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DRUG USE AMONG HISPANIC FEMALE ADOLESCENTS WHO ARE AT RISK FOR SUICIDE Cecily Luncheon, MD, DrPH, Sejong Bae, PhD, Sue Lurie, PhD, Karan P. Singh, PhD.....	108
THE RELIABILITY AND VALIDITY OF AN ORGANIZATIONAL HEALTH CULTURE AUDIT Thomas Golaszewski, EdD, Cassandra Hoebbel, EdM, Jonathan Crossley, BS, CHES, Gabrielle Foley, MPH, CHES, Joan Dorn, PhD .....	116
HEALTH DEPARTMENTS' ACTIVITIES IN PROMOTING MOTOR VEHICLE SAFETY AMONG CHILDREN Grace K. Lartey, PhD, Farida Habib, PhD Shabbar I. Ranapurwala, Ty Bowles.....	124
EFFECT SIZE REPORTING IN CURRENT HEALTH EDUCATION LITERATURE Matthew Lee Smith, MPH, CHES, CPP, Heather H. Honoré, PhD, MSW.....	130
HETEROSEXUAL ANAL SEX AMONG MINORITY STUDENTS – RESULTS FROM A COMMUNITY NEEDS ASSESSMENT Titilayo A. Okoror, PhD, E. Thomaseo Burton, MS, Stephanie Saur, MS, Jennifer Coleman, BA.....	136
PERCEIVED SUSCEPTIBILITY TO DIABETES AND ATTITUDES TOWARDS PREVENTING DIABETES AMONG COLLEGE STUDENTS AT A LARGE MIDWESTERN UNIVERSITY Dong-Chul Seo, PhD, CHES, Mohammad R. Torabi, PhD, Kaigang Li, MS, Priya M. John, MPH, Stephanie G. Woodcox, MPH, Bilesha Perera, PhD.....	143
INFLUENCES ON ALCOHOL USE AMONG NCAA ATHLETES: APPLICATION OF THE SOCIAL ECOLOGY MODEL Ronald D. Williams, Jr., PhD, Michael A. Perko, PhD, Stuart L. Usdan, PhD James D. Leeper, PhD, Don Belcher, PhD, Deidre D. Leaver-Dunn, PhD .....	151
CHES REVIEW ACTIVITY .....	160

# American Journal of Health Studies

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## THE RELIABILITY AND VALIDITY OF AN ORGANIZATIONAL HEALTH CULTURE AUDIT

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*Abstract: The reliability and validity of an established organizational health culture assessment are examined using responses from 2613 employees from 55 western New York companies. Reliability is tested through item-total correlation and Cronbach's alpha. Validity is tested through confirmatory factor analysis, inter-correlations among the six identified factors, and examination of the relationship between the health culture score and a measure of organizational support for employee health. The results show strong evidence of internal consistency, and construct and criterion validity, suggesting the instrument is an acceptable measure of organizational health culture.*

Over the past four decades, worksite health promotion initiatives have shown great promise in addressing many of the nation's leading public health concerns. A growing literature supports its positive impact on employee health risks (Wilson, Holman & Hammock, 1996; Aldana & Pronk, 2001) health care costs (Pelletier, 2005) and productivity (Riedel, Lynch, Baase, Hymel, & Peterson, 2001; Aldana & Pronk, 2001), confirming the benefits of past initiatives. However, as this movement evolved, new ways of thinking arose to influence the intervention landscape. One approach gaining considerable attention has been the recognition of the workplace environment as critical in shaping the health status and health behaviors of employees.

The workplace environment can be broadly defined to encompass work factors, its physical structure, and health culture (Golaszewski, Allen & Edington, 2008). Of these components, the health culture maybe the least understood even with its growing prominence in best practice research (Goetzel, Guindon, Turshen & Ozminkowski,

2007). For example, in a recent article on emerging trends in the industry, Goetzel and colleagues state that a "...greater weight likely will be placed on interventions that affect the entire organization and that are instrumental in creating a healthy organizational culture" (Goetzel, Ozminkowski, Pelletier, Metz & Chapman, 2007, p. 4). Despite this interest, few instruments exist that measure organizational health culture or its sub-components, and have published evidence for reliability and validity (Ribisl & Reischl, 1993; Basen-Engquist, Hudmon Tripp & Chamberlain, 1998).

