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CONSTRUCT VALIDITY AND RE-ASSESSMENT OF THE RELIABILITY OF THE HEALTH CONCERN QUESTIONNAIRE

Ruth C. Engs

The Health Concern Questionnaire was developed almost 20 years ago (Engs, 1970) and has been used by both personal health classroom instructors and researchers. In this time some of the terminology for certain items have changed. A more serious limitation of its usefulness was that construct validity was not initially determined, resulting in the inability to calculate a total mean health concern score. Thus the purpose of the study was to update the terminology, determine construct validity, and revalidate the internal consistency of the instrument.

The first step in this procedure was to have a panel of individuals who had taught personal health classes suggest changes in terminology. The next step was to accomplish a factor analysis to determine underlying themes using an eigenvalue of 1, resulting in nine factors. Factor 1 contained 27 of the items and accounted for 31% of the variance. Since there was no underlying theme of health areas for any of the factors, a two-factor solution with an eigenvalue of 2 was used. The results indicated factor 1 contained 33% of the variance and included 31 items dealing with issues of personal, social, and mental health problems. The remaining items in factor 2 contributed 7% of the variance containing sexuality and personal health items. Further analysis indicated a correlation between the two primary factors was positive (r=.6). This relationship enabled the collapse of the 50 items into one factor and the feasibility of computing total mean health concern score.

Cronbach's alpha (r=.96), Spearman-Brown's split half technique (r=.92) and Guttman's split half technique (r=.92) all revealed high reliability coefficients. The item reliability of each of the 50 items correlated with the total mean score and revealed positive coefficients. They ranged from r=.43 to r=.73.

*In summary, current terminology for the Health Concern
Questionnaire has been added. A total mean health concern score
can be ascertained and the instrument shows high internal consistency
homogeneity.*

The *Health Concern Questionnaire (HCQ)* has been used over the past 20 years by educators to rank college students' concerns about health-related issues. This information is then used for curriculum planning in personal health classes. It has also been used in research studies attempting to determine current health concerns (Schaaldt and Engs, 1971), health concerns in relationship to specific health areas (Engs, 1983), changes in health concerns over time (Goodrow, 1977; Engs, 1985), and cross-cultural aspects of health concerns (Engs and Badr, 1984). It has also been used in unpublished studies by graduate students. However, the HCQ is now about 20 years old. It was originally developed as a masters thesis between 1968 and 1970 (Engs, 1970). Since it is still used by health educators both in the classroom and for research purposes, it needs to be updated. Items in the original questionnaire involved physical, mental, and social concerns at the personal and societal level. Topics on the HCQ included human sexuality, alcohol and other drugs, accidents, environmental issues, social conflict, mental health, personal health, sexually transmitted disease, and chronic illnesses.

A limitation of the questionnaire was that it could only rank students' concerns about various health topics, rather than providing a total health concern score. A total score would make the HCQ more useful. This limitation exists because factor analysis, which would determine underlying themes for the possible calculation of a single score, had not been conducted during initial scale development. Moreover, a basic assumption, according to Durkheims' (1951) theory of social change, suggests that as society changes people's attitudes and beliefs also change. This could lead to changes in terminology and concerns about a variety of health matters. For more accuracy in gauging students' concerns about health items, current terms were needed.

Therefore, the purpose of this study was to revise the original instrument in terms of current terminology and concerns. Additionally, construct validity of the scale items would be

assessed to determine the feasibility of being able to sum the items in a manner which would result in a total health concern score. Finally, the health concerns of students in the latter part of the 1980s would be ranked; this information may serve as a guideline for curriculum planning.

METHODS

Sample

All students enrolled in the small section (<50 students) personal health classes at a large midwestern university during the 1988 academic year were asked to volunteer to participate in the study. This course enrolls students from all undergraduate majors and is considered a life science elective.   Procedures for administering the questionnaire conformed to the Human Subjects Review committee protocol. Approximately 30 questionnaires were unusable due to improper completion. The resulting convenience sample contained 388 undergraduate students (92% response rate). Power analysis indicated this sample size had enough power to detect significant differences (Cohen, 1988).

