

Health behaviors and professional health orientation as correlates of community participation intention among health sciences students in Istanbul: a cross-sectional study

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Abstract

Background. Health sciences education links students' personal health practices with emerging professional and social-accountability roles. We examined whether provisional health-behavior, coping, and professional-orientation constructs were associated with community participation intention.

Material and methods. This cross-sectional online survey included 245 health sciences students aged 18-24 years. Academic staff distributed the survey link through student WhatsApp groups at four foundation universities in Istanbul, Türkiye. A researcher-developed 27-item questionnaire underwent exploratory factor analysis. Primary HC3 robust linear regression was supplemented by oblique-rotation, bootstrap, and influence analyses.

Results. Four provisional dimensions were identified (Kaiser-Meyer-Olkin=0.918; Bartlett $\chi^2(351)=3780.46$; $p<0.001$). Mean participation intention was 4.38 ± 0.58 ; 60.4% scored ≥ 4.5 . Health perceptions and behaviors ($\beta=0.336$; 95% CI: 0.147-0.526) and professional health orientation ($\beta=0.305$; 95% CI: 0.128-0.482) were independently associated with intention (both $p<0.001$); psychosocial coping was not. Principal estimates remained stable in bootstrap and influence sensitivity analyses.

Conclusions. Personal health practices and professional health orientation were correlates of highly endorsed community participation intention. Because the same convenience sample was used to develop and test provisional composites, replication with validated measures and prospective assessment of actual participation is required.

Keywords: community participation, cross-sectional studies, health behavior, quality of life, students

Introduction

Health sciences students occupy two related roles: they manage the health demands of university life while developing expectations about how future professionals should promote health. Recent evidence describes substantial variation in health, quality of life, stress, and health-promoting lifestyles across health professions students [1-9]. These personal experiences may shape perceived capacity to contribute beyond the classroom, but personal well-being and community engagement should not be treated as interchangeable.

Social accountability asks health professions education to orient learning, service, and institutional priorities toward community needs. Student surveys show generally favorable

attitudes yet variable understanding and experience [10-12]. Contemporary guidance and systematic-review evidence emphasize that social accountability is most meaningful when it is linked to authentic community partnerships, reciprocal learning, and observable educational experiences rather than endorsement alone [13,14]. Professional identity formation provides a complementary perspective: learners gradually internalize values, roles, and responsibilities through curricular and social experiences [15,16]. Community-engaged primary care, community action projects, and service learning can make these expectations concrete [17-20].

We therefore distinguished four provisional constructs. Health perceptions and behaviors represented enacted personal practices and perceived health-related functioning. Psychosocial coping represented broad self-regulatory resources for managing emotional demands. Professional health orientation represented internalized health-promotion values and perceived congruence between personal conduct and a future professional role. Community participation intention represented a proximal motivational disposition toward future community-health involvement, not observed participation. These provisional constructs were conceptually distinct but not entirely separate in content: several professional health orientation items referred to serving the community or contributing to society, whereas community participation intention assessed willingness and intention to participate in community-health activities. Professional health orientation was treated as a professional value orientation, while community participation intention was treated as a behavioral intention toward future involvement. The theory of planned behavior supports maintaining this intention-behavior distinction because intention may precede action but does not guarantee it [21].

The conceptual model expected the three personal/professional constructs to be mutually related and associated with participation intention, while allowing demographic and educational context to account for additional variation (Figure 1). Because all variables were measured once, the arrows denote hypothesized cross-sectional associations rather than causal or temporal paths.

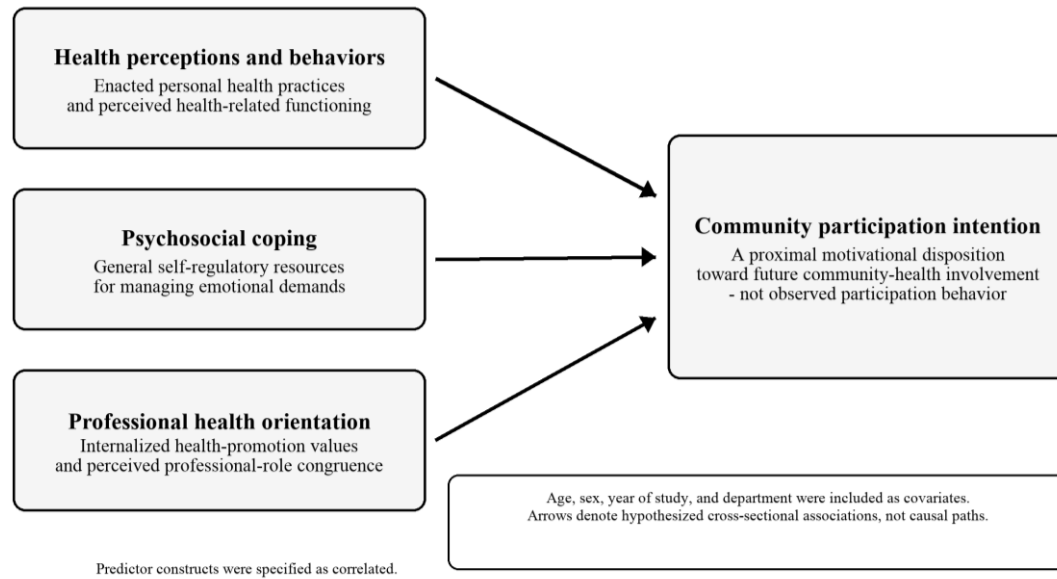


Figure 1. Conceptual organization of the study constructs

Notes: Predictor constructs were specified as correlated; arrows represent hypothesized cross-sectional associations rather than causal paths. Source: Authors' own elaboration.

Aim of the work

The primary aim was to examine whether health perceptions and behaviors, psychosocial coping, and professional health orientation were independently associated with community participation intention among health sciences students in Istanbul. A secondary aim was to transparently describe the exploratory measurement structure and its robustness to oblique rotation. We expected positive associations for all three provisional predictors but made no causal or behavioral prediction.

