

# Preliminary Psychometric Evidence of an Integrated Life Autonomy and Coherence Measure (LAC-Scale) in Community-Dwelling Adults

Pei-Ching Wu<sup>1,2</sup>, Yi-Jung Chen<sup>3</sup>, Keng-Ren Lin<sup>2,4</sup>, Yi-Ching Yang<sup>5</sup>, Chia-Han Yang<sup>6</sup>,  
Tsan-Hsun Huang<sup>2</sup>, Wei-Ching Hung<sup>4</sup>, Chung-Ying Lin<sup>3,7,8</sup>, Fong-Chin Su<sup>1,9</sup>

<sup>1</sup>Department of Biomedical Engineering, National Cheng Kung University, Tainan, 701401, Taiwan; <sup>2</sup>OOPS Limited Company, Tainan, 744094, Taiwan; <sup>3</sup>Institute of Allied Health Sciences, College of Medicine, National Cheng Kung University, Tainan, 701401, Taiwan; <sup>4</sup>Lampe Smed Limited Company, Tainan, 744094, Taiwan; <sup>5</sup>Department of Family Medicine, National Cheng Kung University Hospital, Tainan, 701401, Taiwan; <sup>6</sup>Institute of Creative Industries Design, National Cheng Kung University, Tainan, 701401, Taiwan; <sup>7</sup>Biostatistics Consulting Center, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, 701401, Taiwan; <sup>8</sup>School of Nursing, College of Nursing, Kaohsiung Medical University, Kaohsiung, 807378, Taiwan; <sup>9</sup>Medical Device Innovation Center, National Cheng Kung University, Tainan, 701401, Taiwan

Correspondence: Fong-Chin Su, Department of Biomedical Engineering, National Cheng Kung University, No. 1, University Road, Tainan, 701401, Taiwan, Tel +886-6-2757575 ext. 63422, Fax +886-6-2343270, Email fcsu@mail.ncku.edu.tw; Chung-Ying Lin, Institute of Allied Health Sciences, College of Medicine, National Cheng Kung University, No. 1, University Road, Tainan, 701401, Taiwan, Tel +886-6-2353535 ext. 5106, Fax +886-6-2367981, Email cylin36933@gmail.com

**Background:** Life autonomy and coherence have been recognized as essential psychological resources that contribute to overall functioning and quality of life (QOL). However, there is a dearth of validated measures on life autonomy and coherence in the literature, especially a culturally appropriate measure in East Asian contexts (eg, Taiwan). This study provides preliminary psychometric evidence for the Life Autonomy and Coherence Scale (LAC-Scale) in community-dwelling adults. Specifically, the present study aimed to develop the LAC-Scale and evaluate its initial psychometric properties.

**Methods:** The LAC-Scale was first developed using literature review, expert panel committee, and pilot testing; a 25-item LAC-Scale was then generated. Then, a total of 305 community-dwelling adults participated in the study (mean age = 44.47 years, SD = 18.20). The sample was predominantly female (68.20%) and highly educated, with 77.70% of participants having completed a college-level education or above. The sample consisted predominantly of highly educated adults and was primarily female. Participants completed the LAC-Scale and external measures on QOL, physical resilience, and health literacy. Exploratory factor analysis (EFA) was used to examine the factorial structure of the LAC-Scale. Internal consistency, item–total correlations, and concurrent validity (with external measures) of the LAC-Scale were evaluated as well.

**Results:** EFA results indicated a two-factor structure comprising “Life Autonomy and Daily Coherence” and “Life Meaning and Social Connectedness”. Four items with factor loadings below 0.50 were deleted, resulting in a final 21-item scale. Both factors demonstrated excellent internal consistency ( $\alpha$  and  $\omega$  = 0.96–0.98). Significant associations were observed between LAC-Scale scores and external measures ( $r$ =0.31 to 0.55), supporting concurrent validity.

**Conclusion:** The present study provides preliminary psychometric evidence supporting a two-factor structure of the LAC-Scale and high internal consistency across the scale and its subscales. The LAC-Scale may help identify individuals with lower autonomy and coherence who could benefit from targeted interventions. Further confirmatory factor analysis and longitudinal validation studies are warranted.

**Plain Language Summary:** This study developed the Life Autonomy and Coherence Scale (LAC-Scale), a tool designed to assess how individuals manage daily life demands, maintain life meaning, and stay socially connected. The scale was created through expert input (using a Delphi process) and pilot testing, and its preliminary psychometric properties were examined in a Taiwanese community sample. The findings provided preliminary support for a two-factor structure and showed excellent internal consistency. Higher LAC-Scale scores were moderately associated with better quality of life, physical resilience, and health literacy. The LAC-Scale may serve



as a complementary tool in clinical and community settings to help identify individuals who may benefit from interventions targeting autonomy- and coherence-related functioning. Further confirmatory and longitudinal studies are needed to establish broader validity and clinical utility.

**Keywords:** life autonomy, coherence, quality of life, psychological resources, scale development

## Introduction

The increasing prevalence of chronic conditions and lifestyle-related health challenges has heightened global interest in maintaining and enhancing individuals' quality of life (QOL). QOL has been defined by the World Health Organization (WHO) as individuals' subjective evaluations of their life circumstances within cultural and value-based contexts<sup>1</sup> and has been widely recognized as a key indicator for evaluating disease prognosis and the effectiveness of clinical and community health interventions.<sup>2</sup>

In recent years, it has been increasingly acknowledged that QOL is shaped not only by physical health status but also by internal psychological resources, including the sense of coherence (SOC) and the sense of control or mastery. Within the salutogenic framework, it has been proposed that perceiving life as comprehensible, manageable, and meaningful facilitates resilience and supports QOL under stressful conditions.<sup>3</sup> Foundational work by Pearlin and Schooler, as well as later distinctions between personal mastery and perceived constraints, has emphasized the importance of psychological control in adapting to life challenges.<sup>4,5</sup> Contemporary reviews have further highlighted SOC, mastery, and agency as essential psychological determinants of long-term well-being.<sup>6</sup>

Although SOC and QOL are recognized as interrelated contributors to health and functioning, the measurement traditions associated with each have largely developed separately. Widely used QOL instruments—such as the World Health Organization Quality-of-Life Scale-Brief Version (WHOQOL-BREF),<sup>1,7</sup> the Short-Form 36 (SF-36),<sup>8</sup> and the more recent Clinical Quality of Life Scale (CLINQOL)<sup>9</sup>—have been designed to assess physical, psychological, social, and environmental domains of functioning. In contrast, instruments related to SOC, mastery, and agency—such as measures based on Antonovsky's SOC framework,<sup>3</sup> Pearlin and Schooler's mastery model,<sup>4,5</sup> and self-efficacy<sup>10</sup> or control-related constructs—focus on the underlying psychological resources that shape individuals' adaptive behavior and capacity to make sense of life circumstances. Newly developed measures, including the Sense of Agency Scale<sup>11</sup> and the Life Project Scale,<sup>12</sup> have underscored the importance of cognitive, emotional, and behavioral integration in guiding purposeful action and managing life demands.

