Technical Report:
LiFE*sports* Survey Tools

The LiFE*sports* Initiative
College of Social Work
The Ohio State University

LiFE*sports* Survey Tools
Healthy Lifestyles Scale

THE OHIO STATE UNIVERSITY
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Healthy Lifestyles Scale

I. Definition of Construct

Health lifestyles are characterized by behaviors which promote physical and mental health and well-being (Lowry et al., 2002; Melnyk et al., 2013). Assessment of perceived healthy lifestyle behaviors is important among youth as it has been associated with lower BMI (Melnyk et al., 2013), improved mental health outcomes (Melnyk et al., 2009, 2013), and academic success (Faught et al., 2017; Melnyk et al., 2013).

II. Relevance for Practice

Assessing healthy lifestyles is critical for understanding youths' perceptions and behaviors to identify strengths and areas for improvement in health-related behaviors, as well as to evaluate outcomes associated with programs and interventions designed to foster physical activity, healthy decision-making, and overall well-being.

III. Scale Description and Instructions

A. *Items*

1. I can do at least 60 minutes of physical activity each day.
2. I can eat 5 fruits and vegetables every day.
3. I can drink water instead of other drinks (like sodas or juices).
4. I can spend less than two hours a day watching television or playing video/computer games.
5. I can make healthy choices in my life.
6. I can manage my stress in healthy ways.

B. *Response Options*

1. = Not at all true
2. = A little true
3. = Somewhat true
4. = Pretty true
5. = Really true

C. *Instructions for Respondents*

Please read each statement and fill ill in the circle that best shows your answer.

D. *Instructions for Scale Administers*

Once each student has a survey, explain that the purpose of the survey is to learn more about their lifestyle and healthy choices. They should mark one answer per statement, selecting the choice that best reflects how they feel.

IV. Scoring Procedures

An average of the response scores from the six (6) items should be calculated and used as an indicator of healthy lifestyle behaviors, with higher scores reflecting greater levels of healthy lifestyle behaviors.

V. Psychometric Properties of the Scale

The Healthy Lifestyles Scale (HLS) was originally developed for use in a sport-based positive youth development program to assess youths' perceptions of the extent to which they engage in a range of healthy behaviors.

The six-item Healthy Lifestyles scale fits a single factor well with no model modifications (CFI = .986, RMSEA = .046) and shows acceptable internal consistency (α = .77 at pre-camp, .82 at post-camp). It is invariant from pre- to post-camp through the strict level, and partially scalar invariant across gender (one intercept freed) and age group (one intercept freed). Boys report slightly higher healthy-lifestyle self-efficacy than girls, campers aged 11 and older report slightly lower levels than those aged 8–10, and scores do not change from pre- to post-camp. The scale correlates .38 with sport competence, .61 with physical self-efficacy, and .55 with effort.

The analytic sample comprised 1,110 campers aged 8–16 years (M = 10.98, SD = 1.59) with complete Pre-Camp responses on all six items. Campers younger than 8 were excluded. Two campers who did not report as male or female are included in overall analyses but not gender analyses. Of the sample, 799 completed the Post-Camp survey in the same summer, and 790 answered all six items at Post-Camp.

Table 1
Analytic Sample by Gender and Age Group

Group	Age 8–10	Age 11+	Total
Female	183	255	438
Male	264	406	670
Other / not reported	0	2	2
Total	447	663	1,110

Confirmatory Factor Analysis
A one-factor model was estimated in lavaan (R) with robust maximum likelihood (MLR). The model fit well: $\chi^2(9) = 25.24$, $p = .003$; CFI = .986; TLI = .976; RMSEA = .046, 90% CI [.025, .068]; SRMR = .023. No modifications were made; the largest modification index (an HL7–HL9 residual correlation, MI = 16.3) was small. All standardized loadings were significant (.52–.71), and McDonald's ω = .78. Treating items as ordinal (WLSMV) gave the same conclusion (CFI = .989, TLI = .981, RMSEA = .057).

Table 2
Standardized Factor Loadings

Item	λ (MLR)	95% CI	R^2	λ (WLSMV)
HL1 60 min activity	.59	.53–.64	.35	.64
HL2 Fruits and vegetables	.60	.55–.66	.36	.66
HL3 Water	.60	.54–.66	.36	.67
HL4 Screen time	.52	.46–.57	.27	.58
HL7 Healthy choices	.71	.66–.76	.51	.78
HL9 Manage stress	.65	.60–.71	.43	.70

Note. All loadings $p < .001$. HL7 and HL9 define the factor most strongly; HL4 is the weakest item.