Material and methods

Design and setting

A cross-sectional online survey was conducted from November 28th to December 7th, 2024, as documented by Google Forms submission timestamps recorded in the linked response sheet (Türkiye locale; GMT+03:00 Istanbul). The ethics application stipulated that data collection would begin only after the approval; the approval was issued on November 27th, 2024, and no recorded submission preceded it. Online administration was selected to facilitate

consistent distribution across institutions and standardized electronic response capture without paper-based distribution or subsequent manual data entry. Four foundation universities in Istanbul, Türkiye were approached, and all four participated. Written institutional permission was obtained at the authors' university. At the other three universities, academic contacts shared the survey link once through the relevant student WhatsApp group or groups. No reminder messages, repeat postings, incentives, or other response-enhancement procedures were used. Participation was entirely voluntary. The pre-data-collection ethics application specified a target of at least 250 submissions; the form was closed after this target had been exceeded (284 submissions). Email addresses and personal identifiers were not collected. Google-account sign-in was required solely to restrict submission to one response per account, and respondents could not edit answers after submission. Institution identifiers, the number of unique students who received or viewed the invitation, group-membership overlap, and non-participant information were not recorded. Consequently, an individual-level response rate, correspondence with each university's demographic distribution, institutional representativeness, and university-level clustering cannot be assessed. Reporting follows applicable STROBE recommendations [22].

Participants and analytic samples

Eligible participants were students in health sciences programs who provided electronic consent. The participant-information and consent section preceded the questionnaires, and respondents affirmed that they had read and understood the information and wished to participate. The protocol-aligned primary analysis included respondents aged 18-24 years in the second, third, or fourth year. The pre-data-collection protocol excluded vocational-school students and first-year students in their first semester. Because recruitment occurred during the fall semester, the recorded preparatory/first-year group was excluded from the primary analysis. The spreadsheet contained 284 submissions. Seven records were removed before analysis because they did not meet age/program eligibility (six respondents aged ≥ 25 years and one vocational Audiometry respondent). One submission was identified as an exact duplicate because all recorded demographic fields and responses across the 27-item and separate 20-item questionnaire sections matched another submission; the first chronologically listed submission was retained. Among the remaining 276 non-duplicate age- and program-eligible records, 31 preparatory/first-year records were excluded, yielding 245 primary records. The 276-record set

was used only for a sensitivity analysis (Figure 2). No item-level data were missing in the primary sample.

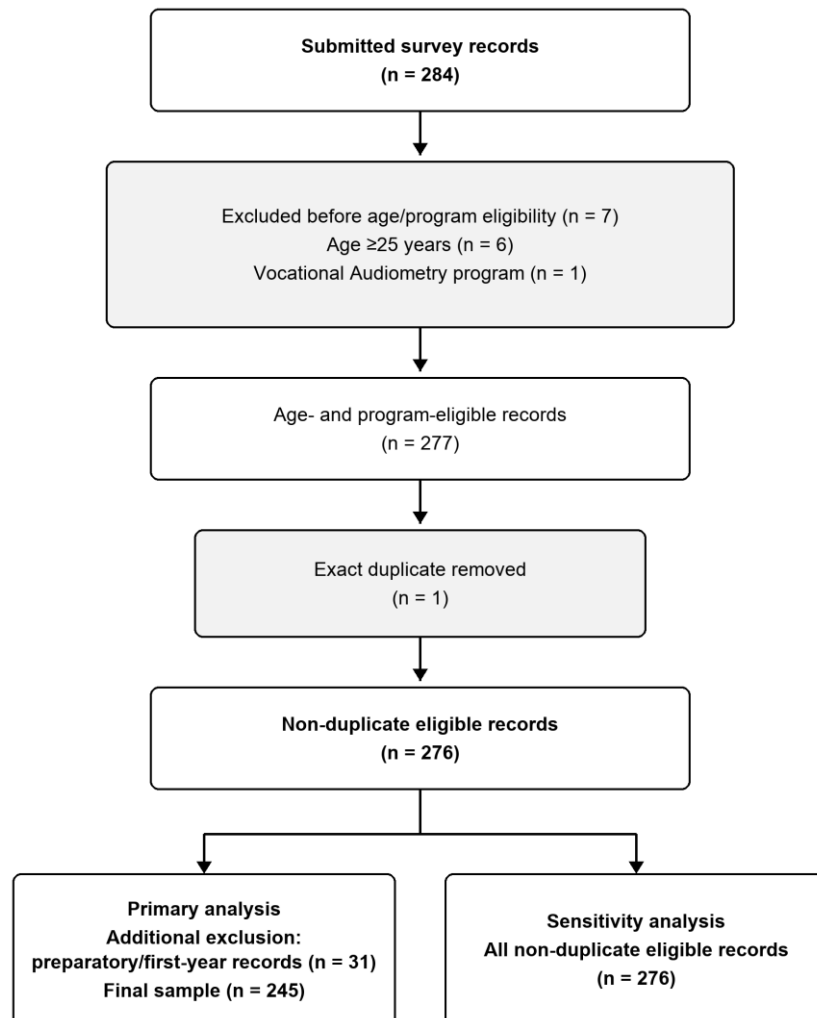


Figure 2. Participant flow and construction of the primary and expanded analytic samples

Questionnaire development

The instrument contained age, sex, marital status, department, and year of study, followed by 27 study-specific statements rated from 1 (strongly disagree) to 5 (strongly agree). The complete 27-item Turkish questionnaire and the separate 20-item Turkish form were included in the ethics application submitted on November 6th, 2024, before ethics approval and before data collection began on November 28th, 2024. The approved appendix organized the 27 statements prospectively under four content headings: quality of life and health perception (items 1-5), healthy lifestyle habits and physical activity (6-13), contribution to community

health and awareness (14-19), and attitudes toward healthy quality of life (20-27). These headings document pre-administration content organization; they were not treated as validated subscales or used automatically as the final empirical composites (Supplementary Table S1c). The first author developed the statements by adapting the meaning of broad health-status concepts represented in the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36), the Medical Outcomes Study 20-Item Short Form General Health Survey (SF-20), the RAND 36-Item Health Survey (RAND-36), and the Turkish SF-36 literature, including general health perception, physical/role functioning, vitality or mental well-being, and social functioning, and by adding study-specific items on preventive behavior, nutrition, coping, community-health participation intention, and professional orientation [23-26]. The author and thesis supervisor reviewed domain coverage, relevance, clarity, meaning continuity, and redundant wording and revised the items before administration. Supplementary Table S1b provides a retrospective document-based conceptual crosswalk between every study item, the pre-administration ethics appendix, and the source concepts. Because a contemporaneous item-by-item derivation log was not created, this crosswalk documents semantic provenance but is not presented as evidence of formal content validation or direct equivalence to a standard item.

A separate 20-item Turkish health-perception and quality-of-life form was included in the broader thesis questionnaire as a structured assessment of students' general health perception and quality of life, as documented in the pre-data-collection ethics application. It was administered in the same Google Form. However, it did not reproduce a standard SF-36, SF-20, or RAND-36 instrument and was not scored, interpreted, or used to define any exposure, outcome, composite, or inferential result in this article; its fields contributed only to whole-record duplicate screening. The exact administered wording is reproduced for transparency in Supplementary Table S1d and is explicitly identified as an administered but unanalyzed researcher-modified form. No qualitative stakeholder input, external multidisciplinary expert panel, formal content-validity index, cognitive interviewing, or pilot study was undertaken. The 27-item instrument is therefore neither an SF-36/SF-20/RAND score nor a validated scale. The complete administered Turkish wording and an English translation of the 27 study items appear in Supplementary Table S1.