Taken together, these constructs—SOC, mastery, and agency—represent complementary psychological resources that shape individuals' ability to make sense of their lives and act effectively within them. However, existing instruments typically assess these constructs separately, leaving a gap in integrated measurement.

Existing instruments such as the Sense of Coherence scale (SOC-13) and the Mastery Scale assess related constructs. Specifically, the SOC-13 measures comprehensibility, manageability, and meaningfulness as core salutogenic resources,<sup>3</sup> whereas the Pearlin Mastery Scale assesses generalized perceived control over life circumstances.<sup>4,5</sup> However, these instruments primarily focus on specific theoretical dimensions rather than capturing the combined operation of multiple psychological resources in everyday life.

Therefore, an assessment that simultaneously captures autonomy (the capacity to regulate and direct one's actions) and coherence (the sense that life is structured, meaningful, and manageable) is needed to reflect how these psychological resources function together in everyday life. The Life Autonomy and Coherence Scale (LAC-Scale) developed in the present study integrates autonomy-related daily self-regulation with coherence-related meaning and social connectedness, aiming to capture the joint functioning of these psychological resources in everyday contexts. More specifically, the LAC-Scale integrates autonomy-related daily self-regulation with coherence-related meaning and social connectedness, aiming to capture how these psychological resources function jointly in everyday contexts. The LAC-Scale integrates established constructs related to life autonomy and coherence into a unified operational framework.

Across rehabilitation and occupational science fields, the dynamic interaction among the person, their daily activities, and the surrounding environment has been widely recognized as fundamental to sustaining autonomy, participation, and

meaningful engagement.<sup>13–15</sup> Interventions that enhance daily routines, optimize environmental supports, or strengthen opportunities for meaningful activity have been shown to improve individuals' perceived control and coherence in everyday life, which in turn contributes to higher QOL and better functional outcomes.<sup>13–15</sup> These perspectives underscore the importance of assessing life autonomy and coherence as core psychological resources that influence how individuals organize their daily lives, respond to challenges, and maintain well-being across diverse community and healthcare contexts.<sup>3–6</sup>

Research across health, psychology, and behavioral sciences has increasingly highlighted the ways in which life autonomy and coherence influence key outcomes such as QOL, adaptive functioning, and overall well-being. Individuals with higher autonomy and coherence are more likely to interpret life events as manageable and meaningful, to regulate daily routines effectively, and to sustain motivation in the face of challenges—all of which contribute to enhanced QOL.<sup>3,6</sup>

Physical resilience, defined as the capacity to recover or adapt following physical or environmental stressors, has also been theoretically linked to autonomy and coherence because individuals who perceive their lives as structured and purposeful tend to show better self-regulation and adaptive responses.<sup>16</sup> Similarly, health literacy has been conceptualized not only as a cognitive ability but also as a resource that depends on motivation, self-organization, and the capacity to make sense of health-related information.<sup>17,18</sup> These characteristics overlap substantially with autonomy and coherence, suggesting that individuals with higher autonomy and coherence may be more capable of navigating health information, engaging in preventive behaviors, and sustaining self-management.

Together, these theoretical links indicate that life autonomy and coherence represent foundational psychological resources that shape multiple aspects of functioning—ranging from daily regulation to coping, resilience, and health-related decision-making—thereby underscoring the importance of developing a valid instrument to assess these constructs.

In East Asian and collectivistic cultural contexts, autonomy is often expressed in relational forms, where individuals regulate their actions while coordinating with family roles and interpersonal obligations.<sup>19,20</sup> Likewise, life meaning and coherence are frequently grounded in socially embedded values such as family harmony, relational connectedness, and collective responsibility. Therefore, integrating autonomy-related daily self-regulation with coherence-related meaning and social connectedness may better reflect how these psychological resources operate jointly in Taiwanese sociocultural settings.

Given the theoretical and empirical links between autonomy, coherence, and key health-related outcomes,<sup>3,5,6,10,21–23</sup> the present study aimed to develop a culturally grounded measure (ie, LAC-Scale) and to examine its associations with QOL, physical resilience, and health literacy. Existing instruments tend to assess these constructs separately, and few provide an integrated assessment of the psychological resources that support daily-life regulation, meaning, and adaptive functioning within East Asian cultural contexts.<sup>7,24</sup> Accordingly, this study sought to address gaps in cultural suitability and conceptual coverage observed in current measurement tools and to clarify how autonomy- and coherence-related psychological resources contribute to overall functioning and well-being among community-dwelling adults.<sup>3,6,21</sup>

## Methods

### Participants and Data Collection

Participants were recruited between January 2024 and December 2024 through community centers (4.9%), online announcements (85.2%), and university e-mailing lists (9.8%). Recruitment at community centers was conducted by trained research staff who approached potential participants on-site, briefly introduced the study purpose, and invited eligible individuals to participate. Online recruitment materials included an IRB-approved advertisement with a study description and contact information.

A total of 305 adults completed the survey (mean age = 44.47 years, SD = 18.20), of whom 68.20% were female. Most participants had completed a college-level education (77.70%), and 46.71% were married. Detailed sociodemographic characteristics and descriptive statistics for all included measures are summarized in [Table 1](#).

All participants completed paper-based questionnaires administered in person at community centers or outpatient clinics. Individuals recruited online were scheduled for an in-person appointment to complete the same paper-based survey, ensuring standardized administration across recruitment sources. Trained staff were present during all data collection sessions to provide clarification, assist participants who required help with reading or comprehension, and check for missing responses.

Eligibility was restricted to adults aged  $\geq 18$  years who were able to independently complete the questionnaire. Individuals with known cognitive impairment or acute medical instability were excluded. Specifically, cognitive impairment screening was conducted verbally by research staff, who confirmed participants' age, ability to understand questionnaire items, and self-reported absence of diagnosed cognitive impairment or acute medical instability. Participants reporting recent hospitalization, diagnosed cognitive disorders, or unstable health conditions were also excluded from the study.

The sample size was decided based on the rule-of-thumb criterion for the exploratory factor analysis (EFA); that is, a participant-to-item ratio at 10:1.<sup>25</sup> Considering that we intended to develop the LAC-Scale in a 25-item measure, the required minimum sample size is 250 (ie,  $25 \times 10$ ). In order to ensure that the final sample size exceeds the minimum requirement, we increased the sample size to over 300. Finally, the present study recruited 305 participants, resulting in a participant-to-item ratio of 12.2:1, exceeding commonly recommended guidelines for EFA.

