



Psychometric Properties of the Perceived Wellness Culture and Environment Support Scale

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Abstract

Objective: This study reports on the psychometric properties of the 11-item Perceived Wellness Culture and Environment Support Scale (PWCESS) and its relationship with employee healthy lifestyle beliefs and behaviors.

Methods: Faculty and staff (N = 3959) at a large public university in the United States mid-west completed the PWCESS along with healthy lifestyle beliefs and behaviors scales. Data were randomly split into 2 halves to explore the PWCESS' validity and reliability and the second half to confirm findings.

Results: Principal components analysis indicated a unidimensional construct. The PWCESS was positively related to healthy lifestyle beliefs and behaviors supporting the scale's validity. Confirmatory factor analysis supported the unidimensional construct (Cronbach's $\alpha = .92$).

Conclusion: Strong evidence supports the validity and reliability of the PWCESS. Future use of this scale could guide workplace intervention strategies to improve organizational wellness culture and employee health outcomes.

Keywords

wellness culture, scale, instrument, healthy behaviors, workplace, employees, university

Findings from multiple studies document that health promotion programs, which are well designed, carefully implemented and rigorously evaluated, can have positive effects on employee health outcomes, productivity, and health-care costs.¹⁻⁴ The launch of health promotion programs in companies and organizations has accelerated over the past 2 decades with 90% of all worksites with 50 or more employees offering some type of health promotion program.⁵ Academic researchers and practitioners agree that there is no "one-size-fits-all" solution and that successful impactful workplace wellness programs must be comprehensive, including addressing tailored individual employee's health needs and desires as well as building a culture of wellness that makes healthy choices the default choices.⁶⁻⁹ The development of a population-based approach in workplace health promotion with an emphasis on culture and environment to positively influence how employees perceive it is necessary along with the implementation of individual behavior change programs to ultimately influence their health and well-being outcomes.

outcomes for successful workplace health promotion programs, including an improvement in population health.⁴ Employers in the United States emphasize that establishing a culture of health is their top priority and an essential factor for success.¹⁰ A culture of health and wellness surrounds individuals with an environment, policies, and cues that facilitate healthy choices.¹¹ It is perceived by a population through intangibles, through delivering programs and communications, and reporting how success through goals is achieved. Culture also encompasses the values and beliefs of people in an organization.¹² Johnson and Johnson's culture of health is built on 5 pillars, including leadership and commitment, enterprise programs (a distinct set of goals, engagement, and participation strategies), policies and procedures, marketing

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Background

A culture of health and wellness has come to be viewed as a critical foundation for and factor that influences positive

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and communications, and measurement and outcomes.¹² In addition to a thorough literature review with input from content experts,¹³⁻¹⁸ aspects from Johnson and Johnson's leadership, enterprise programs, and communications pillars were taken into consideration when developing the items that comprise the new Perceived Wellness Culture and Environment Support Scale (PWCESS).

Wellness culture and environment are 1 component of the socioecological framework, which is used at The Ohio State University to guide evidence-based interventions and measurement of outcomes to achieve the vision of becoming the healthiest university in the world.¹⁹ Included in this model are several levels that must be positively impacted for positive outcomes, including the individual, social networks (eg, family, work colleagues), culture and environment (eg, leadership support, grassroots efforts) and, at the outermost layer, organizational, local, state, and federal policies.

Measurement of wellness culture is important as findings from research have supported its relationship with healthy lifestyle behaviors and health outcomes.^{4,19} In the field of health promotion, several assessments have been developed over time to measure perceived culture and environment by employees in an organization, specifically corporations.¹³⁻¹⁸ However, there is limited research that assesses perceived culture and environment support conducted in institutions of higher learning. Higher education institutions are often more complex in the field of worksite health promotion because they tend to involve various organizational units who promote health and wellness, but these units often function in silos or in fragmented ways. For example, a college of public health at a University may have a health promotion initiative to reduce smoking on campus, while there is a faculty and staff fitness program operating in an exercise science department in another college. The University's human resources department also may be implementing wellness programs, while a school of nutrition is working on a faculty/staff weight loss initiative. As a result, it can become unclear who is doing what if all of the activities across campus are not coordinated and clearly communicated.

The notion of environmental support is an additional concept important for workplace health promotion programs that is included in the PWCESS. We define environment support as the physical features of the environment that promote well-being (recreation buildings and workspace ergonomics) as well as support that is provided to encourage engagement in wellness programming (eg, leadership support and ease of engagement).