Exploratory measurement analysis

Records were screened for missingness, response range, duplicate content, and protocol eligibility. Factorability was evaluated from the Pearson correlation matrix using the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity. Horn parallel analysis compared observed Pearson-correlation eigenvalues with the 95th percentile from 500 normally distributed random datasets using a fixed random seed of 20260814. Principal-axis factoring was first rotated with varimax to obtain a simple, readily interpretable exploratory solution. Because the constructs were expected to correlate and the resulting composite correlations were moderate, the analysis was repeated with promax oblique rotation as a sensitivity analysis. The number of factors was informed by parallel analysis; item meaning, loading pattern, and interpretability informed the provisional domain labels and item assignments.

For transparent review, an absolute primary loading below 0.40 was characterized as weak. A cross-loading was flagged when two absolute loadings were at least 0.40 and differed by less than 0.20. These rules supported interpretation rather than automatic deletion. Four provisional composites were calculated as item means: health perceptions and behaviors (items 1, 2, 3, 4, 6, 7, 8, 10, 11), psychosocial coping (12, 13, 20, 25, 26), community participation intention (14-17), and professional health orientation (18, 21-24, 27). Item 5 was excluded because two salient loadings and its empirical primary factor conflicted with its intended domain; item 9 because no loading reached 0.40, and its two largest loadings were similar; and item 19 because its primary loading and communality were low. Item 17 was retained provisionally on substantive grounds because its content was central to intention, despite a borderline varimax loading of 0.397 and promax pattern coefficient of 0.359; its promax structure loading was 0.536. Items 18, 20, and 24 met the stated cross-loading criterion but were retained provisionally because their highest loadings and item meanings supported professional health orientation, psychosocial coping, and professional health orientation, respectively. Complete varimax, promax pattern, and promax structure matrices, communalities, intended domains, and item-level decisions appear in Supplementary Tables S2-S4. Internal consistency was summarized using Cronbach's alpha and corrected item-total correlations.

Measurement limitations and provisional status

The pre-data-collection ethics application specified a target of at least 250 submissions and planned descriptive, group-comparison, correlation, and regression analyses. It did not prespecify the four-factor solution, item exclusions, final composite construction, exact covariate-adjusted model, or sensitivity analyses. All item generation, factor selection, post-hoc item exclusions, composite construction, reliability estimation, and association testing used the same sample. The study did not include independent content validation, an established comparator for convergent validity, a holdout sample, confirmatory factor analysis, or measurement-invariance testing. The resulting scores are provisional research variables developed for this dataset; they should not be treated as standardized instruments or evidence of validated latent constructs. Dedicated social-accountability instruments have required both exploratory and confirmatory validation, illustrating the level of evidence needed before newly developed scores can be treated as established measures [27]. Measurement analyses and the reported multivariable associations are therefore exploratory and hypothesis-generating; “primary” identifies the principal reported model and protocol-aligned sample, not a confirmatory preregistered analysis.

Statistical analysis

Continuous variables are reported as mean±standard deviation (SD), and categorical variables as n (%). Pearson correlations described bivariate relationships among the provisional composites. The primary outcome was standardized community participation intention. A multivariable ordinary least-squares model included standardized health perceptions and behaviors, psychosocial coping, professional health orientation, and age, together with sex, year of study, and department. These covariates were included together because developmental stage and discipline may relate to professional orientation or opportunities for community involvement. Nursing and second year were reference categories. Heteroskedasticity-consistent HC3 standard errors and 95% confidence intervals (CI) were used; variance-inflation factors, residuals, leverage, studentized residuals, and Cook’s distance were examined.

Sensitivity analyses comprised: (1) the 276-record expanded sample, in which preparatory/first-year respondents were represented by an additional early-year indicator, while second year remained the reference category, and all other coding was unchanged; (2) 2,000

participant-level nonparametric bootstrap resamples with replacement, using percentile 95% confidence intervals and a fixed random seed of 20260827; and (3) refitting after observations with Cook's distance $>4/n$ were removed. Consistent with the historical protocol record, descriptive, correlation, group-comparison, and regression analysis families were planned broadly before data collection; the exact measurement solution, item decisions, final model specification, promax rotation, bootstrap, influence, and expanded-sample analyses were exploratory/post-hoc. Tests were two-sided with $\alpha=0.05$. Analyses were conducted using Python 3.12.13, pandas 2.2.3, and NumPy 2.3.5 with reproducible custom routines. De-identified participant-level data may be available from the corresponding author subject to ethical and institutional approval; the analysis code and variable documentation are available from the corresponding author on reasonable request.

Results

Participant characteristics

The 245 participants had a mean age of 21.55 ± 1.20 years; 159 (64.9%) were women. Fourth-year students comprised 50.6% of the sample, and nursing and physiotherapy students together represented 68.6% (Table 1).

Table 1. Characteristics of the primary analytic sample (n=245)

Characteristic	Category	Value
Age, years	Mean $\pm$ SD	21.55 $\pm$ 1.20
Sex	Women	159 (64.9%)
	Men	86 (35.1%)
Study year	Second	68 (27.8%)
	Third	53 (21.6%)
	Fourth	124 (50.6%)
Department	Nursing	92 (37.6%)
	Physiotherapy and rehabilitation	76 (31.0%)
	Nutrition and dietetics	52 (21.2%)
	Other health sciences	25 (10.2%)

Notes: Data are n (%) unless otherwise stated. SD – standard deviation.

Exploratory measurement findings

The 27-item correlation matrix was suitable for factor analysis (Kaiser-Meyer-Olkin=0.918; Bartlett $\chi^2(351)=3780.46$; $p<0.001$). Parallel analysis supported four factors. The full-item alpha was 0.940, but interpretation focused on the multidimensional composites. Composite alphas ranged from 0.774 to 0.896 (Table 2). Promax rotation reproduced the substantive four-factor organization; estimated factor correlations ranged from 0.418 to 0.609, supporting the decision to treat the constructs as related rather than orthogonal (Supplementary Tables S3-S4). The highest estimated promax factor correlation was between professional health orientation and community participation intention (0.609); together with item 18's cross-loading on both dimensions, this indicated empirical overlap between these provisional constructs (Supplementary Tables S2-S4).