**Table 1** Participant Characteristics and Descriptive Statistics of External Measures (N = 305)

| Characteristics          | Mean (SD) or n (%) |
|--------------------------|--------------------|
| Age (year)               | 44.47 (18.20)      |
| Gender                   |                    |
| Male                     | 97 (31.80)         |
| Female                   | 208 (68.20)        |
| Educational level        |                    |
| Primary school or below  | 32 (10.49)         |
| Junior high school       | 6 (1.97)           |
| Senior high school       | 30 (9.84)          |
| College or above         | 237 (77.70)        |
| Marital status           |                    |
| Single                   | 122 (40.13)        |
| Currently married        | 142 (46.71)        |
| Others                   | 40 (13.16)         |
| Religion                 |                    |
| Yes                      | 196 (64.47)        |
| No                       | 108 (35.53)        |
| QOL1 score               | 3.38 (0.92)        |
| QOL2 score               | 3.13 (1.09)        |
| Dom1_physical score      | 13.82 (2.39)       |
| Dom2_psychological score | 13.53 (2.76)       |
| Dom3_social score        | 14.17 (3.32)       |
| Dom4_environment score   | 14.04 (2.92)       |
| PRIFOR_sum score         | 58.99 (13.26)      |
| HLSEU_sum score          | 60.21 (7.31)       |

**Note:** Values represent mean (SD) or n (%).

**Abbreviations:** QOL1, overall quality of life; QOL2, general health; Dom1\_physical, physical quality of life; Dom2\_psychological, psychological quality of life; Dom3\_social, social quality of life; Dom4\_environment, environmental quality of life; PRIFOR\_sum, physical resilience; HLSEU\_sum, health literacy.

All participants provided written informed consent using an IRB-approved consent form. Research staff reviewed the consent form with each participant, answered questions, and obtained signatures prior to questionnaire completion. All study procedures were reviewed and approved by the Institutional Review Board of National Cheng Kung University Hospital (IRB B-ER-112-426) and National Cheng Kung University Human Research Ethics Committee (NCKU HREC-E-112-632-2).

Additional methodological details regarding the instrument development process, expert review procedures, and pilot testing are provided in [Supplementary Procedure 1](#), [Supplementary Table S1](#), and [Supplementary Tables S2–S9](#).

## Measures

### Life Autonomy and Coherence Scale (LAC-Scale)

The LAC-Scale was developed to assess psychological resources related to autonomy, coherence, life meaning, and social connectedness—constructs grounded in salutogenic theory,<sup>3</sup> perceived control and mastery frameworks,<sup>4,5</sup> and self-efficacy theory.<sup>10</sup> These theoretical foundations are described in the Introduction and guided the development of the scale.

Item generation was initiated through a systematic review of validated instruments related to QOL, self-efficacy, life meaning, and daily-life organization. The detailed item development process and supporting materials are provided in [Supplementary Procedure 1](#), [Supplementary Table S1](#) and [Supplementary Tables S2–S9](#). Specifically, [Supplementary Table S2](#) summarizes the reference instruments used for item development, [Supplementary Table S3](#) presents the item generation and content validation summary, [Supplementary Table S4](#) lists the original 55 candidate items, [Supplementary Table S5](#) maps the final 25 items to the initial item pool, [Supplementary Table S6](#) presents the final item list and factor loadings, and [Supplementary Table S7](#) reports descriptive statistics and factor analytic results, while [Supplementary Table S8](#) presents exploratory factor analysis and inter-factor correlations and [Supplementary Table S9](#) reports reliability indices.

Because numerous measures exist in these domains, selection criteria for the LAC-Scale items included: (1) established psychometric validity, (2) conceptual relevance to autonomy or coherence, (3) cultural applicability, and (4) use in community-based adult populations. This process resulted in an initial pool of 55 candidate items.

A multidisciplinary expert panel of 10 Taiwan-based professionals (including occupational therapy educators, long-term care occupational therapists, mental-health experts, special-education specialists, and rehabilitation clinicians) evaluated each item for relevance, clarity, and cultural appropriateness. To ensure systematic refinement, a Delphi method was adopted, involving iterative rounds of anonymous expert rating and feedback until consensus on item clarity and conceptual alignment was reached. Items were retained when expert agreement reached  $\geq 80\%$  consensus. Although experts provided structured feedback, item-level and scale-level content validity indices (I-CVI and S-CVI) were calculated to quantify expert agreement on item relevance and clarity, items with I-CVI values  $\geq 0.80$  were retained, and the overall scale demonstrated strong content validity (S-CVI = 0.92).

Based on the Delphi process, the scale was refined to 25 items, which were subsequently culturally adapted through cognitive interviewing and wording adjustments to enhance readability and contextual suitability. Detailed procedures for instrument development, expert validation, and pilot testing are provided in [Supplementary Procedure 1](#).

Pilot-tested with 47 participants, including 25 older adults (mean age = 68.44 years; majority female; education primarily junior or senior high school), and 22 primary caregivers (mean age = 50.55 years; majority female; most with college-level education; predominantly adult children of the care recipients; average caregiving duration = 9 years). Pilot testing aimed to evaluate item clarity and cultural appropriateness rather than psychometric properties, and pilot data were not included in the subsequent factor analyses or validation procedures.

All items were rated on a six-point Likert scale (1 = strongly disagree to 6 = strongly agree), with higher scores indicating stronger autonomy and coherence. This format was adopted to avoid a neutral midpoint and to encourage clearer response differentiation across agreement levels.

### Other Instruments for Validity Testing

Concurrent validity was assessed using three standardized instruments:

1. WHOQOL-BREF (Taiwan version): The Taiwan version of the WHOQOL-BREF consists of 28 items assessing health-related QOL across four domains—physical, psychological, social, and environmental—along with two general items evaluating overall QOL and general health.<sup>1,2,7,24</sup> Items are scored on a 5-point Likert scale, and domain scores are converted to a 4–20 scale according to standard WHO procedures, with higher scores indicating better QOL. The WHOQOL-BREF Taiwan version has demonstrated acceptable internal consistency (Cronbach's  $\alpha = 0.70$ – $0.77$ ) and good construct validity in prior studies. Domain-level scores were used in subsequent analyses (Table 1).
2. Physical Resilience Instrument for Older Adults (PRIFOR): The PRIFOR is a 16-item instrument measuring physical resilience across three domains: positive thinking, lifestyle adaptation, and belief/hope. Items are rated on a 5-point Likert scale, yielding total scores ranging from 16 to 80, with higher scores indicating greater resilience. The scale has shown excellent internal consistency ( $\alpha = 0.94$ ) and strong construct and criterion validity in Taiwanese populations.<sup>16</sup> A validated Chinese version was used in this study, and total PRIFOR scores were included as the physical resilience index for concurrent validity testing.
3. European Health Literacy Survey Questionnaire (HLS-EU): The HLS-EU assesses comprehensive health literacy across three domains—healthcare, disease prevention, and health promotion—using 47 items rated on a 4-point scale from 1 (“very difficult”) to 4 (“very easy”). A standardized index score (0–100) was calculated based on standard scoring procedures, with higher values indicating better health literacy. The instrument has demonstrated excellent internal consistency ( $\alpha > 0.95$ ) and strong construct validity in both Asian and European validation studies.<sup>17,34</sup> The standardized index score was used for all analyses.