Measurement Invariance by Gender and Age Group

Multigroup CFAs tested configural, metric (equal loadings), scalar (equal intercepts) and strict (equal residual variances) invariance. Each model was compared with the preceding one using Satorra–Bentler scaled χ^2 difference tests and changes in robust CFI and RMSEA. Because $\Delta\chi^2$ is highly sensitive with samples over 1,000, decisions followed Chen's (2007) criteria (ΔCFI $\geq -.010$, ΔRMSEA $\leq .015$). When full scalar invariance failed, the intercept with the largest score test was freed (partial invariance).

Table 3

Measurement Invariance Across Gender and Age Group

Comparison / model	χ^2 (df)	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$ (df)	p	ΔCFI	ΔRMSEA	Decision
Gender: configural	45.92 (18)	.976	.960	.060	.027	—	—	—	—	Baseline
Gender: metric	51.89 (23)	.977	.969	.053	.031	4.21 (5)	.52	+.001	−.008	Supported
Gender: scalar (full)	76.40 (28)	.962	.959	.061	.040	26.78 (5)	< .001	−.015	+.008	Not supported
Gender: partial scalar (HL2 free)	65.37 (27)	.970	.966	.055	.036	14.27 (4)	.006	−.007	+.003	Supported
Gender: strict (HL2 free)	68.63 (33)	.972	.974	.048	.037	3.45 (6)	.75	+.002	−.007	Supported
Age: configural	27.80 (18)	.992	.986	.036	.022	—	—	—	—	Baseline
Age: metric	38.08 (23)	.988	.984	.038	.034	10.94 (5)	.053	−.004	+.002	Supported
Age: scalar (full)	68.76 (28)	.968	.965	.056	.043	35.41 (5)	< .001	−.020	+.018	Not supported
Age: partial scalar (HL1 free)	53.21 (27)	.979	.977	.046	.038	16.84 (4)	.002	−.009	+.008	Supported
Age: strict (HL1 free)	74.00 (33)	.967	.970	.052	.047	20.72 (6)	.002	−.012	+.006	Not supported

Note. Gender n = 1,108 (438 female, 670 male); age group n = 1,110 (447 aged 8–10, 663 aged 11+). MLR estimation; robust CFI, TLI and RMSEA. Partial scalar models are compared with the metric model; strict models with the partial scalar model.

Gender. Loadings were equal for boys and girls. Full scalar invariance was not supported, but freeing the HL2 (fruits and vegetables) intercept restored it: at the same latent level, girls endorsed HL2 more than boys (intercepts 3.86 vs. 3.61). Strict invariance also held. In the partial scalar model, boys' latent mean was 0.20 SD higher than girls' ($z = 2.72$, $p = .007$).

Age group. Loadings were equal across age groups. Freeing the HL1 (60 minutes of activity) intercept produced partial scalar invariance: campers aged 11+ endorsed HL1 more than those aged 8–10 at the same latent level (4.05 vs. 3.75). Strict invariance was not supported,

reflecting different item residual variances in the two age groups; this does not affect comparisons of means. In the partial scalar model, campers aged 11+ were 0.16 SD lower than those aged 8–10 ($z = -2.20$, $p = .028$).

Longitudinal (Time) Invariance

A two-wave CFA modeled Healthy Lifestyles at pre-camp and at post-camp in the same summer. Each item's pre- and post-camp residuals were correlated. The model used MLR with full-information maximum likelihood (FIML), so all 1,110 campers contributed, including the 311 without post-camp data.

Table 4

Longitudinal Measurement Invariance, Pre-Camp to Post-Camp

Model	χ^2 (df)	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2$ (df)	p	ΔCFI	ΔRMSEA	Decision
Configural	81.80 (47)	.988	.984	.031	.023	—	—	—	—	Baseline
Metric	84.04 (52)	.989	.986	.028	.024	1.57 (5)	.90	+.001	−.003	Supported
Scalar	102.24 (57)	.985	.983	.032	.027	20.09 (5)	.001	−.004	+.004	Supported
Strict	130.71 (63)	.977	.976	.038	.031	27.73 (6)	< .001	−.008	+.006	Supported

Note. N = 1,110 (FIML). Each model is compared with the preceding model.