Many existing culture assessments are lengthy and take considerable time to complete, which can be a barrier to its measurement. Therefore, the purpose of this study was to report on the development of a new brief perceived wellness culture and environment support scale and determine its validity and reliability using exploratory principal component analyses (PCA) and confirmatory factor analysis (CFA).

Methods

Design

A cross-sectional descriptive survey was used for this psychometric study, which was reviewed by the university's institutional review board and granted exempt status as it was an anonymous survey. Informed consent was obtained by completion of the survey.

Procedure

Information about the voluntary anonymous wellness survey was communicated to faculty and staff through multiple venues, including the university and medical center's daily news updates, e-mails from deans of the university's 14 colleges, and advertisements in the campus paper. In order to increase generalizability of the sample to the entire university population, the Office of Human Resources selected a random sample of 10% of faculty and staff from across the university who also were invited to participate in the survey. These individuals were e-mailed the survey link with a message from the investigators asking them to consider completing the survey. A reminder e-mail to complete the survey was sent to this random sample of faculty and staff 7 to 10 days following the first communication. A total of 3959 faculty and staff responded to the call for participants and completed the survey.

Measures

Perceived Wellness Culture and Environment Support Scale. The PWCESS is an 11-item instrument that was created by the first 2 authors to tap faculty and staff perceptions of the university's wellness culture and environment. Items were developed from a thorough literature review of components of a wellness culture and environment. Patients respond to each item on a 5-point Likert-type scale that ranges from 1 "strongly disagree" to 5 "strongly agree." Examples of items include: "Do you believe Ohio State has a vested interest in your health and personal wellness?"; "Do you believe Ohio State has a culture and environment that promotes health and wellness for its faculty, staff and students?"; and "Do you believe the leaders at Ohio State are actively engaged in promoting and role-modeling health and wellness?" The 11 items were formatted in a self-report questionnaire (see Table 1).

A higher score on the PWCESS indicates a perception of a stronger wellness culture and environment at the University. Face validity was established with 10 individuals. Six wellness experts confirmed content validity. Construct validity was established with factor analysis and confirmed that the items comprised a single scale. Factor analysis supported a single dimension to the scale (Eigenvalue = 5.97), and the items accounted for 64% of the variance, loading .66 or higher.

Healthy Lifestyle Beliefs Scale. The Healthy Lifestyle Beliefs Scale was adapted from other beliefs scales used by Melnyk in prior studies.^{20,21} It is a 16-item instrument that measures

Table 1. Principal Component Matrix With Factor Loadings, Eigenvalues, and Variance Explained for the Perceived Wellness Culture and Environment Scale.^a

Item	Factor Loading	Correlation to Scale
1. Do you believe the University has a vested interest in your health and personal wellness?	0.753	0.697
2. Do you believe the University has a culture and environment that promotes health and wellness for its faculty, staff, and students?	0.816	0.755
3. Do you believe the leaders at the University are actively engaged in promoting and role-modeling health and wellness?	0.767	0.701
4. Do you think health and wellness programs are readily available to you at the University?	0.783	0.720
5. Do you think that the communications you receive about wellness programs, activities, and services are clear?	0.722	0.652
6. Do you think that it is important for the University to promote health and wellness for faculty, staff, and students?	0.336	0.281
7. Have you found it easy to engage in health and wellness programs and activities at the University?	0.767	0.705
8. How satisfied are you with the current wellness programs and services offered at the University?	0.822	0.769
9. To what degree does your unit/college support your participation in health and wellness activities and events?	0.658	0.588
10. To what extent do you believe the University cares about your health and personal wellness?	0.826	0.772
11. To what extent do you agree with the statement, "I have a substantially higher overall well-being because of the University."?	0.737	0.672
12. Eigenvalue and variance explained	5.93	54%

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beliefs/confidence about one's ability to engage in healthy lifestyle behaviors (eg, I believe that exercise and being active will help me feel better about myself, I am certain that I will make healthy food choices, I believe that I can reach the goals that I set for myself). Participants respond to each item on a 5-point Likert-type scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Total scores range from 16 to 80; higher scores support stronger beliefs about the ability to engage in healthy lifestyle behaviors. Ten individuals established face validity. Eight health specialists confirmed content validity. Cronbach's α for the scale has exceeded .85 in prior research.²¹