## Statistical Analysis

Descriptive statistics (means, standard deviations, skewness, kurtosis, and frequency distributions) were computed for all variables. Score normality was evaluated using skewness and kurtosis values within  $\pm 2$ , following Kim's recommended criteria.<sup>35</sup>

EFA was performed using principal axis factoring. Sampling adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) index<sup>36</sup> and Bartlett's test of sphericity.<sup>37</sup>

The number of factors to retain was determined using parallel analysis with 1000 bootstrapped resamples.<sup>38</sup> When two or more factors were extracted, Promax oblique rotation was applied.<sup>39</sup> Items with factor loadings  $< 0.50$  were removed from subsequent analyses.<sup>25</sup>

Internal consistency was evaluated using Cronbach's  $\alpha$  and McDonald's  $\omega$ , with values  $> 0.70$  reflecting acceptable reliability.<sup>34,40,41</sup> Item discrimination was examined using item-to-total correlations, with values  $> 0.40$  considered satisfactory.<sup>18</sup>

Concurrent validity was assessed using Pearson correlations between scores from the LAC-Scale and scores from WHOQOL-BREF, PRIFOR, and HLS-EU. Correlation magnitudes were interpreted using Cohen's effect-size conventions.<sup>42</sup> All statistical analyses were conducted using JASP Version 0.19.3.0.<sup>43</sup>

## Results

### Participant Characteristics

A total of 305 participants completed the survey. The mean age was 44.47 years ( $SD = 18.20$ ). Most participants were female (68.20%) and had completed a college-level education or above (77.70%). Nearly half were currently married (46.71%), and 64.47% reported having a religious affiliation. Descriptive statistics for all demographic characteristics and criterion measures (WHOQOL-BREF domains, PRIFOR, and HLS-EU scores) are presented in Table 1.

### Item-Level Descriptive Statistics and Distributional Properties

Descriptive analyses showed that item means ranged from 4.11 to 4.71, with standard deviations between 1.26 and 1.47. Skewness values ranged from  $-1.04$  to  $-0.21$ , and kurtosis values ranged from  $-1.00$  to  $0.70$ , indicating approximate

normality across all items. Ceiling effects were more prominent (15.53–37.22%) than floor effects (1.62–7.44%). Neither floor nor ceiling effects exceeded 40% at the item level. The KMO statistic was 0.97, and Bartlett's test of sphericity was significant ( $\chi^2 = 8956.01$ ,  $p < 0.001$ ), supporting the suitability of the item set for factor analysis. Item-level statistics are summarized in Table 2. Additional descriptive statistics and item-level distributional details are provided in Supplementary Table S6.

## Exploratory Factor Analysis

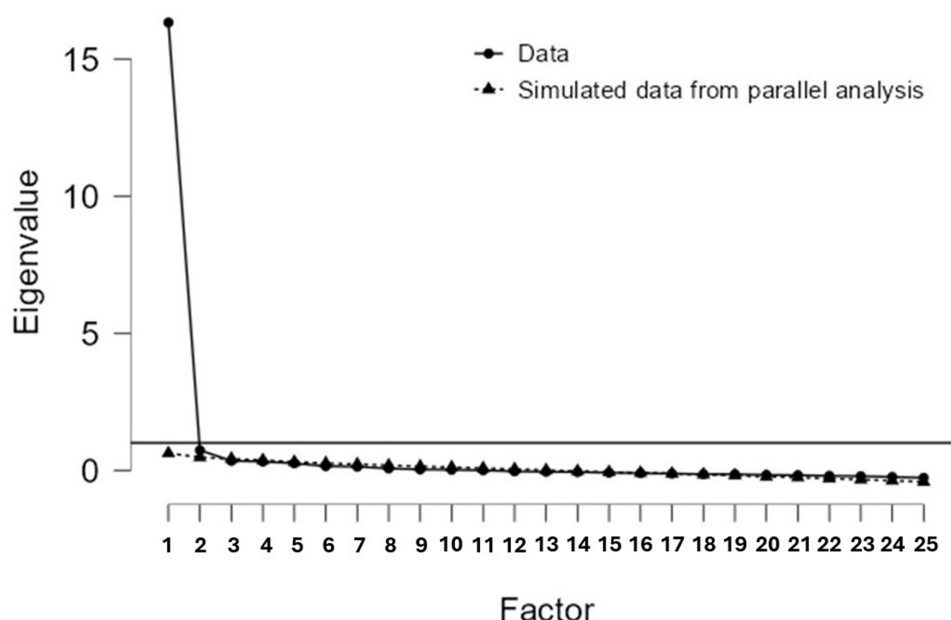
Parallel analysis suggested a two-factor solution for the LAC-Scale. The first factor yielded an eigenvalue of 16.33, explaining 65.33% of the variance; the second factor yielded an eigenvalue of 0.73, explaining 3.2% of the variance. Four items (Items 11–13 and 24) demonstrated factor loadings  $< 0.50$  in the EFA and were removed from subsequent analyses. The remaining 21 items loaded onto two distinct factors: Factor 1 (Items 1–10 and 25) representing Life Autonomy and Daily Coherence, and Factor 2 (Items 14–23) representing Life Meaning and Social Connectedness. All

**Table 2** Item Properties and Exploratory Factor Analysis Results for the Life Autonomy and Coherence Scale (LAC-Scale)

| Item # | Mean | SD   | Skewness | Kurtosis | Loading | ITC  | Ceiling (%) | Floor (%) | Factor  |
|--------|------|------|----------|----------|---------|------|-------------|-----------|---------|
| L1     | 4.60 | 1.34 | −0.95    | 0.37     | 0.93    | 0.89 | 30.74       | 3.88      | 1       |
| L2     | 4.55 | 1.35 | −0.78    | 0.05     | 0.87    | 0.88 | 30.74       | 3.56      | 1       |
| L3     | 4.43 | 1.35 | −0.75    | 0.04     | 0.87    | 0.84 | 25.24       | 4.53      | 1       |
| L4     | 4.53 | 1.37 | −0.92    | 0.37     | 0.71    | 0.82 | 29.13       | 5.18      | 1       |
| L5     | 4.71 | 1.38 | −1.04    | 0.40     | 0.67    | 0.81 | 37.22       | 3.88      | 1       |
| L6     | 4.57 | 1.31 | −1.01    | 0.70     | 0.73    | 0.88 | 26.86       | 4.53      | 1       |
| L7     | 4.61 | 1.37 | −0.95    | 0.27     | 0.90    | 0.91 | 32.36       | 4.21      | 1       |
| L8     | 4.52 | 1.38 | −0.77    | −0.04    | 0.80    | 0.87 | 31.07       | 4.21      | 1       |
| L9     | 4.39 | 1.39 | −0.63    | −0.30    | 0.69    | 0.82 | 26.86       | 4.21      | 1       |
| L10    | 4.32 | 1.37 | −0.61    | −0.27    | 0.52    | 0.73 | 23.30       | 4.53      | 1       |
| L11    | 4.38 | 1.28 | −0.67    | 0.13     | $<0.50$ | –    | 21.36       | 3.56      | Deleted |
| L12    | 4.24 | 1.47 | −0.66    | −0.32    | $<0.50$ | –    | 22.65       | 7.44      | Deleted |
| L13    | 4.33 | 1.40 | −0.68    | −0.20    | $<0.50$ | –    | 23.30       | 5.50      | Deleted |
| L14    | 4.40 | 1.28 | −0.74    | 0.12     | 0.61    | 0.79 | 20.71       | 3.24      | 2       |
| L15    | 4.31 | 1.31 | −0.62    | −0.13    | 0.97    | 0.82 | 20.06       | 3.56      | 2       |
| L16    | 4.33 | 1.36 | −0.68    | −0.16    | 0.93    | 0.89 | 21.36       | 4.21      | 2       |
| L17    | 4.41 | 1.33 | −0.80    | 0.22     | 0.75    | 0.90 | 22.65       | 4.53      | 2       |
| L18    | 4.38 | 1.26 | −0.66    | 0.10     | 0.85    | 0.90 | 20.39       | 2.91      | 2       |
| L19    | 4.39 | 1.28 | −0.69    | 0.09     | 0.77    | 0.90 | 21.31       | 3.24      | 2       |
| L20    | 4.43 | 1.30 | −0.74    | 0.22     | 0.74    | 0.91 | 23.62       | 3.88      | 2       |
| L21    | 4.17 | 1.36 | −0.69    | −0.08    | 0.60    | 0.62 | 15.53       | 6.15      | 2       |
| L22    | 4.11 | 1.37 | −0.44    | −0.40    | 0.52    | 0.64 | 17.80       | 5.18      | 2       |
| L23    | 4.37 | 1.26 | −0.73    | 0.21     | 0.52    | 0.81 | 18.77       | 3.24      | 2       |
| L24    | 4.61 | 1.29 | −1.00    | 0.68     | $<0.50$ | –    | 28.48       | 3.88      | Deleted |
| L25    | 4.20 | 1.35 | −0.21    | −1.00    | 0.53    | 0.54 | 21.68       | 1.62      | 1       |