The ongoing Western New York Wellness Works (WNYWW) project has taken a broad approach in assessing the impact of multiple interventions within the western New York region (Dorn, et al, 2007). One of the areas of research interest concerned the potential impact of worksite health promotion interventions on the workplace health culture. To investigate cultural support, the Lifegain Health Culture Audit (LHCA) was added to the data collection protocol based on its brevity, comprehen-

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sion across multiple cultural domains, and a substantial history of use in health culture change initiatives (Allen, 2002). The instrument appeared to have adequate face and content validity and scores have consistently moved in the expected direction following numerous interventions providing evidence for predictive validity (Judd Allen, personal correspondence, August 2006). However, no published results were available to substantiate its metric properties.

With respect to the above, the purpose of this paper is to describe the reliability and validity testing of the LHCA instrument, and add to the understanding of cultural influences in worksite health promotion.

## METHODS

### BACKGROUND

The principle purpose of the aforementioned WNYWW initiative was to examine the feasibility of using public funding to leverage private dollars to jointly support and evaluate the physical and fiscal benefits of community-based worksite health promotion (Dorn, Hoebbel, Foley, Golaszewski & Crossley, 2008). Participant companies were selected based on a blind review of submitted proposals and awarded up to \$25,000/year for two years with one-to-one matched funding required. Thirteen applicants representing 20 organizations diverse in size, industry, demographics, and geographic location were funded to implement self-directed worksite wellness programs. Multi-faceted programs incorporating traditional health promotion activities (e.g. nutrition, physical activity, weight control, etc.) in conjunction with environmental improvements, such as walking paths/ fitness trails, and policy changes, were conducted over a two-year intervention period after baseline assessment. Standardized data collection included individual health risk appraisals (HRA), individual measures of perception of worksite culture (LHCA), a corporate environmental health survey (Heart Check), and health cost data. The Health Sciences Institutional Review Board at the University at Buffalo approved the study protocol and each person who completed an HRA and LHCA also signed a voluntary consent form for their responses to be included in the WNYWW study.

Early demographic analysis of this group indicated that minority populations were not well represented. Subsequently, an ancillary community-based grant was secured to build the Western New York Wellness Works Regional Resource Center (WNYWW-RRC). The Center was designed to target minority and rural worksites that might not otherwise have the opportunity or resources to complete such a battery of assessments. The organizations recruited by the WNYWW-RRC study did not

receive any funding for worksite health promotion interventions, and were solely offered the opportunity to complete the HRA and LHCA assessments.

### SAMPLE

Participants for this study were drawn from the composite working groups as identified in the above. Individual employee recruitment varied in design and implementation across these worksites. HRA/LHCA response rates ranged from 2.5% to 95% of potential respondents. A total of 4245 baseline LHCA's were also collected; however, only those that were complete (n = 3221) and could be linked to demographic information through a match to HRA (n = 3467) were included in the analysis. Therefore, the final study sample consisted of 2613 active employees from 55 organizations.

### INSTRUMENT

The proprietary Lifegain instrument was first developed in 1981 by a community psychologist with expertise in workplace health promotion (Allen & Linde, 1981). Based on cultural premises derived from social learning (Bandura, 1977), theory of reasoned action (Ajzen & Fishbein, 1980) and social marketing (Novelli, 1984), the instrument was adapted for use in a broad range of community and organizational settings by its owner, the Human Resources Institute, LLC.