Healthy lifestyle behaviors Scale. The Healthy Lifestyle Behaviors Scale is a 16-item instrument developed by Melnyk et al.²¹ The scale measures healthy lifestyle behaviors, which include nutrition, exercise, and goal setting. Participants respond to each item on a 5-point Likert-type scale that ranges from 1 "strongly disagree" to 5 "strongly agree." Examples of items include "I

make healthy food choices," "I exercise on a regular basis," and "I set goals I can accomplish." A higher score on the scale (range of scores is between 16 and 80 for the summed items) indicates a greater number of healthy behaviors. Ten individuals established face validity. Eight health behavior experts confirmed content validity. Cronbach's α have been over .85 in prior research.²³

Demographic and institutional characteristics. Demographic characteristics included questions about biological sex, race/ethnicity, marital status, and insurance coverage. Institutional characteristics included university campus and department, role, employee status (full or part time), and hours per week worked.

Data Analysis

The data were analyzed to address the psychometric qualities of the perceived wellness and environment scale, item and scale reliability, and construct validity of the PWCESS. The data from the survey were randomized into 2 data sets. The first ($n = 1977$) was analyzed using exploratory PCA. The second ($n = 1975$) was analyzed by fitting a CFA and estimating correlations. Prior to modeling, sampling adequacy and the appropriateness of the data for factor analysis were examined. All analyses were conducted in STATA 12.

Results

Sample Description

A total of 3959 faculty and staff (729 faculty and 3230 staff) of a total of 30 689 participated in the survey within a 2-month period of time, a 12.9% response rate. Among those with complete data (3571), more than half of the participants were female ($n = 2581$, 65.2%) and married (2350, 58.4%); the majority were white (3156, 79.7%) and were covered under one of the varieties of Prime Care Advantage insurance (3181, 80.3%). Administrative staff comprised 30% of the sample ($n = 1187$) and 18.4% were faculty ($n = 729$). All others were a combination of administrators and various other types of staff. The vast majority of participants were from the University's main campus ($n = 2887$, 72.9%), worked full-time ($n = 3326$, 84%), and reported working 40 or more hours a week (3189, 80.6%). Almost all departments were represented with arts and sciences ($n = 505$, 12.8%), the medical center ($n = 418$, 10.6%) and food and agriculture ($n = 259$, 6.5%) constituting the top 3 units with the highest number of participants. The respondents reported a moderately positive wellness culture (mean [M] = 39.1, standard deviation [SD] = 8.5), healthy lifestyle behaviors (M = 59.4, SD = 9.5), and healthy lifestyle beliefs (M = 63.4, SD = 8.6).

Construct Validity

Prior to conducting the principal component analysis (PCA), sampling adequacy was tested using the Kaiser-Meyer-Olkin statistic.²⁴ This statistic, which should be more than .70,^{24,25}

Table 2. Goodness-of-Fit Indices for the Perceived Wellness Culture and Environment Scale.

Model	χ^2 , <i>P</i> Value	CFI ^a	TLI ^b	NFI ^c	RMSEA ^d
10 item	260.67, <i>P</i> < .001	.98	.97	.98	.067 (.062-.077)

Abbreviations: CFI, comparative fitness index; NFI, normed fit index; TLI, Tucker–Lewis index; RMSEA, root mean square residual values.

^aComparative fitness index values $\geq .95$ represent a good fit.³⁴

^bTucker–Lewis index values $\geq .95$ represent a good fit.³¹

^cNormed fit index, adjusted goodness-of-fit index percentage of improvement over the null model.³²

^dRoot mean square residual values < .06 to .08, with a confidence interval.³³

was .88 indicating appropriateness for factor analysis. A second test of the data, Bartlett's Test of Sphericity,²⁵ examining whether the correlation matrix was significantly different from an identity matrix and was statistically significant ($\chi^2_{(136)} = 1030.9$, *P* < .0001).

Principal Components Analyses

Construct validity was examined by an exploratory PCA of the 11 items of the wellness culture measure from the first split half of the data. In addition to the conceptual framework, 2 quantitative criteria were used to select the number of factors to extract (1) eigenvalues that were 1.0 or higher²⁶ and (2) the examination of a scree plot of eigenvalues.²⁷

The PCA identified a single factor with the first eigenvalue of 5.921 explaining 59.2% of the variance. There were no other eigenvalues of 1.0 or higher. The solution of a single dimension was confirmed by the scree plot. No rotation was used. To be included, item loadings had to be, at minimum, .40 and did not cross-load more than .30 on other factors.²⁸ The factor structure matrix is presented in Table 1. Item 6, "Do you think that it is important for the University to promote health and wellness for faculty, staff, and students?" had a factor loading of only 0.336 and a weak correlation with the complete scale at *r* = .28. Therefore, item 6 was dropped.