**Notes:** Factor loadings  $< 0.50$  were deleted from subsequent analyses. Ceiling and floor effects represent the percentage of participants scoring the highest or lowest possible value. Factor = factor membership for retained items. Normal distribution supported when  $|\text{skewness}| < 2$  and  $|\text{kurtosis}| < 2$ . Bartlett's test was significant at  $p < 0.001$ , indicating suitability for factor analysis.

**Abbreviations:** ITC, item-to-total correlation.



**Figure 1** Scree plot with parallel analysis for the Life Autonomy and Coherence Scale (LAC-Scale).

**Notes:** Observed eigenvalues are plotted against component number together with simulated eigenvalues derived from parallel analysis. The first two components show eigenvalues exceeding the parallel analysis criterion, supporting a two-factor solution for the LAC-Scale.

retained items demonstrated acceptable item–total correlations (0.54–0.91). Detailed factor loadings and item properties are presented in [Table 2](#), with additional supporting analyses provided in [Supplementary Tables S6](#) and [S7](#). Parallel analysis results are illustrated in [Figure 1](#).

## Scale-Level Psychometric Properties

The refined LAC-Scale and its two subscales demonstrated excellent internal consistency. Cronbach's  $\alpha$  ranged from 0.961 to 0.977, and McDonald's  $\omega$  ranged from 0.962 to 0.977. Specifically, the total scale showed  $\alpha = 0.977$  and  $\omega = 0.977$ , Factor 1 (Life Autonomy and Daily Coherence) showed  $\alpha = 0.962$  and  $\omega = 0.963$ , and Factor 2 (Life Meaning and Social Connectedness) showed  $\alpha = 0.961$  and  $\omega = 0.962$ . Distributional indices showed that the total scale and both subscales approximated normality (skewness =  $-0.95$  to  $-0.79$ ; kurtosis = 0.50 to 0.71). Ceiling and floor effects were minimal at the scale level (0.0–6.8%), indicating that the final version of the instrument captured a broad range of response patterns without substantial clustering. Scale-level statistics are summarized in [Table 3](#). Additional reliability analyses supporting these results are reported in [Supplementary Table S9](#).

**Table 3** Scale-Level Psychometric Properties of the Life Autonomy and Coherence Scale (LAC-Scale)

|                   | LAC-Scale   | Factor 1    | Factor 2    |
|-------------------|-------------|-------------|-------------|
| Mean (SD)         | 4.41 (1.10) | 4.49 (1.16) | 4.33 (1.12) |
| Skewness          | −0.93       | −0.95       | −0.79       |
| Kurtosis          | 0.71        | 0.50        | 0.59        |
| Ceiling effect; % | 0.7         | 2.6         | 6.8         |
| Floor effect; %   | 0.0         | 0.0         | 1.6         |
| KMO value         | 0.97        | —           | —           |

(Continued)

**Table 3** (Continued).

|                           | LAC-Scale        | Factor 1 | Factor 2 |
|---------------------------|------------------|----------|----------|
| Bartlett's test (p-value) | 8956.01 (<0.001) | –        | –        |
| Eigenvalue                | –                | 16.33    | 0.73     |
| Explained variance; %     | 68.6             | 65.5     | 3.2      |
| Cronbach's $\alpha$       | 0.977            | 0.962    | 0.961    |
| McDonald's $\omega$       | 0.977            | 0.963    | 0.962    |

**Notes:** Cronbach's  $\alpha$  and McDonald's  $\omega$  values > 0.70 indicate acceptable internal consistency. Ceiling and floor effects represent the percentage of participants scoring the maximum or minimum possible value. Eigenvalues and explained variance correspond to factor structure after item removal.

**Abbreviation:** KMO, Kaiser–Meyer–Olkin.

## Concurrent Validity

The LAC-Scale demonstrated significant correlations with all external measures. As shown in [Figure 2](#), the total score and both subscale scores were moderately to strongly correlated with the physical, psychological, social, and environmental domains of the WHOQOL-BREF ( $r = 0.439$ – $0.550$ , all  $p < 0.05$ ). Moderate correlations were found with the WHOQOL-BREF overall quality-of-life item ( $r = 0.419$ – $0.460$ ), whereas correlations with the general health item were smaller in magnitude ( $r = 0.114$ – $0.122$ ). The LAC-Scale also demonstrated moderate to strong correlations with the PRIFOR total score ( $r = 0.470$ – $0.514$ ) and moderate correlations with the HLS-EU total score ( $r = 0.312$ – $0.340$ ). All associations were statistically significant, demonstrating consistent relationships between the LAC-Scale and the external measures. Additional exploratory factor analysis results and inter-factor correlation statistics are provided in [Supplementary Table S8](#).