The version of LHCA used in this study is a 23 item, Likert-type scale that measures multiple characteristics of the organization's health culture. Participants are asked to rate their level of agreement (strongly agree, agree, undecided/don't know, disagree or strongly disagree) with 23 statements on how the organizational culture plays a role in supporting healthy employee lifestyles. [Note: Typically, this data is collected anonymously with no identifiers connected to the respondent. However, in this research, it was linked with an HRA creating two potential problems. One, it increases its length and might reduce compliance. Two, inclusion with HRA reduces perceived anonymity which may increase respondent discomfort when rating peers.] The original author (Allen, 2002), cites five elements of organizational health culture that make up the LHCA: "cultural norms", "cultural values", "cultural touch points" (generally identified in the literature as "organizational support"), "peer support", and "cultural climate". Borrowing from multiple sources, including the LHCA's author, Table 1 provides operational definitions of these terms that guided this research.

### DATA COLLECTION

During the baseline period, research staff visited each participating worksite to provide voluntary par-

Table 1. Operational Definitions of the Organizational Health-Culture Construct\*

<b>Construct</b>	<b>Definition</b>
Health Culture	A socially and organizationally-constructed set of core attributes reflecting the prevailing values, underlying assumptions, expectations and definitions that members of a work organization collectively maintain; and effect the way they think, feel, and behave related to matters of personal and group health.
Components of Health Culture	
Norms	The social boundaries that define the expected and accepted ways of behaving with respect to health issues.
Values	The collective beliefs about what health-related issues are important.
Social Support	Co-worker rendering of emotional, appraisal, informational, and instrumental resources to another regarding a personal health matter or initiative.
Cultural Touch Points (Organizational Support)	The system-wide provision of informal and formal structures, services, policies and procedures that influence the organizational culture in matters of health.
Organizational Climate	A set of temporary employee attitudes, feelings and perceptions that are influenced by workplace social and structural characteristics; and serve as a catalyst to individual health behavior change.

\*Note. Adapted from the writings of Allen (2002), Basen-Engquist and colleagues (1998), Cameron (2008), and Ribisl and Reischl (1993).

ticipants with the HRA and LHCA questionnaires, and to answer questions regarding the IRB-approved informed consent. Employees were informed that participation was voluntary and confidential, and that individual results would not be shared with employers or anyone outside the research project. Completion of the paper and pencil HRA/LHCA typically took between 15 to 20 minutes. Research staff visited each site for the administration and collection of all measures in an effort to maximize the anonymity of individual responses to both the HRA and LHCA. Because the LHCA could be linked to demographic information on the HRA, it can not technically be defined as anonymous data. However, no one other than research team members had access to individual responses and participants were made aware of this prior to completion of these measures.

For the purpose of establishing criterion validity, additional data were collected using the Heart Check, an instrument that measures an organization's support for employee heart health. Heart Check is a 226-item survey that measures the existence of employer policies, services, facilities, and health program administrative features within five heart health related content areas: tobacco use, nutrition, physical activity, stress, and screening; and two general areas, organizational support (e.g., availability of subsidized health insurance), and administrative support (e.g., existence of a wellness committee) (Golaszewski & Fisher, 2002). Heart Check has well established evidence for internal consistency and inter-rater reliability; along with content, face, criterion and construct validity (Golaszewski & Fisher, 2002). Further, it has a substantial history of use

within New York State with over 1000 companies measured to date.

The Heart Check assessment is completed by a trained rater through an interview with workplace representatives, including human resource managers, occupational nurses, and safety directors. Only the WNYWW companies completed the Heart Check assessments. Items are scored +1 or 0, depending on the criterion's observation or not. Scores are then calculated for each sub-scale and the total. The higher the Heart Check score, the greater the level of organizational support for employee health.

#### DATA ANALYSIS

**Reliability.** Item-total correlations were calculated to determine the degree of consistency of each survey item to the total LHCA score. Alpha was set at a conservative .01 in recognition of the number of observations and large sample size. Moderate and significant correlations were expected as one measure of internal consistency. Low or non-significant correlations would provide evidence to consider dropping an item from further analysis.

Following the above, Cronbach's alpha was calculated with the retained items to determine the degree of internal consistency for the entire scale.