Internal Consistency

The 10 items were evaluated for internal consistency by estimating Cronbach's α and examining interitem correlations and item–total correlations. The acceptable coefficient benchmark for Cronbach's α was set at .80. Item analyses were performed to examine homogeneity and potential collinearity. Acceptable coefficients for item–total correlations were $> .30$, indicating those items contributing to the measure.²⁹ Internal consistency was supported with an α of .918, with a mean intercorrelation of .539, minimum *r* = .380, and maximum *r* = .783.

Confirmatory Analyses

To adequately examine item reliability and confirm the psychometric properties of the PWCESS, a CFA model was fit to the data. The advantages of fitting the CFA model lie in the

Table 3. Estimated Reliability and Standardized Factor Loadings for the Perceived Wellness Culture and Environment Scale From a Confirmatory Factor Analysis.^a

Indicator	Reliability	Standard Factor Loading
1. Do you believe the University has a vested interest in your health and personal wellness?	.42	.733
2. Do you believe the University has a culture and environment that promotes health and wellness for its faculty, staff, and students?	.36	.811
3. Do you believe the leaders at the University are actively engaged in promoting and role-modeling health and wellness?	.47	.748
4. Do you think health and wellness programs are readily available to you at the University?	.56	.703
5. Do you think that the communications you receive about wellness programs, activities, and services are clear?	.59	.654
6. Eliminated		
7. Have you found it easy to engage in health and wellness programs and activities at the University?	.71	.671
8. How satisfied are you with the current wellness programs and services offered at the University?	.47	.747
9. To what degree does your unit/college support your participation in health and wellness activities and events?	.41	.625
10. To what extent do you believe the University cares about your health and personal wellness?	.34	.830
11. To what extent do you agree with the statement, "I have a substantially higher overall well-being because of the University.?"	.39	.715

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explicit acknowledgement of measurement error and the ability to estimate reliabilities for each item.³⁰

From the original 11 items, PCA indicated a single dimension with 10 items. The CFA model, conducted with the second split half of the data, fits as evidenced by the estimated $\chi^2_{(127)} = 260.67$, *P* < .001, and various other goodness-of-fit indices (see Table 2). The root mean square error of approximation was .067, in accordance with Browne and Cudeck suggestion that up to .08 represents reasonable errors of approximation.³² The comparative fitness index (CFI) was .98, above the .95 benchmark.³³

The estimated reliabilities for the 10 items ranged from .34 to .71, and standardized factor loadings for the PWCESS measure ranged from .625 to .830 (see Table 3). Although the loadings were consistent with those from the PCA, the reliability of .71 for item 7, "Have you found it easy to engage in health and wellness programs and activities at the University?" is higher than the other items. Internal consistency of the total scale was strong (Cronbach's α = .921).

Concurrent Validity

As further evidence of the new measure's concurrent validity, Pearson's correlations were estimated among the PWCESS, the Healthy Lifestyle Beliefs Scale, and the Healthy Lifestyle Behaviors Scale. The PWCESS was positively, moderately correlated with both the Healthy Lifestyle Beliefs Scale ($r = .335, P < .001$) and positively, weakly correlated with the Healthy Lifestyle Behaviors Scale ($r = .218, P < .001$). These correlations indicate that while they are related, the PWCESS did not measure the same constructs.³⁵

Discussion

The new PWCESS demonstrated very good psychometric properties, reliability (Cronbach's $\alpha = .92$), and validity ($r = .22-.34, P < .001$) with this population. Item 6, "Do you think that it is important for the University to promote health and wellness for faculty, staff, and students?" did not load on the single-dimension scale in the PCA nor in the CFA. This indicated that the employees' assessment of culture differed from their estimate of the importance of efforts to enhance that culture. We suggest that this item is retained as a single, Likert-type item for comparison with the culture measure as a whole.