Table 2. Descriptive and internal-consistency properties of provisional composites

Composite	Items, n	Mean±SD	Cronbach α	Minimum corrected item-total r	Score ≥ 4.5 , %
Health perceptions and behaviors	9	4.09±0.60	0.896	0.557	28.2
Psychosocial coping	5	3.90±0.63	0.846	0.614	20.4
Community participation intention	4	4.38±0.58	0.774	0.467	60.4
Professional health orientation	6	4.45±0.49	0.851	0.550	62.4

Notes: Scores range from 1 to 5; higher values indicate stronger endorsement. Items 5, 9, and 19 were excluded after exploratory loading review. SD – standard deviation.

Community participation intention correlated with health perceptions and behaviors ($r=0.603$), professional health orientation ($r=0.571$), and psychosocial coping ($r=0.443$); all $p<0.001$. The outcome had only 11 observed score levels: 60.4% scored ≥ 4.5 , and 24.9% scored 5.0, demonstrating substantial upper-end concentration.

Multivariable findings and diagnostics

The primary model explained 46.9% of outcome variance (adjusted $R^2=0.446$). Health perceptions and behaviors and professional health orientation were independently associated with higher intention; psychosocial coping, age, sex, study year, and department were not

statistically significant in the primary model (Table 3). The maximum variance-inflation factor was 4.58.

Table 3. HC3 robust linear regression for standardized community participation intention (n=245)

Predictor	Coefficient	Robust SE	95% CI	<i>p</i>
Health perceptions and behaviors	0.336	0.097	0.147 to 0.526	<0.001
Psychosocial coping	0.105	0.108	−0.106 to 0.316	0.328
Professional health orientation	0.305	0.090	0.128 to 0.482	<0.001
Age	0.121	0.122	−0.118 to 0.359	0.322
Women vs. men	−0.173	0.115	−0.398 to 0.052	0.132
Third vs. second year	−0.187	0.169	−0.519 to 0.145	0.269
Fourth vs. second year	−0.157	0.311	−0.767 to 0.453	0.614
Physiotherapy vs. nursing	−0.096	0.138	−0.367 to 0.175	0.487
Nutrition vs. nursing	0.081	0.156	−0.225 to 0.387	0.604
Other department vs. nursing	−0.390	0.226	−0.832 to 0.052	0.084

Notes: The outcome and continuous predictors were standardized. Continuous-predictor coefficients are standardized β values; categorical coefficients are outcome-SD differences. Model $R^2=0.469$; adjusted $R^2=0.446$. CI – confidence interval; SE – standard error.

Residuals were centered but showed heavy tails (kurtosis=5.81; Jarque-Bera $p<0.001$), consistent with the ceiling-concentrated outcome. Four observations had absolute studentized residuals >3 , 10 exceeded the leverage criterion $2p/n$, and 16 exceeded Cook's distance $4/n$; maximum Cook's distance was 0.301. Removing those 16 observations preserved the direction and statistical evidence for the two principal correlates, as did bootstrap and expanded-sample analyses (Table 4). Some demographic estimates changed in the influence analysis; because they were non-significant in the primary model and not stable, they were not interpreted.

Table 4. Robustness analyses for the three principal correlates

Predictor	Primary HC3 β (95% CI)	Bootstrap 95% CI	Cook-sensitive β (95% CI), n=229	Expanded sample β (95% CI), n=276
Health perceptions and behaviors	0.336 (0.147 to 0.526)	0.162 to 0.521	0.359 (0.228 to 0.489)	0.344 (0.164 to 0.525)
Psychosocial coping	0.105 (−0.106 to 0.316)	−0.083 to 0.273	0.051 (−0.058 to 0.161)	0.085 (−0.106 to 0.277)
Professional health orientation	0.305 (0.128 to 0.482)	0.148 to 0.459	0.306 (0.197 to 0.414)	0.324 (0.162 to 0.485)

Notes: Bootstrap intervals used 2,000 participant-level nonparametric resamples with replacement and the percentile method. The Cook-sensitive analysis excluded observations with Cook's distance $>4/n$. The expanded model included a preparatory/first-year indicator; second year remained the reference category. CI – confidence interval.

Discussion

In this exploratory study, health perceptions and behaviors and professional health orientation were independently associated with community participation intention. Psychosocial coping was related at the bivariate level but not after joint adjustment. The stability of the two principal estimates across bootstrap, influence, and expanded-sample analyses reduces concern that they were driven solely by a small set of records. It does not, however, overcome the cross-sectional design, provisional measurement, or substantial ceiling effect.

The findings fit the proposed conceptual distinction. Personal health practices may reflect perceived energy, self-efficacy, or congruence with a health-promotion role, whereas professional health orientation reflects internalized expectations about how a future health professional should contribute. However, because several professional health orientation items referred to serving the community or contributing to society, part of its adjusted association with community participation intention may reflect conceptual and item-content proximity between these provisional constructs, in addition to common-method, social-desirability, and acquiescence effects. Professional identity literature describes such values as developing through interactions among individual dispositions, curricula, role models, and clinical or community experiences [15,16]. The present associations are compatible with that account, but their direction is indeterminate: a community-oriented outlook could reinforce personal health practices, and a general tendency toward socially desirable endorsement could strengthen all self-reports.

Social-accountability literature increasingly examines authentic community-engaged education, reciprocal partnerships, and competencies rather than attitude alone [13,14,17-20]. This study adds a hypothesis-generating view of how personal and emerging professional orientations co-vary with willingness to participate, but it did not measure exposure to service learning, quality of partnerships, community-defined outcomes, or actual engagement. The high intention scores may indicate genuine readiness, normative expectations within health education, scale acquiescence, or limited upper-end discrimination. Under the theory of planned behavior, intention is proximal to, but distinct from, behavior [21]. Claims that these correlates predict future participation would therefore require prospective evidence.

Psychosocial coping should not be considered unimportant because its adjusted coefficient was non-significant. The composite measured broad, mainly adaptive activities and may not capture resilience, community-engagement self-efficacy, time pressure, burnout, or context-specific barriers. Its correlations with the other provisional predictors also create shared variance. A mediation model was not added because temporal ordering was absent, and the predictor and outcome composites were derived in the same sample; a statistically estimable indirect path would risk implying a mechanism not supported by the design.

Study year and other demographic covariates were not significant in the primary model. This does not establish equivalence across years. Similar estimates may reflect early formation of professional values, comparable curricular exposure, self-selection into health sciences, limited power for subgroup contrasts, or unmeasured institutional differences. The instability of demographic coefficients after influential-case exclusion further argues against a substantive between-year interpretation.