**Validity.** As a measure of construct validity, data were submitted to confirmatory factor analysis using two methods: principal-component analysis and varimax rotation. These two methods were used to account for the maximum possible variance and to create independent factors; presumably those originally identified by the instrument's author (Allen, 2002). Eigenvalues, variance explained, internal re-

liability within identified factors (Cronbach's alpha), and interpretability of factors were also obtained. Factor structures were identified for questions with loadings  $\geq .50$ . If a question loaded concurrently in two or more factors, the question was then placed into the factor with the highest loading value.

With a list of identified factors, inter-factor correlations were then determined to further substantiate construct validity. Moderate and significant correlations were expected to determine if the individual factors formed a unified dimension – organizational health culture. Alpha was set at .05 for determining statistical significance.

Last, mean LHCA scores for each company which were evaluated at the organizational level ( $n=20$ ) were correlated with their Heart Check results to examine criterion validity. With alpha set at .05, a significant correlation was expected to indicate that these two different measures of organizational health (employee perceptions and workplace structures) were related.

## RESULTS

The mean age of the sample was 42.7 years and was comprised of 65.1% women. The majority of participants were racially white (87.5%); however, this finding mimics the racial composition of the eight counties comprising the WNY region (State University of New York at Buffalo, 2008). Approximately 62.2% were married and 63.8% were college graduates. Nearly 61% of the sample reported household income greater than \$50,000 per year. There were no statistical differences ( $p > .05$ ) in demographic variables (gender, race, marital status, education and income) between the study sample ( $n=2613$ ) and all first-time respondents ( $n=4245$ ).

Of the sample used in this reliability and validity study, 967 HRAs were collected specifically from employees at WNYWW-RRC participating organizations. Nearly fifteen percent of the sub-sample self-identified as non-white, 6.1% as African American and 4.0% as Latino. Fifty-seven percent of HRA administrations occurred in organizations located in rural areas.

All item-total correlations were significant ( $p < .01$ ), with values ranging from .52 to .77 (Table 2). The mean correlation of all individual questions to LHCA total was .64. With these results, all items were retained, producing a Cronbach's alpha of .934. Thus the results showed evidence for internal consistency reliability at both the individual item level and for the instrument as a whole.

The principal component analysis was then performed and produced 4 factors with eigenvalues  $> 1.0$ , accounting for more than 65% of the total variance. Over 41% of the total variance was explained by the first factor, amounting to 3.5 times

the variance of the second factor. Eigenvalues for the 4 factors respectively were: 9.51, 2.72, 1.63, and 1.09. These 4 factors were then submitted to varimax rotation resulting in a 4 factor solution. Two of the questions, however, did not load with any of the factors based on the conservative  $\geq .50$  requirement; thus, a 6 factor solution was developed with those two questions serving as independent factors due to their strong correlation to the LHCA total.

The first factor is comprised of four items regarding exercise, weight maintenance, and healthy eating, and labeled as "Exercise/Diet Norms". The lowest loading value for any of these four questions within this factor was .81 and when analyzed as an independent sub-scale, showed a Cronbach's alpha of .918. The next six similarly worded items regarding alcohol consumption, motor vehicle operation after alcohol consumption, use of car safety belts, compliance with work safety procedures, and encouragement to not smoke and stay current on medical screenings, were labeled as the "General Health Norms" factor. These questions loaded into the factor at values ranging from .50 to .79, ( $r = .85$ ). The third factor, "Cultural Touch Points" ("Organizational Support") included all six questions regarding the commitment to, and promotion of, resources made available to employees by the organization to support healthy lifestyles. Factor loading values for these questions ranged from .50 to .84, ( $r = .88$ ). A fourth factor, "Climate", was also produced. This factor contained five questions regarding supervisor and coworker support for health practice adoption, as well as the sense of community, shared vision, and positive outlook within the organization. Factor loadings for these questions ranged from .55 to .82, ( $r = .87$ ). Lastly, there were two questions that were independent of any of the above. Question #12, regarding immediate supervisor modeling of a health lifestyle was then labeled the "Supervisor Modeling" factor, and Question #11, referencing the level of value placed upon living a healthy lifestyle in the work unit became the "Values" factor. Thus 6 factors emerged from this effort that appeared to parallel the intent of the LHCA author (Allen, 2002). Other than the splitting of the "norms" factor into two subcomponents and the combining of social support and climate indicators into one factor (both address social issues, see Table 1 Definitions), the results were consistent with what was expected.