Invariance held at every level, including strict, so pre- to post-camp comparisons reflect change in the construct rather than in how items function. Latent Healthy Lifestyles did not change over camp (+0.01 SD, $SE = 0.037$, $z = 0.17$, $p = .86$), and scores were moderately stable (latent $r = .65$). Restricting the analysis to the 790 campers with complete data at both times gave the same conclusions (metric ΔCFI = +.001, scalar ΔCFI = −.004, strict ΔCFI = −.007; latent change +0.003 SD, $p = .93$).

Internal Consistency

Cronbach's α was .77 at pre-camp and consistent across gender and age groups (.77–.78). It was higher at post-camp (.82). Removing any single item would not raise α in any group. HL4 (screen time) had the lowest corrected item–total correlation (.45).

Table 5

Cronbach's Alpha Overall and by Group

Group	n	α	95% CI	Mean inter-item r	Item–total r (range)
Overall (pre-camp)	1,110	.77	.75–.79	.37	.45–.60
Male	670	.77	.74–.80	.37	.45–.58
Female	438	.78	.75–.81	.39	.45–.63
Age 8–10	447	.78	.74–.81	.38	.43–.59
Age 11+	663	.77	.75–.80	.37	.46–.63
Post-camp (complete)	790	.82	.80–.84	.44	.49–.69

Note. Item–total correlations are corrected (item removed from total).

Descriptive Statistics

Campers rated their healthy-lifestyle self-efficacy fairly high (M = 3.79 on a 1–5 scale). Item distributions were negatively skewed, except HL4 (screen time), which had the lowest mean and a flat, nearly symmetric distribution.

Table 6

Descriptive Statistics for Items and Scale Scores

Variable	n	M	SD	Mdn	Skew	Kurtosis	% at 5
HL1 60 min activity	1,110	3.86	1.27	4	−0.88	−0.31	42.9
HL2 Fruits and vegetables	1,110	3.80	1.28	4	−0.78	−0.54	41.3
HL3 Water	1,110	4.08	1.14	5	−1.08	0.25	50.4
HL4 Screen time	1,110	3.15	1.45	3	−0.15	−1.32	25.1
HL7 Healthy choices	1,110	4.02	1.06	4	−0.93	0.18	41.8
HL9 Manage stress	1,110	3.83	1.16	4	−0.80	−0.19	36.2
Healthy Lifestyles, pre-camp	1,110	3.79	0.85	3.83	−0.75	0.46	9.3
Male	670	3.83	0.83	4.00	−0.76	0.53	10.4
Female	438	3.72	0.87	3.83	−0.72	0.34	7.5
Age 8–10	447	3.83	0.89	4.00	−0.79	0.39	12.5
Age 11+	663	3.76	0.82	3.83	−0.72	0.51	7.1
Healthy Lifestyles, post-camp	790	3.81	0.88	4.00	−0.75	0.32	10.9
Sport competence (7 items)	1,110	3.29	0.76	3.29	−0.08	0.07	3.2
Physical self-efficacy (12 items)	1,110	3.11	0.59	3.17	−0.68	0.59	0.0
Effort (7 items)	1,110	3.85	0.84	4.00	−0.80	0.58	9.0

Note. % at 5 = percentage with the maximum possible score. Sport competence, physical self-efficacy and effort are pre-camp scale means.

Group Differences

Boys scored slightly higher than girls on the scale ($d = 0.13$, $p = .036$). Age groups did not differ in observed scale scores ($d = 0.08$, $p = .22$). At the item level, boys scored higher on HL1 and HL9, and campers aged 8–10 scored higher on HL4 and HL7, while those aged 11+ scored higher on HL1.