Implications and future directions

The findings support further study of personal health practice and professional-role orientation as candidate correlates, not as proven curricular levers. Educators may consider pairing student well-being support with structured, reciprocal community experiences, but this dataset cannot show that changing either predictor will increase participation. Future work should begin with multidisciplinary content review, cognitive interviews, and pilot testing; validate the measurement model in an independent sample; test invariance across disciplines, years, and institutions; and use established measures of social accountability, professional identity, self-efficacy, and social desirability. Longitudinal multicenter designs should record

invitation denominators, institution, prior community experience, curricular exposure, and subsequent participation verified by activity type, duration, and community-partner perspectives.

Strengths and limitations

The strengths were complete item data, a protocol-consistent primary sample, an auditable exclusion flow, parallel analysis, full loading disclosure, oblique-rotation and regression sensitivity analyses, and heteroskedasticity-consistent inference. The central limitation is that item development, factor exploration, post-hoc exclusions, reliability estimation, and hypothesis testing occurred in one convenience sample. No external expert panel, pilot, cognitive interview, comparator measure, holdout sample, or confirmatory analysis was available. The scores are provisional, and item 17 had a borderline varimax loading.

All four approached foundation universities participated, the submission target and data-collection dates are documented, and the survey was distributed through academic contacts. Written institutional permission was obtained at the authors' university; at the other three universities, academic contacts shared the link once through the relevant student WhatsApp group or groups. No reminders, repeat postings, incentives, or other response-enhancement procedures were used. Nevertheless, unique-recipient denominators and institution identifiers were not recorded, preventing individual-level response-rate calculation, institution-specific representativeness assessment, or adjustment for clustering. The primary sample comprised 64.9% women, 50.6% fourth-year students, 37.6% nursing students, and 31.0% physiotherapy and rehabilitation students. Because institution-level student-population denominators were not recorded, correspondence with the underlying student populations cannot be assessed. The restricted age and year criteria constrain generalizability. All principal variables were collected at one time through the same five-point self-report format, creating common-method, social-desirability, and acquiescence risks that may inflate associations. Conceptual and item-content proximity between professional health orientation and community participation intention represents an additional, more specific source of shared variance: item 18 cross-loaded on both dimensions, and their estimated promax factor correlation was 0.609. Accordingly, part of the adjusted association may reflect overlap between these provisional measures and should be interpreted cautiously. The outcome's ceiling concentration restricts discrimination and contributed to non-normal and influential residuals. Robustness analyses addressed inference

but cannot restore unobserved upper-end variability. Actual community participation and intention-behavior conversion were not measured.

Conclusions

Among health sciences students recruited in Istanbul, stronger self-reported health perceptions and behaviors and professional health orientation were associated with higher community participation intention; broad psychosocial coping was not independently associated after adjustment. The outcome was already highly endorsed, and the constructs were developed and tested in the same convenience sample. These results should be treated as exploratory associations among provisional scores. Independent measurement validation and prospective observation of actual community engagement are needed before causal, predictive, or curricular conclusions are drawn.

Disclosures and acknowledgements

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The study was approved by the Bahçeşehir University Scientific Research and Publication Ethics Committee on November 27th, 2024 (meeting no. 2024/10; document no. E-85646034-604.01-93405). Electronic informed consent was obtained before questionnaire access. The participation was voluntary, and the analyses used de-identified records.

OpenAI ChatGPT was used solely to assist with the translation of the authors' original Turkish manuscript into English and with language editing to improve grammar, clarity, and readability. The tool was not used to generate scientific content, conduct literature searches, generate or verify references, analyze data, or formulate scientific interpretations or

conclusions. All the translated and edited text was critically reviewed and approved by the authors, who take full responsibility for the accuracy and integrity of the final manuscript.

De-identified participant-level data may be available from the corresponding author on reasonable request and subject to applicable ethical and institutional approval. The analysis code and variable documentation are available from the corresponding author on reasonable request.

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SUPPLEMENTARY MATERIAL

Health behaviors and professional health orientation as correlates of community participation intention among health sciences students in Istanbul: a cross-sectional study

All psychometric results are exploratory and were derived in the same primary sample (n=245) used for the association analyses. Abbreviations: CPI – community participation intention; HPB – health perceptions and behaviors; PC – psychosocial coping; PHO – professional health orientation.

Supplementary Table S1. Complete administered 27-item questionnaire and English translation

Item	Original Turkish wording (administered)	English translation	Intended domain
1	Genel olarak sağlıklı bir yaşam sürdürdüğümü düşünüyorum.	In general, I believe that I lead a healthy life.	HPB
2	Fiziksel sağlığımın günlük hayatımda herhangi bir engel oluşturmadığını hissediyorum.	I feel that my physical health does not create any obstacle in my daily life.	HPB
3	Ruhsal ve fiziksel sağlığımı korumak için aktif çaba gösteriyorum.	I make an active effort to protect my mental and physical health.	HPB
4	Sağlığımı korumak için düzenli sağlık kontrollerine önem veriyorum.	I consider regular health check-ups important for protecting my health.	HPB
5	Sağlıklı bir yaşam sürmenin, günlük hayatıma olumlu katkı sağladığını düşünüyorum.	I believe that leading a healthy life contributes positively to my daily life.	HPB
6	Düzenli olarak fiziksel aktivite veya egzersiz yapıyorum.	I regularly engage in physical activity or exercise.	HPB
7	Sağlıklı beslenme alışkanlıklarına günlük yaşamımda dikkat ediyorum.	I pay attention to healthy eating habits in my daily life.	HPB
8	Her gün yeterli uyku almaya özen gösteriyorum.	I make an effort to get sufficient sleep every day.	HPB
9	Fiziksel aktivitelerin ruh halimi olumlu yönde etkilediğini düşünüyorum.	I believe that physical activity positively affects my mood.	HPB/PC
10	Hareketli bir yaşam tarzını sürdürmenin sağlığım açısından önemli olduğunu düşünüyorum.	I believe that maintaining an active lifestyle is important for my health.	HPB
11	Günlük yaşamda stresle başa çıkmak için zihinsel rahatlama yöntemleri (meditasyon, nefes egzersizleri vb.) kullanıyorum.	I use mental relaxation methods (e.g., meditation or breathing exercises) to cope with stress in daily life.	HPB
12	Duygusal olarak rahatlamamı sağlayan hobi veya aktivitelerle ilgileniyorum.	I engage in hobbies or activities that help me relax emotionally.	PC
13	Ruhsal sağlığımı korumak için belirli stratejiler kullanıyorum. (örneğin; düzenli sosyal etkileşim, olumlu düşünme vb.)	I use specific strategies to protect my mental health (e.g., regular social interaction or positive thinking).	PC