Because of the emergence of two single-item factors, a secondary factor analysis was performed, this time with both of these items (questions #11 and #12) removed from the process. A repeat of the principle component analysis and follow-up varimax rotation produced the same four primary factors as noted previously. The total explained variance in the abbreviated model increased slightly from 65.00

Table 2. Factor Loadings for Confirmatory Factor Analysis of Lifegain Health Culture Audit© items after Varimax rotation (n=2613) and item-total correlations

Item	Item-Total (All: p<.01)	Exercise Diet Norms	General Health Norms	Values	Supervisor Modeling	Touch Points (Support)	Climate
1.Exercise regularly (at least 3 times a week)	.67	.82					
2.Maintain a healthy weight	.69	.81					
3.Eat foods low in fat and refined sugar	.71	.84					
4.Eat foods high in fiber	.72	.84					
5.Drink alcohol moderately if at all (that is not more than 14 drinks per week or more than 5 drinks on a single day)	.58		.50				
6.Never drive after drinking alcohol or ride in a car driven by someone who has been drinking	.57		.79				
7.Use car safety belts	.63		.78				
8.Follow safety precautions at work (including practicing good lifting techniques and organizing the work environment to avoid injury)	.52		.77				
9.Not smoke	.59		.57				
10.Stay current on medical screenings	.69		.53				
11.Living a healthy lifestyle is highly valued in my work unit	.77			1.00			
12.My immediate supervisor models a healthy lifestyle	.57				1.00		
13.My workplace shows commitment to supporting healthy lifestyles through its use of resources such as time, space and money	.66					.72	
14.People in my work unit are taught skills to achieve a healthy lifestyle	.68					.80	
15.A new employee in my work unit is made aware of support to live a healthy lifestyle	.64					.84	
16.In my work unit, people are rewarded and recognized for efforts to live a healthy lifestyle	.60					.80	
17.In my work unit, participation in healthy activities is a primary way to renew friendships and to meet new people	.65					.69	
18.In my work unit, unhealthy behavior such as smoking and excess drinking is discouraged and confronted	.60					.50	
19.My immediate supervisor supports employee efforts to adopt healthier lifestyle practices	.66						.55
20.My immediate coworkers support each other's efforts to adopt healthier lifestyle practices	.68						.60
21.My work unit has a sense of community (e.g., people really get to know each other, feel that they belong and care for each other in times of need)	.58						.82
22.My work unit has a shared vision (e.g., people feel that the organization's conduct is consistent with their personal values and people are clear about how they fit in...)	.66						.80
23.My work unit has a positive outlook (for example, people enjoy their work, celebrate accomplishments, adopt a "we can do it" attitude and bring out the best in each other)	.59						.81

Mean: .64  
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Table 3. Comparison of Explained Variances Between Full and Reduced Item Factor Analyses

	All 23 Items	Questions 11 & 12 removed
KMO Measure of Sampling Adequacy	.941	.934
Percent variance Explained by 4 factors	65.001	66.768

Table 4. . Intercorrelations among components of the Lifegain Health Culture Audit© and total score (n = 2613)

Component	Exercise/ Diet Norms	General Health Norms	Values	Supervisor Modeling	Support	Climate	Total
Exercise/Diet Norms		.64**	.64**	.32**	.48**	.40**	.78**
General Health Norms			.61**	.35**	.41**	.46**	.79**
Values				.46**	.55**	.53**	.77**
Supervisor Modeling					.47**	.51**	.57**
Touch Points (Support)						.64**	.81**
Climate							.78**
Total							

\*\* Correlation is significant at the 0.01 level (2-tailed).

to 66.77 (see Table 3), and factor specific explained variance shifted slightly as well, however, these changes were nominal. Because of these minor differences and the observance of strong item to total correlations for questions #11 and #12 (Table 2), the original six factor solution was retained for all further analyses. For example, the values factor (item #11) had the highest item to total correlation of all variables (.77) suggesting its importance in identifying the organizational culture.