Table 7

Differences by Gender and Age Group

Variable	Male M (SD)	Female M (SD)	d	p	8–10 M (SD)	11+ M (SD)	d	p
HL1	3.98 (1.23)	3.67 (1.31)	0.24	< .001	3.75 (1.39)	3.93 (1.18)	−0.14	.028
HL2	3.77 (1.28)	3.86 (1.29)	−0.07	.28	3.84 (1.32)	3.77 (1.26)	0.05	.38
HL3	4.08 (1.14)	4.08 (1.14)	0.00	.97	4.05 (1.22)	4.10 (1.08)	−0.05	.45
HL4	3.19 (1.46)	3.09 (1.44)	0.07	.28	3.29 (1.50)	3.05 (1.41)	0.17	.007
HL7	4.06 (1.03)	3.95 (1.10)	0.11	.076	4.15 (1.07)	3.93 (1.04)	0.21	< .001
HL9	3.92 (1.13)	3.70 (1.19)	0.19	.002	3.88 (1.21)	3.80 (1.13)	0.08	.23
Scale	3.83 (0.83)	3.72 (0.87)	0.13	.036	3.83 (0.89)	3.76 (0.81)	0.08	.22

Note. Welch t-tests with Cohen's d. Positive d indicates higher scores for boys or for campers aged 8–10. 95% CI for d on the scale score: gender [0.01, 0.25]; age [−0.04, 0.20]. Mann–Whitney tests agreed (gender p = .041; age p = .076).

A 2 (gender) × 2 (age group) ANOVA on the scale score showed a significant effect of gender, $F(1, 1104) = 4.47$, $p = .035$, no effect of age group, $F(1, 1104) = 1.68$, $p = .20$, and no interaction, $F(1, 1104) = 0.79$, $p = .38$. Cell means were 3.85 for boys aged 8–10, 3.80 for girls aged 8–10, 3.82 for boys aged 11+, and 3.67 for girls aged 11+.

Group differences are somewhat larger in the latent models (gender $d = 0.20$; age $d = −0.16$) than in observed scores. The latent models account for the item intercepts that differ between groups. In the raw mean, girls' higher HL2 responses offset part of the gender gap, and older campers' higher HL1 responses offset part of the age gap.

Pre- to Post-Camp Change

Among the 790 campers with all six items at both times, scale scores did not change: 3.79 ($SD = 0.84$) at pre-camp and 3.81 ($SD = 0.88$) at post-camp, $t(789) = 0.67$, $p = .51$, $dz = 0.02$. No subgroup changed significantly: boys 3.84 to 3.89 ($p = .14$), girls 3.72 to 3.69 ($p = .59$), ages 8–10 3.86 to 3.83 ($p = .51$), and ages 11+ 3.75 to 3.80 ($p = .11$). This matches the latent result from the longitudinal invariance model.

Correlations With Other Scales

At pre-camp, Healthy Lifestyles correlated strongly with physical self-efficacy and effort and moderately with sport competence (all $p < .001$). Correlations were similar across gender and age groups.

Table 8

Pearson Correlations Among Pre-Camp Scales

Scale	1	2	3	4	α
1. Healthy Lifestyles	—				.77
2. Sport competence	.38	—			.64
3. Physical self-efficacy	.61	.49	—		.90
4. Effort	.55	.32	.56	—	.86

Note. N = 1,110. All correlations $p < .001$.

Table 9

Correlations of Healthy Lifestyles With Other Scales by Group

Healthy Lifestyles with	Overall [95% CI]	Male	Female	Age 8–10	Age 11+
Sport competence	.38 [.33, .43]	.38	.37	.35	.40
Physical self-efficacy	.61 [.58, .65]	.60	.63	.61	.62
Effort	.55 [.51, .59]	.54	.56	.56	.54

Note. Group ns: male 670, female 438, age 8–10 447, age 11+ 663. All correlations $p < .001$.

The correlation with sport competence is likely attenuated by that scale's modest reliability ($\alpha = .64$), which is expected for ratings of competence in distinct sports.

VI. Summary

The results of the psychometric testing indicate support for the Healthy Lifestyles Scale to measure healthy lifestyle behaviors for practice and research youth development initiatives. Future research will continue to strengthen this measure for research and practice.

VII. Recommended Citation of Scale

When using the Healthy Lifestyles Scale for program evaluation or research purposes, please use the following citation:

Anderson-Butcher, D., & Amorose, T. (2019). Healthy Lifestyles Scale. LiFE*sports* Initiative, Community and Youth Collaborative Institute, The Ohio State University, Columbus, OH.

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LiFE*sports* is a university-wide Initiative at The Ohio State University focused on promoting quality youth development experiences through sport, recreation, and play. For more information, please visit our website at: www.lifesports.osu.edu or contact us at osulifesports@osu.edu