## Discussion

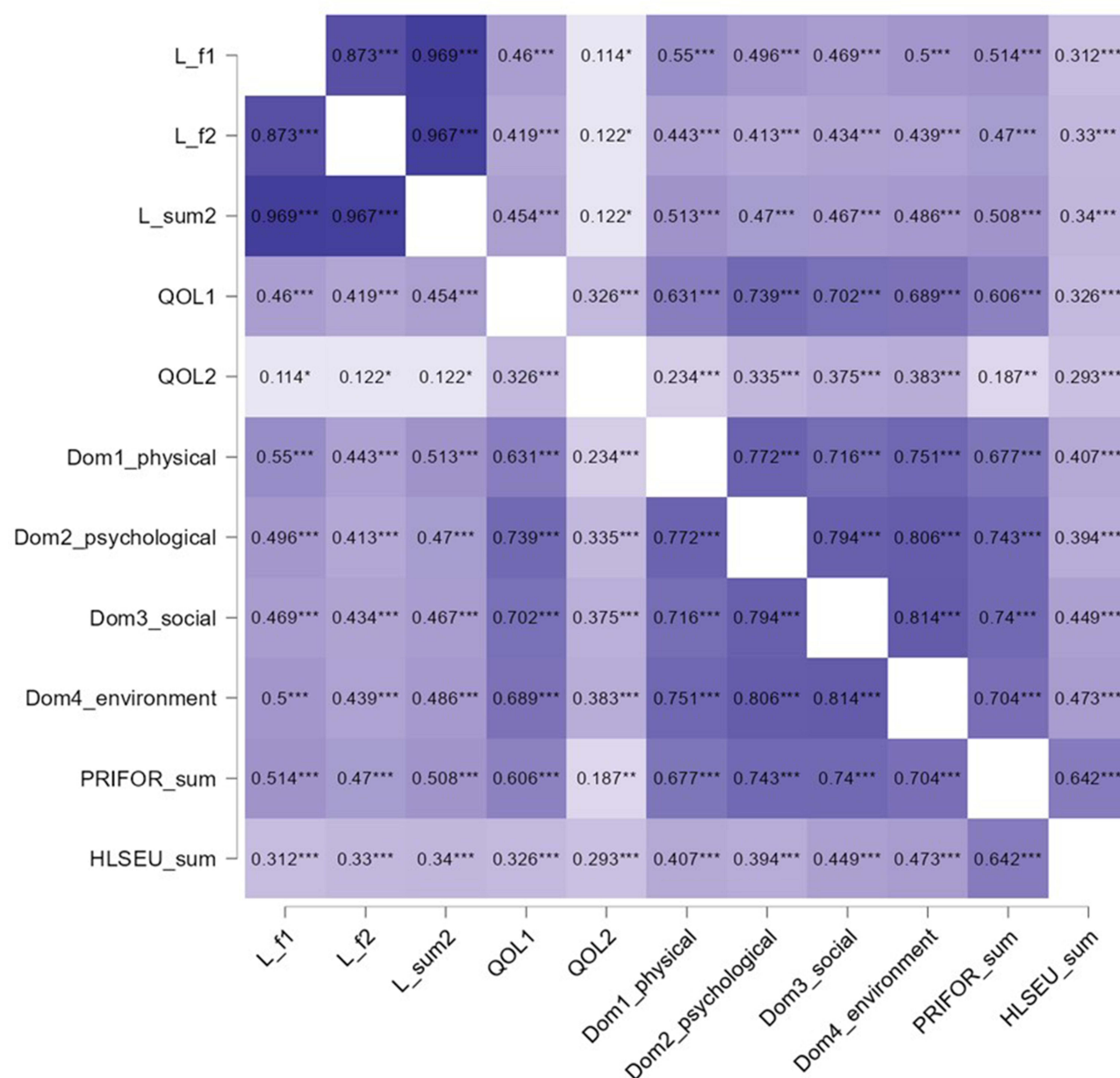
The present findings suggest that the LAC-Scale captures two theoretically meaningful psychological dimensions—Life Autonomy and Daily Coherence and Life Meaning and Social Connectedness—both of which are conceptually grounded in the salutogenic framework. In line with the theoretical model described in the Introduction, these two dimensions correspond to the core components of the salutogenic framework: “Life Autonomy and Daily Coherence” reflects comprehensibility and manageability, whereas “Life Meaning and Social Connectedness” reflects meaningfulness. These dimensions were found to exhibit moderate to strong correlations with indicators of quality of life, physical resilience, and health literacy, supporting the interpretation that life autonomy and coherence are meaningfully associated with key indicators of well-being.<sup>22,23</sup> This pattern is consistent with salutogenic theory, in which comprehensibility, manageability, and meaningfulness have been proposed as foundational to adaptive functioning and long-term health.<sup>3</sup>

The present findings provide preliminary empirical support for a two-factor structure consistent with the theoretical integration of life autonomy and coherence.

## Theoretical Alignment

The factor structure identified for the LAC-Scale was found to be aligned with the salutogenic perspective, which emphasizes the capacity to interpret and regulate life experiences as a pathway to health.<sup>3</sup> Specifically, the Life Autonomy and Daily Coherence factor aligns with the salutogenic components of comprehensibility and manageability, while the Life Meaning and Social Connectedness factor aligns with meaningfulness, the third core component of the model. This alignment was further supported by classic research on psychological mastery, in which perceived control has been described as a central self-regulatory resource across the life course.<sup>4,5</sup>

Additional support is provided by behavioral and motivational theories such as self-efficacy theory, which proposes that behavioral regulation is shaped by beliefs about one's own capability,<sup>10</sup> a concept reflected in items assessing individuals' confidence in organizing daily routines and managing life demands within the Life Autonomy and Daily Coherence factor. Similarly, self-determination theory views autonomy as a basic psychological need that facilitates well-



**Figure 2** Concurrent validity of the Life Autonomy and Coherence Scale using heatmaps.

**Notes:** \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

**Abbreviations:** L\_f1, LAC-Scale factor 1; L\_f2, LAC-Scale factor 2; L\_sum2, LAC-Scale; QOL1, overall quality of life (QOL); QOL2, general health; Dom1\_physical, physical QOL; Dom2\_psychological, psychological QOL; Dom3\_social, social QOL; Dom4\_environment, environment QOL; PRIFOR\_sum, physical resilience; HLSEU\_sum, health literacy.

being and behavioral persistence,<sup>22</sup> providing theoretical grounding for items in the Life Meaning and Social Connectedness factor that assess purposeful engagement and relational connectedness. Models of eudaimonic functioning also underscore the importance of sustained life meaning and goal-oriented engagement as essential components of psychological thriving.<sup>21</sup>

The two-factor solution is theoretically interpretable: one factor reflects autonomy-related daily self-regulation and coherence-related comprehensibility/manageability, whereas the second factor reflects coherence-related meaningfulness and social connectedness. This structure is consistent with the salutogenic distinction between comprehensibility/manageability and meaningfulness, while also reflecting complementary motivational processes of self-regulation versus purpose/relatedness-oriented engagement.

Taken together, these theoretical perspectives help clarify how the two-factor structure of the LAC-Scale—one reflecting coherence and daily regulatory capacity, and the other reflecting life meaning and relational connectedness—captures complementary dimensions of autonomy- and coherence-related functioning as proposed in established health and motivation theories.