The study sample was comparable to the overall university demographics of faculty and staff. A majority of respondents were female, which is comparable to the university where approximately 59% of faculty and staff are female. A majority of respondents were caucasian, which is comparable to the university where 75% are caucasian. A majority of survey participants were staff, much like the university that is comprised of 80% staff. In addition, the majority of the university faculty and staff (97%) work on the main campus. The response rate of 12.9% in our survey was comparable to Kwon et al¹⁸ who reported a response of 6% and 10%; other studies have reported response rates from 2% to 95%.^{13-16,18}

In comparison to other published wellness culture instruments reported in the literature that range from 14 to 43 items,¹⁴⁻¹⁷ and the PWCESS is 10 items. Given that patient burden is a major barrier in conducting research and obtaining complete data, the use of shorter scales with good psychometric properties has a definite advantage over longer scales. Although the other culture instruments reported in the literature have established validity and adequate internal consistency reliabilities, the PWCESS is the first culture and environment scale to be tested in a university setting compared to other published culture scales that have been exclusively used in corporations.¹⁴⁻¹⁷

Perceived wellness culture and environment support were positively related to the employees' healthy lifestyle beliefs and healthy lifestyle behaviors. Therefore, it is important for organizations to build a strong organizational culture and environment of wellness that could enhance the healthy lifestyle beliefs and behaviors of employees in order to ultimately influence improvements in their health outcomes. Cognitive-behavior theory contends that how an individual thinks directly influences how they behave and how they feel.³⁶ Findings from

prior research have shown that cognitive-behavioral skill building interventions can positively impact cognitive beliefs, emotional health outcomes, and healthy behaviors.^{21,37}

It is now well known that organizational success in impacting healthy lifestyle behaviors in employees is heavily influenced by its culture and environment.³⁸ The building of a wellness culture and environment that sustains requires a multi-component integrative strategy that focuses not only on individuals in the organization with evidence-based programming, wellness web portals, and health coaching but also targets the family, social, and workplace network as well as organizational policies (eg, flexible work policy, tobacco free workplace). It requires that leaders "walk the wellness talk," and the environment is one in which healthy choices are the default choice for employees. Leaders and supervisors are key in facilitating and supporting a positive wellness culture. Aldana and colleagues³⁸ found that organizations with supportive leadership were approximately 4 times more likely to report substantial improvement in employee health risk and two-and-a-half times more likely to report substantial improvement in medical cost trend. Grass roots initiatives, such as wellness champion networks, who volunteer their time to promote well-being in their colleagues also have been used as a high reach strategy to enhance a culture of wellness across an organization.³⁹ It also is important for organizations to implement strategic communications that are clear, educational, and engaging as well as those that build trust.⁴

Implications for Practice and Future Research

The PWCESS can be used to assess perceived wellness culture and environment support in employees as part of quality improvement initiatives to enhance organizational wellness culture. When using the PWCESS in corporate settings versus institutions of higher learning, the items in the scale should be changed to "your organization" instead of "the University." The new scale also can be used in future intervention studies to determine the impact of wellness focused interventions on perceived culture, healthy lifestyle beliefs, healthy behaviors, and health outcomes of employees. In a prior study, findings indicated that the effect of perceived wellness culture on employees' healthy lifestyle behaviors was completely mediated by their healthy lifestyle beliefs.¹⁹ In future uses of this survey, an item related to norms should be considered for inclusion in the scale as well as any other item that might further define perceived culture. Randomized controlled trials to determine the most effective interventions in building perceived strong wellness cultures to enhance employee health outcomes are urgently needed.

Limitations

The collection of cross-sectional data at a single point in time was a major limitation of this study. Therefore, causal inferences cannot be made about the relationships among the PWCESS, healthy lifestyle beliefs, and healthy lifestyle

SO WHAT? Implications for health promotion practitioners and researchers

What is already known on this topic?

A culture of health and wellness has come to be viewed as a critical foundation for and factor that influences positive outcomes for successful workplace health promotion programs.

Yet, brief instruments to measure perceived wellness culture by employees is lacking in the literature.

What does this article add?

This article describes the development and psychometric properties of the brief 11-item Perceived Wellness Culture and Environment Support Scale with 3959 faculty and staff at a large public land grant University in the midwest United States. Findings support the scale's validity and reliability as well as its relationship to employee healthy lifestyle beliefs and behaviors.

What are the implications for health promotion practice or research?

Use of this valid and reliable scale could guide workplace intervention strategies to improve organizational wellness culture and employee health outcomes.

behaviors. The sample was predominantly white and, as such, the findings may not be generalizable to more racially/ethnically diverse institutions. Another limitation was the response rate of 12.9% of all faculty and staff, so the findings could be biased if the employees who completed the survey were more vested in health and wellness.

Conclusion

The PWCESS is a new instrument exhibiting both good reliability and validity with this population that taps perceived wellness culture and environment support. It can be completed in 2 to 3 minutes by employees and used in both clinical practice and organizational research.

Declaration of Conflicting Interests

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