Degree of Concern

Students indicated their degree of concern for each item by using the number "5" for Extremely Concerned, "4" for Very Concerned, "3" for Moderately Concerned, "2" for Mildly Concerned, and "1" for Not Concerned. To interpret the results for comparisons across these groups, each item was given a value range. "Extremely Concerned" = 5.00-4.56, "Very Concerned" = 4.5-3.56, etc.

Various procedures (discussed below) were utilized to assess content validity, construct validity, item reliability, and internal consistency.

Content Validity

The instrument was first tested for content or face validity to determine if it still measured what it was intended to test. To carry out this procedure it was initially reviewed by four doctoral students and three faculty members who had taught personal health courses. They were asked to update terms, to clarify confusing items, and to comment on the apparent validity of each item.

After examination by these individuals, several items were changed. "Venereal Disease" was changed to "Sexually Transmitted Diseases other than AIDS." "Vietnam War" as a current crisis issue was replaced by "AIDS," "Atomic Warfare" was updated to "Nuclear Warfare," and "Vietnam Combat" was changed to "Combat."

The resulting form was administered to 97 personal health students during the 1987 spring term. They were asked to comment and to clarify items which were not easily understood. No items were changed.

Construct Validity

A search for underlying themes was conducted using the factor analysis technique. A minimum eigenvalue of 1.0 and the orthogonal rotation solution (varimax) procedure using the SPSSX package was used (Norusis, 1987). This procedure was also carried out to determine if a simple method for summing all of the items resulting in a total health concern score would be possible.

Items Reliability

Item reliability of each item in relationship to the total score would be carried out using the Pearson Correlation analysis depending upon the results of the factor analysis. This procedure would be accomplished if the factor analysis indicated that either a simple regression equation for determining a total score could be utilized or if the individual items could be summed for a total health concern score.

Internal Consistency and Homogeneity

To examine the internal consistency reliability of the 50 item questionnaire, the Spearman-Brown prophecy formula for equal lengths test was accomplished. Cronbach's alpha measurement of homogeneity was calculated. The Guttman's split-half technique for reliability of the instrument was also calculated. All these procedures were accomplished using the SPSSX program (Norusis, 1987).

Ranking of Health Concerns

To rank the items, the highest to lowest mean score of each item was determined. In case of ties the item with the greatest variance was ranked first.

RESULTS

Construct Validity

Factor analysis using principle component analysis with an orthogonal (varimax) rotation solution and a minimum eigenvalue of 1 as the cut-off point for the totaled factors, indicated the instrument contained nine factors. Factor 1 explained 33.3% of the variance. It contained 27 of the 50 items. Factor 1 contained miscellaneous items ranging from "liver diseases" to "masturbation" and involved personal, social, physical, and mental health items. Factor 2 contained 19 items with five of the items relating to sexual matters while the other items identified other personal health problems. This factor accounted for 7% of the variance. Factor 3 contained three items related to war or pollution. The other factors contained one item each. It was decided to keep the three items from factor 3 in this scale as they are important current environmental health problems. However, it could be easily argued that these items should be deleted and only the 46 items in factor 1 and factor 2 be retained. Because no clear underlying themes were found and because of the numerous resulting factors, the

analysis was recalculated with a forced two factor solution. This was accomplished by using a minimum eigenvalue of 2.

This resulted in Factor 1 containing 31 items (explaining 33.3% of the variance) and factor 2 containing the remaining items (explaining 7% of the variance) (Table 1). The correlation between the two factors was positive (r=.58).

Because of the high association between the two factors and because both factors appeared to be a mix of personal, mental, social, and environmental issues, it was concluded that the test of 50 items could be collapsed into one factor. This results in the ability to sum all of the 50 items for a total health concern score.