## Associations with External Criterion Measures and Practical Implications

The LAC-Scale was found to correlate moderately to strongly with QOL, physical resilience, and health literacy, suggesting that life autonomy and coherence are meaningfully associated with multiple aspects of individuals' functioning and well-being.<sup>1,7,16</sup> These associations are theoretically consistent with prior literature, suggesting that coherence, manageability, and meaningfulness are linked to emotional regulation, daily-life organization, and perceived QOL.

The association with physical resilience may indicate that individuals with stronger autonomy and coherence are better equipped to adapt to physical challenges or recover from stressors, consistent with prior findings on adaptive functioning.<sup>16</sup> Similarly, the significant correlations with health literacy suggest that individuals with higher autonomy and coherence may navigate, interpret, and apply health information more effectively—skills that rely on organized thinking, self-regulation, and motivation.<sup>17,44</sup>

Taken together, these findings indicate that life autonomy and coherence are consistently associated with QOL, adaptive functioning, and health-related decision-making, suggesting that the LAC-Scale may serve as a complementary assessment tool in community and healthcare contexts.

## Clinical and Societal Implications

The LAC-Scale may be used as an outcome indicator within rehabilitation, long-term care, and community health settings to understand individuals' internal psychological resources related to autonomy and coherence. Rather than replacing traditional QOL assessments, the LAC-Scale provides complementary information that reflects how people interpret, organize, and manage daily life demands, which may influence their perceived QOL and functional outcomes.

Although the present study did not specifically examine older adults or chronic-condition subgroups, prior literature has suggested that these populations may experience challenges related to autonomy, daily manageability, and coherence. In health-promotion and policy contexts, the LAC-Scale may therefore help identify individuals who could benefit from early support or tailored interventions that strengthen daily-life organization, self-management, and meaningful engagement.

LAC-Scale results may also guide the development of culturally responsive community interventions by highlighting differences in autonomy- and coherence-related needs. Such information can help practitioners design supports that bolster self-management, facilitate health-literacy processes, and align activities with individuals' perceived sense of coherence and meaningful engagement.

Although the LAC-Scale demonstrated strong internal consistency and a clear factor structure, its application in routine clinical settings may benefit from further refinement. In particular, the development of a shorter version of the scale may enhance feasibility and reduce respondent burden in time-limited clinical environments. Future research should examine whether item reduction strategies can produce a brief form that maintains the conceptual coverage and psychometric robustness of the current scale.

In addition, several items demonstrated relatively high ceiling effects, which may limit the scale's sensitivity to detect change among individuals with higher baseline autonomy and coherence. Future studies should therefore examine the responsiveness of the LAC-Scale in intervention contexts and evaluate whether certain items require refinement to improve sensitivity to treatment-related changes.

## Limitations

The present study has several limitations that should be acknowledged. First, the cross-sectional design prevents inferences regarding causality or temporal change. Future studies should examine predictive validity using longitudinal designs and intervention-based studies. Given the exploratory design of the present study, confirmatory factor analysis using independent samples is also warranted in future research.

Second, ceiling effects were observed for several items, indicating that discriminative ability should be enhanced. Several items demonstrated ceiling effects over 30%; thus, these items might not be sensitive to detect improvements in high-functioning individuals. This problem is commonly seen among community-based samples. In this regard, the LAC-Scale needs further examination across diverse samples, including those with functional disability. Because the Cronbach's  $\alpha$  values were extremely high, this may indicate potential item redundancy. In this regard, future studies are needed to develop a shortened version of the LAC-Scale to avoid redundancy.

Third, the sample was recruited from a single cultural context, limiting generalizability. The sample consisted primarily of highly educated adults and was predominantly female. Findings should therefore be interpreted with caution and may not generalize to populations with different demographic characteristics. The present sample consisted primarily of highly educated adults and may differ from older or clinical populations. Findings should therefore be interpreted with caution.

Fourth, related psychological constructs such as self-efficacy, mastery, and behavioral activation were not simultaneously assessed. To further establish discriminant validity, related constructs such as self-efficacy, mastery, and behavioral activation should be included. The present study did not include qualitative exploration of culturally specific lived experiences. Future research incorporating qualitative inquiry may further strengthen content relevance and contextual validity.

## Conclusion

The present study provides preliminary psychometric evidence supporting the potential utility of the LAC-Scale and identifies a theoretically interpretable two-factor structure reflecting life autonomy and daily coherence as well as life meaning and social connectedness. The scale demonstrated high internal consistency, and its development incorporated expert review and culturally informed item refinement to enhance contextual relevance in Taiwanese settings.

The LAC-Scale was shown to capture autonomy, coherence, and life meaning—constructs associated with quality of life, physical resilience, and health literacy. These findings highlight life autonomy and coherence as relevant assessment domains for interdisciplinary, person-centered health-promotion strategies across community and healthcare contexts.

Overall, the present study provides preliminary psychometric evidence supporting the potential utility of the LAC-Scale. Meanwhile, the findings should be interpreted in light of several limitations, including the relatively highly educated sample and the presence of item-level ceiling effects. Findings should be interpreted within the Taiwanese sociocultural context. Further cross-cultural validation is required.

Further validation in diverse populations and confirmatory analyses are required; specifically, future studies should further evaluate the scale's predictive validity, cross-cultural applicability, and measurement invariance across these diverse populations, including older adults and individuals living with chronic health conditions.

## Data Sharing Statement

The datasets generated and analyzed during the current study are not publicly available due to institutional restrictions and participant privacy protection.

## Ethics Approval

All study procedures were reviewed and approved by the Institutional Review Board of National Cheng Kung University Hospital (IRB B-ER-112-426) and National Cheng Kung University Human Research Ethics Committee (NCKU HREC-E-112-632-2). The study was conducted in accordance with the Declaration of Helsinki and all applicable institutional guidelines.

## Consent to Participate

All participants gave their consent before participating in the study.

## Acknowledgments

The authors express their sincere gratitude to the occupational therapists, community health partners, and clinical professionals who provided expert consultation during the development of the LAC-Scale. Appreciation is also extended to the older adults and caregivers who participated in the pilot and validation testing.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Funding

This research was supported by the National Science and Technology Council (NSTC), Taiwan (Grant No. 114-2321-B-006-013), and National Cheng Kung University Hospital (Grant Nos. NCKUH-11310038 and NCKUH-11210038).

## Disclosure

All authors declare no conflicts of interest.