Item	Original Turkish wording (administered)	English translation	Intended domain
14	Toplum sağlığını desteklemeye yönelik projelerde yer almak bana anlamlı geliyor.	I find it meaningful to take part in projects that support community health.	CPI
15	Sağlık alanındaki toplumsal projelere gönüllü olarak katılmak istiyorum.	I would like to participate voluntarily in community projects in the field of health.	CPI
16	Sağlıklı yaşam alışkanlıklarının toplumda yaygınlaşması için çalışmalar yapılmasının önemli olduğuna inanıyorum.	I believe that activities to promote healthy lifestyle habits in the community are important.	CPI
17	Sağlık bilincinin yaygınlaşması için toplum içinde liderlik yapmaya hazırım.	I am prepared to take a leadership role in the community to promote health awareness.	CPI
18	Toplum sağlığına katkıda bulunmak, mesleki kimliğimin bir parçasıdır.	Contributing to community health is part of my professional identity.	PHO
19	Sağlığımın sosyal aktivitelerimi olumsuz etkilemediğini düşünüyorum.	I believe that my health does not negatively affect my social activities.	HPB
20	Fiziksel aktivitelerin yanı sıra zihinsel sağımı korumak için düzenli olarak aktiviteler yapıyorum.	In addition to physical activity, I regularly engage in activities to protect my mental health.	PC
21	Sağlık bilimleri öğrencisi olarak, sağlıklı yaşam kalitesine sahip olmanın topluma daha iyi hizmet etmemi sağlayacağına inanıyorum.	As a health sciences student, I believe that having a healthy quality of life will enable me to serve the community better.	PHO
22	Yaşam kalitesinin korunmasının sağlık alanında çalışacak kişiler için önem taşıdığını düşünüyorum.	I believe that maintaining quality of life is important for people who will work in the health field.	PHO
23	Sağlıklı yaşam kalitesine sahip olmanın, topluma katkı sağlama kapasitemi artıracığını düşünüyorum.	I believe that having a healthy quality of life increases my capacity to contribute to society.	PHO
24	Sağlıklı yaşam kalitesine sahip olmanın, sosyal ve profesyonel ilişkilerimde olumlu etkiler yarattığını düşünüyorum.	I believe that having a healthy quality of life has positive effects on my social and professional relationships.	PHO
25	Sağlıklı yaşam alışkanlıklarını sürdürebilmek, stresle başa çıkmamı kolaylaştırıyor.	Maintaining healthy lifestyle habits makes it easier for me to cope with stress.	PC
26	Sağlıklı yaşam kalitesi, iş ve özel hayat dengemi sağlamamı kolaylaştırıyor.	A healthy quality of life makes it easier for me to maintain work-life balance.	PC
27	Sağlık bilimleri öğrencisi olarak, sağlıklı yaşam davranışlarını topluma örnek olacak şekilde sürdürmem gerektiğine inanıyorum.	As a health sciences student, I believe that I should maintain healthy lifestyle behaviors in a way that sets an example for the community.	PHO

Notes: The Turkish wording is reproduced as administered, including minor orthographic errors. English translations are provided for transparency and are not a separately validated language version.

Supplementary Table S1b. Document-based conceptual provenance of the 27 study items

Study item(s)	Concept represented	Documentary/source basis	Adaptation classification
1	General health perception	SF-36/SF-20/RAND general-health concept; dated Turkish source forms and ethics appendix	Meaning-level adaptation
2	Physical health and limitation in daily roles	Physical-functioning and role-limitation concepts; dated source forms	Meaning-level adaptation with positive wording
3	Active maintenance of physical and mental health	General-health and mental-well-being concepts; dated source forms	Integrative study-specific extension
4	Preventive health behavior	No direct standard-domain equivalent documented	Researcher-generated extension

Study item(s)	Concept represented	Documentary/source basis	Adaptation classification
5	Healthy living and daily functioning	Role-functioning and global health-related quality-of-life concepts	Integrative meaning-level adaptation
6, 10	Physical activity and an active lifestyle	Physical-functioning/activity concepts; dated source forms	Behavioral extension
7	Healthy eating	No direct SF-36/SF-20 domain equivalent documented	Researcher-generated health-behavior item
8	Adequate sleep	Energy/fatigue and functional well-being concepts represented in the dated 20-item source form	Study-specific behavioral extension
9	Physical activity and mood	Vitality and mental-well-being concepts	Integrative meaning-level extension
11-13	Relaxation, hobbies, and mental-health coping strategies	Mental-health/well-being concepts; dated source forms	Researcher-generated coping extensions
14-18	Community-health participation intention, leadership, and professional identity	No direct SF-36/SF-20 domain equivalent documented; community-health purpose in ethics protocol	Researcher-generated study-specific items
19	Health-related social functioning without limitation	SF-36/SF-20/RAND social-functioning concept; separate dated 20-item form included social-activity limitation	Positive/reverse-direction semantic adaptation
20	Combined physical- and mental-health maintenance activities	Mental-health and physical-functioning concepts	Integrative study-specific extension
21-24	Quality of life in professional service, social contribution, and relationships	General health, role-functioning, and social-functioning concepts combined with professional-orientation purpose	Researcher-generated professional extension
25-26	Healthy living in stress coping and work-life balance	Mental-health/coping and role-functioning concepts	Integrative study-specific extension
27	Healthy lifestyle as professional role modelling	No direct SF-36/SF-20 domain equivalent documented	Researcher-generated professional-orientation item

Notes: This crosswalk was reconstructed from the complete Turkish questionnaire appendices submitted with the ethics application on November 6th, 2024 and the exact administered Google Forms field labels, before data collection began on November 28th, 2024. It compares concepts and meaning, not verbatim wording. No standard SF-36, SF-20, or RAND scoring algorithm was applied, and the table is not evidence of formal content validation or item equivalence. Source frameworks are cited in manuscript references 24-27.

Supplementary Table S1c. Pre-administration content organization documented in the ethics appendix

Approved questionnaire heading	Items	Status in the present article
Quality of life and health perception	1-5	Historical content heading; not scored as a validated subscale
Healthy lifestyle habits and physical activity	6-13	Historical content heading; not scored as a validated subscale
Contribution to community health and awareness	14-19	Historical content heading; not scored as a validated subscale

Approved questionnaire heading	Items	Status in the present article
Attitudes toward healthy quality of life	20-27	Historical content heading; not scored as a validated subscale

Notes: These four headings and item ranges appear in the questionnaire attached to the November 6th, 2024 ethics application. They establish the content organization before data collection but are distinct from the provisional composites derived by exploratory factor analysis.

