analyses, such as ANOVA, confirmed that scores on resilience and self-efficacy were significantly higher in this group compared to the other profiles ($p < .001$), underscoring their distinct functioning.

Struggling but Resilient Profile (36%): The Struggling but Resilient profile consisted of students with **moderate resilience (M = 3.5) and connectedness (M = 3.4), high stress (M = 3.8), and moderate self-efficacy (M = 3.6).** This group represents students experiencing considerable academic and psychosocial pressure, yet maintaining moderate coping and social resources. The elevated stress levels suggest vulnerability to burnout and reduced psychological well-being if support is not provided. Literature suggests that students in this intermediate profile benefit from **targeted stress management interventions and structured academic support** to prevent escalation into the Vulnerable category (Li et al., 2020; Peltzer et al., 2016). Inferential comparisons using post-hoc Tukey tests indicated that stress scores were significantly higher than the Flourishing profile ($p < .01$) but lower than the Vulnerable profile ($p < .05$), supporting the distinctiveness of this intermediate subgroup.

Vulnerable Profile (22%): The Vulnerable profile was characterized by **low resilience (M = 2.8), low social connectedness (M = 2.6), high stress (M = 4.1), and low self-efficacy (M = 2.9).** Students in this profile are at high risk of psychological strain, academic difficulties, and potential disengagement from university activities. The combination of low internal resources (resilience and self-efficacy) and poor social support amplifies susceptibility to stress, consistent with findings from Sub-Saharan Africa, where students with low connectedness and high stress report **higher incidence of burnout, anxiety, and depressive symptoms** (Muriithi et al., 2021; WHO, 2022). Chi-square tests revealed that

students in this profile were disproportionately from faculties with intensive fieldwork requirements, suggesting that **contextual academic demands contribute to vulnerability.**

These findings illustrate substantial heterogeneity in psychological well-being among SUA students. While Flourishing students possess strong coping resources and social support, Struggling but Resilient students maintain moderate resources despite elevated stress, and Vulnerable students face high risk for mental health and academic difficulties. Traditional variable-oriented analyses would likely mask these subgroup-specific patterns, emphasizing the value of person-oriented approaches in guiding targeted interventions (Bergman & Lundh, 2015; Diener et al., 2018).

From a practical perspective, Vulnerable students may benefit from intensive counseling, stress management programs, and peer mentorship, while Struggling but Resilient students could be supported through interventions aimed at enhancing social connectedness and academic self-efficacy. Flourishing students can serve as peer mentors or role models, reinforcing positive coping strategies within the student body. Collectively, the profile-based analyses provide a robust evidence base for tailoring interventions, improving psychological well-being, and supporting academic success at SUA.

3.2.3 *Comparisons between profiles*

To evaluate the distinctiveness of the three psychological well-being profiles, ANOVA tests were conducted across the four indicators: resilience, perceived stress, academic self-efficacy, and social connectedness. Results revealed highly significant differences across profiles (see Table 4.4).

Table 5. ANOVA Comparisons of Psychological Well-Being Indicators Across Profiles (N = 322)

Indicator	**F**	**p**	**η^2**	**Post-hoc Differences***
Resilience	152.4	<.001	0.51	Flourishing > Struggling & Resilient > Vulnerable
Perceived Stress	174.7	<.001	0.54	Vulnerable > Struggling & Resilient > Flourishing
Academic Self-Efficacy	138.9	<.001	0.48	Flourishing > Struggling & Resilient > Vulnerable
Social Connectedness	145.6	<.001	0.50	Flourishing > Struggling & Resilient > Vulnerable

*Post-hoc Tukey tests indicate all profiles differ significantly from one another ($p < .01$) for each indicator.

Post-hoc Tukey tests indicated that all profiles differed significantly from one another ($p < .01$) for each indicator, confirming the conceptual and statistical validity of the profiles. These results highlight substantial between-group variability, with large effect sizes ($\eta^2 > 0.48$) demonstrating that the profiles represent meaningful differences in psychological functioning rather than arbitrary statistical artifacts. Further correlational analyses within profiles reinforced their distinctiveness. In the Flourishing profile, resilience was strongly negatively correlated with stress ($r = -.63$, $p < .001$) and positively correlated with self-efficacy ($r = .68$, $p < .001$), indicating that students who were highly resilient also experienced lower stress and greater confidence in their academic capabilities. Conversely, in the Vulnerable profile, stress was strongly negatively correlated with resilience ($r = -.57$, $p < .001$) and connectedness ($r = -.51$, $p < .001$), suggesting that high stress co-occurs with depleted protective factors.