Table 4 shows the inter-factor correlations among the six variables. Correlations ranged from .32 to .64, all significant at  $p < .01$  and well within the moderate range target. These results lend further support for construct validity.

Finally, with the unit of analysis at the organizational level ( $n = 20$ ), mean LHCA total scores showed a moderately strong correlation of .56 ( $p < .01$ ) with the Heart Check, providing evidence for criterion validity. These analyses were restricted to the organizations participating in the WNYWW study, as organizations participating in the WNYWW-RRC ancillary project were not assessed at the environmental level using Heart Check.

## DISCUSSION

The purpose of this research was to gather evidence on the reliability and validity of an established but untested health culture inventory. Evidence was provided for reliability demonstrating both high item-total correlations and Cronbach's alpha scores.

Evidence for validity was provided by the identification of six factors which were consistent with those proposed by the instrument's author (Allen, 2002). Additional validity support was provided by the observance of strong correlations among these factors, as well as their relationship to an established measure of structural supports for employee health, the Heart Check. With respect to the above, several suggestions are offered for future developmental or application's research:

- The LHCA was designed to examine cultural support for healthy lifestyle practices. With evidence for metric quality now established, further research could test with greater confidence the relationship between LHCA scores and successful lifestyle improvement efforts, lifestyle change attempt rates, and whether employees in a healthy culture are less likely to adopt new risks. This line of reasoning is well supported in the workplace health domain (Stokols, Pelletier & Eielding, 1996), though virtually no research of this type exists in the present.

- The observed strong relationship of the total health culture score to the Heart Check opens another new area of research opportunity. The authors conceptualize future research that explores the relationship between total and factor scores to specific Heart Check criteria, and hopefully, identifies worksite structural features (e.g., policies, facilities) that impact culture. In combination with the research agenda above, if this other research initiative proves promising, dramatic shifts in intervention focus could possibly evolve. For example, rather than

an almost exclusive emphasis on individual behavior change, future efforts at the workplace might focus on the organization as the intervention priority (DeJoy & Wilson, 2003). For example, changes in workplace policy and structural features may drive improvement in the health culture climate thus laying the foundation for meaningful and lasting employee behavior change. The focus on the organization also improves the likely efficiency and cost effectiveness of large, population-based initiatives in the public health domain. The absence of research on workplace cultural factors has undermined this type of research. The availability of the metrically-tested LHCA and future culture-based instruments should enhance this line of research activity.

- The high Cronbach's alpha ( $r = .934$ ) and strong inter-factor correlations suggest considerable redundancy within constructs. This result offers the possibility that a shorter, more precise organizational culture scale might be created. On the other hand, the acceptance of two, single-item factors suggests room for additional items to enhance the instrument's sensitivity regarding the areas of health values and supervisor support. The construct of health values is well established in the health promotion literature and its ability to define the health culture might be further improved with added questions in future instruments. Less is known about supervisor support, a relatively little investigated construct in the worksite health promotion setting. This area in particular would suggest further research activity.

- Future instruments may utilize a six response scale with the "undecided"/ "don't know" mid-scale category separated, with "don't know" positioned outside of the scale. Anecdotal evidence from this research suggests that some respondents were confused by the combination of these response options into one.

In summary, these data support the utility of the LHCA as a valid and reliable instrument to measure the construct of organizational health culture. The results further suggest that organizational health culture is multi-dimensional and can be measured accurately across a wide spectrum of work organizations and employee demographics. Finally, this effort provides strategies to facilitate the development of new instruments and the progression of novel research opportunities that should arise in this growing area of interest in worksite health promotion.

## RESPONSIBILITIES AND COMPETENCIES OF HEALTH EDUCATION

Responsibility IV – Conduct Evaluation and Research  
Related to Health Education  
Competency B: Review research and evaluation

procedures.

Competency C: Design data collection instruments.

Competency F: Infer implications from findings for future health-related activities.

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