## References

1. WHOQOL Group. Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. *Psychol Med*. 1998;28(3):551–558. doi:10.1017/S0033291798006667
2. World Health Organization. *WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996*. Geneva: World Health Organization; 1996.
3. Antonovsky A. The structure and properties of the sense of coherence scale. *Soc Sci Med*. 1993;36(6):725–733. doi:10.1016/0277-9536(93)90033-Z
4. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav*. 1978;19(1):2–21. doi:10.2307/2136319
5. Lachman ME, Weaver SL. The sense of control as a moderator of social class differences in health and well-being. *J Pers Soc Psychol*. 1998;74(3):763–773. doi:10.1037/0022-3514.74.3.763
6. Schäfer SK, Supke M, Kausmann C, et al. A systematic review of individual, social, and societal resilience factors in response to societal challenges and crises. *Commun Psychol*. 2024;2(1):92. doi:10.1038/s44271-024-00138-w
7. Skevington SM, Lotfy M, O'Connell KA; WHOQOL Group. The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. *Qual Life Res*. 2004;13(2):299–310. doi:10.1023/B:QURE.0000018486.91360.00
8. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Med Care*. 1992;30(6):473–483. doi:10.1097/00005650-199206000-00002
9. Jones P, Drummond PD. The construction of a new Clinical Quality of Life Scale (CLINQOL). *BMC Psychol*. 2022;10(1):210. doi:10.1186/s40359-022-00912-7
10. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev*. 1977;84(2):191–215. doi:10.1037/0033-295X.84.2.191
11. Tapal A, Oren E, Dar R, Eitam B. The sense of agency scale: a measure of consciously perceived control over one's mind, body, and the immediate environment. *Front Psychol*. 2017;8:1552. doi:10.3389/fpsyg.2017.01552
12. Coscioni V, Teixeira MAP, Sacramento AM, Paixão MP, et al. Life Project Scale: a new measure to assess the coherence of the intended future. *Curr Psychol*. 2024;43:27714–27733. doi:10.1007/s12144-024-06407-5
13. American Occupational Therapy Association. Occupational therapy practice framework: domain and process (4th ed.). *Am J Occup Ther*. 2020;74(Suppl 2):7412410010. doi:10.5014/ajot.2020.74S2001
14. Hammell KW. Opportunities for well-being: the right to occupational engagement. *Can J Occup Ther*. 2017;84(4–5):209–222. doi:10.1177/0008417417734831
15. Wilcock AA, Hocking C. *An Occupational Perspective of Health*. 3rd ed. Thorofare, NJ: SLACK; 2015.
16. Hu FW, Lin CH, Yueh FR, Lo YT, Chen YJ, Lin CY. Development and psychometric evaluation of the Physical Resilience Instrument for Older Adults (PRIFOR). *BMC Geriatr*. 2022;22:229. doi:10.1186/s12877-022-02918-7
17. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, Brand H, HLS-EU Consortium Health Literacy Project European, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health*. 2012;12:80. doi:10.1186/1471-2458-12-80
18. Field A. *Discovering Statistics Using IBM SPSS Statistics*. 4th ed. London: SAGE; 2013.
19. Markus HR, Kitayama S. Culture and the self: implications for cognition, emotion, and motivation. *Psychol Rev*. 1991;98(2):224–253. doi:10.1037/0033-295X.98.2.224
20. Kagitcibasi C. Autonomy and relatedness in cultural context: implications for self and family. *J Cross Cult Psychol*. 2005;36(4):403–422. doi:10.1177/0022022105275959
21. Ryff CD. Psychological well-being revisited: advances in the science and practice of eudaimonia. *Psychother Psychosom*. 2014;83(1):10–28. doi:10.1159/000353263

22. Ryan RM, Deci EL. *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York: Guilford Press; 2017.
23. Hobfoll SE. Conservation of resources: a new attempt at conceptualizing stress. *Am Psychol*. 1989;44(3):513–524. doi:10.1037/0003-066X.44.3.513
24. Yao G, Chung CW, Yu CF, Wang JD. Development and verification of validity and reliability of the WHOQOL-BREF Taiwan version. *J Formos Med Assoc*. 2002;101(5):342–351.
25. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate Data Analysis*. 7th ed. Upper Saddle River, NJ: Prentice Hall; 2010.
26. Schwarzer R, Jerusalem M. Generalized self-efficacy scale. In: Weinman J, Wright S, Johnston M, editors. *Measures in Health Psychology: A User's Portfolio*. Causal and Control Beliefs. 1995. p. 35–37.
27. O'Connell MJ, Tondora J, Croog G, Evans AC, Davidson L. From rhetoric to routine: assessing perceptions of recovery-oriented practices in a state mental health and addiction system. *Psychiatr Rehabil J*. 2005;28(4):378–386. doi:10.2975/28.2005.378.386
28. Richardson J, Iezzi A, Khan MA, Maxwell A. Validity and reliability of the Assessment of Quality of Life (AQoL-8D) multi-attribute utility instrument. *Patient*. 2014;7(1):85–96. doi:10.1007/s40271-013-0036-x
29. Wagman P, Håkansson C. Introducing the Occupational Balance Questionnaire (OBQ). *Scand J Occup Ther*. 2014;21(3):227–231. doi:10.3109/11038128.2014.900571
30. Lawton MP, Moss M, Hoffman C, Kleban MH, Ruckdeschel K, Winter L. Valuation of life: a concept and a scale. *J Aging Health*. 2001;13(1):3–31. doi:10.1177/089826430101300101
31. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000;25(24):3186–3191. doi:10.1097/00007632-200012150-00014
32. DeVellis RF. *Scale Development: Theory and Applications*. 4th ed. Thousand Oaks, CA: SAGE; 2017.
33. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*. 2013;310(20):2191–2194. doi:10.1001/jama.2013.281053
34. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951;16(3):297–334. doi:10.1007/BF02310555
35. Kim HY. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restor Dent Endod*. 2013;38(1):52–54. doi:10.5395/rde.2013.38.1.52
36. Kaiser HF. An index of factorial simplicity. *Psychometrika*. 1974;39(1):31–36. doi:10.1007/BF02291575
37. Bartlett MS. Tests of significance in factor analysis. *Br J Stat Psychol*. 1950;3(2):77–85. doi:10.1111/j.2044-8317.1950.tb00285.x
38. Ledesma RD, Valero-Mora P. Determining the number of factors to retain in EFA: an easy-to-use computer program for carrying out parallel analysis. *Pract Assess Res Eval*. 2007;12:2. doi:10.7275/wjnc-nm63
39. Yong AG, Pearce S. A beginner's guide to factor analysis: focusing on exploratory factor analysis. *Tutor Quant Methods Psychol*. 2013;9:79–94. doi:10.20982/tqmp.09.2.p079
40. McDonald RP. *Test Theory: A Unified Treatment*. Mahwah, NJ: Lawrence Erlbaum Associates; 1999.
41. Nunnally JC, Bernstein IH. *Psychometric Theory*. 3rd ed. New York: McGraw-Hill; 1994.
42. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. New York: Routledge; 1988.
43. JASP Team. JASP (Version 0.19.3.0). Available from: <https://jasp-stats.org>. Accessed April 20, 2026.
44. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int*. 2000;15(3):259–267. doi:10.1093/heapro/15.3.259

## Patient Preference and Adherence

### Publish your work in this journal

Patient Preference and Adherence is an international, peer-reviewed, open access journal that focusing on the growing importance of patient preference and adherence throughout the therapeutic continuum. Patient satisfaction, acceptability, quality of life, compliance, persistence and their role in developing new therapeutic modalities and compounds to optimize clinical outcomes for existing disease states are major areas of interest for the journal. This journal has been accepted for indexing on PubMed Central. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/patient-preference-and-adherence-journal>

**Dovepress**  
Taylor & Francis Group