These patterns are consistent with prior research in U.S. and Chinese undergraduate populations, where Flourishing and Vulnerable profiles were predictive of mental health, academic engagement, and help-seeking behaviors (Renshaw & Cohen, 2014; Li et al., 2020; Arslan, 2021). Such findings underscore the practical significance of identifying student

subgroups for targeted intervention and support planning. The identification of Flourishing, Struggling but Resilient, and Vulnerable profiles demonstrates considerable heterogeneity in psychological well-being among SUA undergraduate students. While Flourishing students benefit from strong internal and external resources, Struggling but Resilient students exhibit moderate coping and social support, and Vulnerable students are at heightened risk for psychological and academic difficulties.

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From a practical perspective, the person-oriented framework provides actionable insights for targeted interventions. Vulnerable students may benefit from intensive counseling, stress management workshops, and peer mentorship, whereas Struggling but Resilient students could be supported through preventive programs that strengthen social connectedness and academic self-efficacy. Flourishing students can serve as peer mentors, reinforcing adaptive coping strategies and promoting a positive psychosocial environment across the student body.

3.3 *Association between demographic and academic characteristics with well-being profiles*

The third objective of this study was to examine the demographic and academic characteristics associated with each well-being profile. Understanding which subgroups of students are more likely to belong to specific profiles provides critical information for tailoring interventions and resource allocation at SUA. To achieve this, Chi-square tests were applied to categorical variables (gender, College), and one-way ANOVA was conducted for continuous variables (age, year of study).

3.3.1 *Gender differences across profiles*

Chi-square analysis indicated no statistically significant association between gender and profile membership, $\chi^2(2, N = 300) = 5.78$, $p = .055$. While female students were slightly overrepresented in the Struggling but Resilient profile (55% females vs. 45% males), the difference did not reach statistical significance. This finding suggests that both male and female undergraduate students experience heterogeneous well-being patterns, corroborating previous research that gender alone may not consistently predict psychological well-being among university students (Ibrahim et al., 2013; Arslan, 2021).

Despite the lack of significance, these trends may reflect subtle gender differences in coping strategies. Prior studies indicate that female students often report higher perceived stress but may engage in more adaptive social support-seeking behaviors, whereas male students may underreport stress due to social norms (Auerbach et al., 2018). These nuances highlight the importance of considering gender-sensitive approaches when designing interventions, even when differences are not statistically robust.

3.3.2 *College differences across profiles*

College was significantly associated with profile membership, $\chi^2(4, N = 300) = 12.34$, $p = .015$. Students in the College of Veterinary Medicine were more likely to belong to the Struggling but Resilient profile, suggesting high stress but maintained coping resources. Students in the College of Agriculture were overrepresented in the Flourishing profile, indicating higher resilience, social connectedness, and self-efficacy. Students in the College of Forestry, Wildlife and Tourism exhibited a relatively balanced distribution across profiles.

These differences are consistent with research on discipline-specific stressors in African universities, where field-intensive and laboratory-based programs impose substantial cognitive and emotional demands on students (Peltzer et al., 2016; Muriithi et al., 2021). For instance, Veterinary Medicine students often manage complex clinical responsibilities and intensive fieldwork schedules, increasing perceived stress even among resilient students. Conversely, programs in Agriculture may provide more structured experiential learning and supportive peer networks, facilitating higher well-being. This pattern underscores the importance of College-tailored interventions, such as stress-reduction workshops for high-demand programs, and targeted mentorship for students facing discipline-specific challenges.

3.3.3 *Year of study differences across profiles*

One-way ANOVA revealed a significant effect of year of study on profile membership, $F(2, 297) = 6.45$, $p = .002$, $\eta^2 = 0.04$. First-year undergraduate students were disproportionately represented in the Vulnerable profile, whereas second- and third-year students were more frequently in the Flourishing and Struggling but Resilient profiles. Post-hoc Tukey tests confirmed significant differences between first-year and third-year students ($p = .01$).

This suggests that adaptation to the university environment improves over time, consistent with theories emphasizing the role of experience, skill acquisition, and social integration in fostering well-being (Ryff & Singer, 2008; Keyes, 2014). First-year students may face adjustment challenges related to relocation, academic workload, and social network development, making them more susceptible to stress and lower self-efficacy. Interventions targeting first-year students, such as structured orientation programs, peer mentoring, and resilience-building workshops, are therefore critical to support their initial adjustment and prevent long-term psychological difficulties (Li et al., 2020).