Supplementary Table S1d. Separate 20-item Turkish health-perception and quality-of-life form administered but not analyzed in this article

Item	Original Turkish wording (administered)	English translation
1	Zorlu aktiviteler; örneğin koşma, ağır eşyaları kaldırma, zor sporlara katılma vb. çok zorlandığınızı hissediyor musunuz?	Do you feel considerable difficulty with strenuous activities such as running, lifting heavy objects, or participating in strenuous sports?
2	Çok sayıda merdiven basamağını çıkarken zorlandığınızı hissediyor musunuz?	Do you feel difficulty when climbing several flights of stairs?
3	Öne eğime, çömelme veya diz çökme zorlandığınızı düşünüyor musunuz?	Do you think you have difficulty bending forward, squatting, or kneeling?
4	Bir kilometre yürüyüş yaptığınızda zorlandığınızı hissediyor musunuz?	Do you feel difficulty after walking one kilometer?
5	İki kilometreden çok yürüyüş yaptığınızda zorlandığınızı hissediyor musunuz?	Do you feel difficulty after walking more than two kilometers?
6	Diğer insanlara göre daha kolay hastalandığımı düşünüyorum.	I think that I become ill more easily than other people.
7	Tanıdığım kişiler kadar sağlıklı olduğumu düşünüyorum.	I think that I am as healthy as the people I know.
8	Sağlığımı mükemmel hissediyorum.	I feel that my health is excellent.
9	Kendimi yaşam dolu olarak hissediyorum.	I feel full of life.
10	Kendimi yıpranmış hissediyorum.	I feel worn out.
11	Sağlığınız sosyal aktivitelerinizi sınırlıyor mu?	Does your health limit your social activities?
12	Gün boyu bir yatağa ya da sandalyeye bağımlılık durumunuz var mı?	Are you confined to a bed or chair throughout the day?
13	Günlük aktiviteleriniz sırasında zorluk çekiyor musunuz?	Do you experience difficulty during your daily activities?
14	Uyuma zorluğu çekiyor musunuz?	Do you have difficulty sleeping?
15	Her gün yorgunluk hissediyor musunuz?	Do you feel tired every day?
	Gazete okumak, televizyon izlemek gibi konsantrasyon gerektiren işlerde zorluk hissediyor musunuz?	Do you experience difficulty with tasks requiring concentration, such as reading a newspaper or watching television?
17	Kronik ağrılarınız var mı? (Kadınlarda menstrual dönem hariç)	Do you have chronic pain? (Excluding menstrual periods for women)
18	Görünüştünüzde değişiklik olduğunu düşünüyor musunuz?	Do you think that your appearance has changed?

Item	Original Turkish wording (administered)	English translation
19	Zamanınızı eğlenceli geçirdiğinizi düşünüyor musunuz?	Do you think that you spend your time enjoyably?
20	İlaçlarla kontrol edilemeyen ağrınız var mı? (Kadınlarda menstrual dönem hariç)	Do you have pain that cannot be controlled with medication? (Excluding menstrual periods for women)

Notes: This separate researcher-modified set was included in the pre-data-collection ethics application as a structured assessment of general health perception and quality of life and was administered in the same Google Form. It was rated on the same 1-5 agreement scale but was not scored as SF-36, SF-20, or RAND-36 and did not define any exposure, outcome, composite, or inferential result in this article. Its fields contributed only to whole-record duplicate screening. The Turkish wording is reproduced exactly from the administered Google Forms field labels, including minor linguistic or orthographic inconsistencies. English translations are provided for transparency and are not a validated English version.

Supplementary Table S2. Complete principal-axis factor matrix with varimax rotation

Item	Intended	CPI	PHO	HPB	PC	h ²	Decision	Rationale
1	HPB	0.199	0.221	0.733	0.157	0.651	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
2	HPB	-0.007	0.326	0.622	0.117	0.507	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
3	HPB	0.143	0.379	0.525	0.173	0.470	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
4	HPB	0.379	0.360	0.537	-0.004	0.562	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
5	HPB	0.280	0.527	0.447	0.049	0.557	Excluded	Excluded: two salient loadings and empirical primary factor conflicted with the intended health-perception domain.
6	HPB	0.217	0.171	0.678	0.317	0.636	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
7	HPB	0.229	0.202	0.653	0.261	0.588	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
8	HPB	0.056	0.112	0.673	0.280	0.547	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
9	HPB/PC	0.200	0.226	0.367	0.387	0.376	Excluded	Excluded: no loading reached 0.40 and the two largest loadings were nearly equal.
10	HPB	0.213	0.385	0.402	0.259	0.423	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
11	HPB	0.334	0.064	0.538	0.370	0.542	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
12	PC	0.114	-0.104	0.358	0.712	0.659	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
13	PC	0.090	0.018	0.335	0.639	0.529	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
14	CPI	0.645	0.104	0.273	0.249	0.563	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.

Item	Intended	CPI	PHO	HPB	PC	h ²	Decision	Rationale
15	CPI	0.762	0.166	0.151	0.185	0.665	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
16	CPI	0.614	0.352	0.176	0.154	0.555	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
17	CPI	0.397	0.269	0.329	0.057	0.341	Retained	Retained provisionally on substantive grounds: the item was central to community participation intention despite a borderline varimax loading.
18	PHO	0.474	0.561	0.121	0.077	0.559	Retained	Retained provisionally in PHO: the highest loading was on PHO and the item explicitly concerns contribution to community health as professional identity; the CPI cross-loading was acknowledged.
19	HPB	0.196	0.201	0.378	0.228	0.273	Excluded	Excluded: primary loading was below 0.40 and communality was low.
20	PC	0.115	0.243	0.409	0.510	0.499	Retained	Retained provisionally in PC: the primary loading was on PC and the item concerns regular activities to protect mental health; the HPB cross-loading was acknowledged.
21	PHO	0.107	0.585	0.275	0.084	0.436	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
22	PHO	0.142	0.763	0.201	0.144	0.663	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
23	PHO	0.160	0.745	0.208	0.125	0.639	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
24	PHO	0.089	0.556	0.168	0.424	0.525	Retained	Retained provisionally in PHO: the primary loading was on PHO and the wording emphasizes social/professional functioning; the PC cross-loading was acknowledged.
25	PC	0.189	0.335	0.051	0.682	0.616	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
26	PC	0.168	0.299	0.113	0.733	0.668	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.
27	PHO	0.269	0.513	0.104	0.289	0.430	Retained	Retained: loading pattern and item meaning supported the provisional intended-domain assignment.