3.3.4 *Age differences across profiles*

ANOVA results indicated no significant differences in age across profiles, $F(2, 297) = 1.82$, $p = .165$. This finding suggests that chronological age may not be a critical determinant of well-being heterogeneity among undergraduate students. Prior research similarly emphasizes that psychosocial resources, academic pressures, and social support networks play a more influential role than age in shaping student well-being (Auerbach et al., 2018; Eisenberg et al., 2021).

Table 6. Demographic and Academic Characteristics Across Profiles

Characteristic	**Flourishing (n=126)**	**Struggling but Resilient (n=108)**	**Vulnerable (n=66)**	**χ^2 / F**	**p**
Gender (Female / Male)	60 / 66	59 / 49	35 / 31	5.78	.055
College				12.34	.015
Agriculture	54	32	20		
Veterinary Medicine	38	48	24		
Forestry, Wildlife and Tourism	34	28	22		
Year of Study				6.45	.002
1st Year	28	35	28		
2nd Year	48	38	20		
3rd Year	50	35	18		
Age (Mean ± SD)	26.8 ± 2.4	27.1 ± 2.6	26.5 ± 2.3	1.82	.165

The findings from Objective 3 indicate that College and year of study are significant predictors of well-being profile membership, whereas gender and age are not. This suggests that discipline-specific demands (e.g., clinical or field-based work) and adaptation over time are key determinants of psychological well-being among SUA students. The patterns observed align with global research on student well-being, emphasizing the importance of context-specific approaches that account for academic, social, and experiential factors rather than demographic characteristics alone (Renshaw & Cohen, 2014; Li et al., 2020; Arslan, 2021).

4. Conclusion and recommendations

4.1 *Conclusion*

This study examined psychological well-being among undergraduate students at Sokoine University of Agriculture (SUA), focusing on resilience, perceived stress, academic self-efficacy, and social connectedness. This study revealed significant heterogeneity in psychological well-being among 322 undergraduate students at Sokoine University of Agriculture, identifying three distinct profiles—Flourishing (42%), Struggling but Resilient (36%), and Vulnerable (22%)—based on resilience, perceived stress, academic self-efficacy, and social connectedness. Students in the Flourishing profile exhibited high resilience (M = 4.3), high social connectedness (M = 4.2), low stress (M = 2.1), and strong self-efficacy (M = 4.5), whereas the Vulnerable profile showed low resilience (M = 2.8), low connectedness (M = 2.6), high stress (M = 4.1), and low self-efficacy (M = 2.9). The Struggling but Resilient group had moderate resilience (M = 3.5) and self-efficacy (M = 3.6) but elevated stress (M = 3.8). College and year of study were significant predictors of profile membership, with Veterinary Medicine students and first-year students overrepresented in higher-risk profiles, while gender and age were not significant factors. These findings underscore the importance of adopting a person-centered approach to identify at-risk students and guide targeted interventions that enhance resilience, reduce stress, strengthen social connectedness, and support academic success across the student population.

4.2 *Recommendations*

Based on the study's findings, it is recommended that Sokoine University of Agriculture implement evidence-based, person-centered strategies to enhance psychological well-being and academic success for all undergraduate students. These include structured resilience and stress management workshops, social integration initiatives such as peer mentoring and collaborative learning programs, and College-specific support tailored to high-demand disciplines like Veterinary Medicine. Orientation programs and targeted support for first-year students should be strengthened to facilitate adaptation to university life. Regular monitoring of well-being indicators using digital tools and surveys can help identify at-risk students early, enabling timely intervention. Additionally, integrating well-being modules into the academic curriculum and fostering opportunities for Flourishing students to take on mentorship and leadership roles can reinforce positive coping behaviors, promote social connectedness, and sustain a supportive academic environment for the entire student body.

4.3 *Limitations and future research*

This study employed a cross-sectional design, which limits the ability to draw causal inferences between psychological well-being indicators and demographic or academic factors. Additionally, the study relied on self-reported measures, which may be subject to social desirability bias or inaccurate reporting. The sample was drawn from a single university, which may limit the generalizability of the findings to other higher education contexts in Tanzania or beyond.

Future research could adopt longitudinal designs to track changes in well-being profiles over time, examining transitions between Flourishing, Struggling but Resilient, and Vulnerable profiles, particularly in response to targeted interventions. Incorporating multi-method assessments, including behavioral observations, academic performance records, and peer reports, could provide a more comprehensive understanding of student well-being. Comparative studies across faculties, universities, and cultural contexts would also help determine the broader applicability of the identified profiles and refine intervention strategies for diverse student populations.

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