Notes: Loadings are shown without suppression. A primary absolute loading <0.40 was considered weak. A cross-loading was flagged when two absolute loadings were ≥ 0.40 and differed by <0.20 . These criteria informed, but did not automatically determine, item decisions. Items 18, 20, and 24 met the cross-loading criterion and were retained provisionally on the item-specific substantive grounds shown in the rationale column. Item 17 was retained provisionally for content coverage despite a varimax loading of 0.397; its promax pattern coefficient was 0.359 and structure loading was 0.536.

Supplementary Table S3a. Complete principal-axis factor pattern matrix with promax oblique rotation

Item	Intended	CPI	PHO	HPB	PC	h ²	Decision
1	HPB	0.004	0.008	0.847	-0.088	0.651	Retained
2	HPB	-0.265	0.243	0.735	-0.083	0.507	Retained
3	HPB	-0.064	0.283	0.533	-0.015	0.470	Retained
4	HPB	0.264	0.196	0.540	-0.259	0.562	Retained
5	HPB	0.105	0.459	0.386	-0.172	0.557	Excluded
6	HPB	0.041	-0.062	0.734	0.120	0.636	Retained
7	HPB	0.058	-0.015	0.705	0.057	0.588	Retained
8	HPB	-0.149	-0.081	0.797	0.106	0.547	Retained
9	HPB/PC	0.072	0.089	0.281	0.295	0.376	Excluded
10	HPB	0.048	0.291	0.321	0.114	0.423	Retained
11	HPB	0.253	-0.205	0.525	0.220	0.542	Retained
12	PC	0.024	-0.335	0.286	0.728	0.659	Retained
13	PC	-0.029	-0.158	0.250	0.639	0.529	Retained
14	CPI	0.727	-0.174	0.103	0.109	0.563	Retained
15	CPI	0.899	-0.094	-0.093	0.048	0.665	Retained
16	CPI	0.649	0.189	-0.058	0.006	0.555	Retained
17	CPI	0.359	0.122	0.258	-0.116	0.341	Retained
18	PHO	0.428	0.523	-0.128	-0.070	0.559	Retained
19	HPB	0.086	0.071	0.347	0.107	0.273	Excluded
20	PC	-0.066	0.116	0.322	0.437	0.499	Retained
21	PHO	-0.099	0.631	0.174	-0.060	0.436	Retained
22	PHO	-0.091	0.862	0.000	0.012	0.663	Retained
23	PHO	-0.062	0.833	0.015	-0.014	0.639	Retained
24	PHO	-0.121	0.596	-0.055	0.381	0.525	Retained
25	PC	0.078	0.286	-0.259	0.731	0.616	Retained
26	PC	0.041	0.226	-0.172	0.779	0.668	Retained
27	PHO	0.156	0.512	-0.142	0.220	0.430	Retained

Notes: Pattern coefficients are shown without suppression. Factor labels were aligned with the varimax solution for comparison.

Supplementary Table S3b. Complete principal-axis factor structure matrix with promax oblique rotation

Item	Intended	CPI	PHO	HPB	PC	h ²	Decision
1	HPB	0.476	0.470	0.804	0.400	0.651	Retained
2	HPB	0.285	0.477	0.671	0.320	0.507	Retained
3	HPB	0.420	0.550	0.652	0.379	0.470	Retained
4	HPB	0.591	0.565	0.665	0.248	0.562	Retained
5	HPB	0.539	0.677	0.620	0.287	0.557	Excluded
6	HPB	0.495	0.443	0.790	0.530	0.636	Retained
7	HPB	0.496	0.458	0.764	0.479	0.588	Retained
8	HPB	0.325	0.340	0.721	0.461	0.547	Retained
9	HPB/PC	0.425	0.421	0.545	0.524	0.376	Excluded
10	HPB	0.468	0.556	0.585	0.440	0.423	Retained
11	HPB	0.539	0.348	0.681	0.545	0.542	Retained
12	PC	0.313	0.152	0.519	0.761	0.659	Retained
13	PC	0.307	0.239	0.505	0.703	0.529	Retained
14	CPI	0.731	0.375	0.498	0.417	0.563	Retained
15	CPI	0.807	0.419	0.417	0.353	0.665	Retained
16	CPI	0.732	0.552	0.444	0.339	0.555	Retained
17	CPI	0.536	0.443	0.477	0.240	0.341	Retained
18	PHO	0.639	0.679	0.395	0.265	0.559	Retained
19	HPB	0.384	0.372	0.501	0.373	0.273	Excluded
20	PC	0.390	0.448	0.600	0.640	0.499	Retained
21	PHO	0.363	0.648	0.451	0.260	0.436	Retained
22	PHO	0.439	0.812	0.458	0.332	0.663	Retained
23	PHO	0.448	0.798	0.458	0.316	0.639	Retained
24	PHO	0.378	0.649	0.439	0.546	0.525	Retained
25	PC	0.421	0.488	0.373	0.738	0.616	Retained
26	PC	0.420	0.475	0.428	0.793	0.668	Retained
27	PHO	0.481	0.616	0.377	0.422	0.430	Retained

Notes: Structure loadings are item-factor correlations and are shown without suppression. Factor labels were aligned with the varimax solution for comparison.

Supplementary Table S4. Promax factor-correlation matrix

Factor	CPI	PHO	HPB	PC
CPI	1.000	0.609	0.598	0.442
PHO	0.609	1.000	0.587	0.418
HPB	0.598	0.587	1.000	0.570
PC	0.442	0.418	0.570	1.000

Supplementary Table S5. Regression diagnostics and robustness checks

Diagnostic or analysis	Result
Outcome ceiling	60.4% scored ≥ 4.5 ; 24.9% scored 5.0; 11 unique score levels
Residual distribution	Skewness -0.194 ; kurtosis 5.806 ; Jarque-Bera= 81.93 , $p < 0.001$
Studentized residuals	Maximum $ \text{residual} = 4.688$; 4 observations > 3
Leverage	Threshold $2p/n = 0.0898$; 10 observations exceeded; maximum= 0.166
Cook's distance	Threshold $4/n = 0.0163$; 16 observations exceeded; maximum= 0.301
Influence sensitivity, $n=229$	HPB $\beta = 0.359$ (95% CI: $0.228-0.489$); PC $\beta = 0.051$ ($-0.058-0.161$); PHO $\beta = 0.306$ ($0.197-0.414$)
Nonparametric bootstrap, 2,000 repetitions	Participant-level resampling with replacement; percentile intervals; seed 20260827. HPB 95% CI: $0.162-0.521$; PC: $-0.083-0.273$; PHO: $0.148-0.459$
Expanded eligible sample, $n=276$	Separate preparatory/first-year indicator; second year reference. HPB $\beta = 0.344$ ($0.164-0.525$); PC $\beta = 0.085$ ($-0.106-0.277$); PHO $\beta = 0.324$ ($0.162-0.485$)