Homogeneity and Internal Consistency

The Cronbach alpha test for homogeneity of the 50 item instrument revealed an extremely high alpha coefficient (r=.96). The Guttman's split half technique procedure resulted in a high reliability coefficient (r=.92). Likewise the Spearman-Brown held technique for equal length tests revealed a highly significant (p<.001) reliability coefficient (r=.92). These high reliability coefficients infer that the test halves are highly correlated and the questionnaire has high internal consistency.

The mean score for the questionnaire was 118 (SD=32). The 93 individuals one standard deviation above the mean (>150) were considered to have a high degree of concern about these items, while the 114 individuals one standard deviation below the mean (<86) were believed to have a low degree of concern. The total health concern score can range from 50 to 200.

Item Analysis

Item analysis for each of the 50 questions with the total health concern mean score revealed that all items had a reliability coefficient above r=.43. The reliability coefficients ranged from r=.43 to r=.72.

Ranking of Concerns

The highest ranking health concern was AIDS with a mean score of 3.5 that fell in the range of "moderate" concern. Since this is a fatal disease with no cure, it was encouraging to find that students do in fact feel concerned about this condition. Of course, it is unknown if students in this sample who are concerned then engage in positive prevention methods. The other top ten items included a mixture of social, mental, and personal concerns. They consisted of: the future (death, what I'll be like in 10 or 15 years), sexuality (birth control, use of contraceptives, sexually transmitted diseases other than AIDS), chronic disease (cancer), accidents (auto accidents), overweight, and nuclear warfare. For these top ten concerns students in this sample indicated only "moderate" concern for any item with the mean scores ranging from 3.5 to 2.9 (Table 2).

Two of the leading causes of death among youth, namely auto accidents and cancer, were included among the top ten concerns. On the other hand, suicide, another leading cause of death, ranked 26th. Perhaps this problem is not being thoroughly discussed in mental health units of personal health courses, and students may not be aware that suicide is a problem among youth.

SUMMARY AND CONCLUSION

The determination of construct validity of the Health Concern Questionnaire has resulted in a more usable instrument for a variety of situations. Determining a high correlation between the two major factors underlying the instrument enables the researcher or educator to administer the questionnaire and obtain a total health concern score. Re-assessment of the internal consistency of the instrument demonstrated the questionnaire is highly reliable. Moreover, the researcher or educator can determine the degree of concern for each individual item by assessing its mean score and then ascertain the ranking of all health items. For this sample of students, AIDS was the item of most concern. Among the top ten areas were issues of sexuality, leading causes of death among this age group, and potential future health issues.

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Table 1

Forced 2 Factor Solution Using (Varimax Rotation)
Eigenvalue Minimum of 2 for Testing
Construct Validity (N=388)

Factor	Eigenvalue	% of Variance	Correlation Coefficient Between Factor 1 & 2
1	16.6	33.3	.58
2	3.3	6.7	
3	1.9	3.8	
4	1.8	3.5	
5	1.5	3.0	
6	1.4	2.9	
7	1.3	2.5	
8	1.2	2.3	
9	1.1	2.1	

Table 2

Mean Score and Standard Deviation of All 50
Items Ranked by Descending Score

Item		Mean	Standard Deviation
1.	AIDS	3.5	1.2
2.	Cancer	3.3	1.1
3.	What I'll be like in 10 or 15 years	3.3	1.2
4.	Birth Control	3.3	1.2
5.	Auto Accidents	3.3	.9
6.	Use of Contraceptives	3.1	1.2
7.	Death	3.1	1.3
8.	Sexually Transmitted Disease other than AIDS	3.0	1.3
9.	Overweight	2.9	1.4
10.	Nuclear Warfare	2.9	1.1
11.	Heart Disease	2.8	1.2
12.	Childbirth	2.8	1.3
13.	Smoking and Disease	2.7	1.3
14.	Pregnancy	2.7	1.4
15.	Sex Behavior	2.6	1.5
16.	Halitosis (bad breath)	2.5	1.3
17.	Acne	2.4	1.1
18.	Alcohol Dependence	2.4	1.1
19.	Poor Teeth and Decay	2.4	1.2
20.	Nervousness	2.3	1.0
21.	Moodiness	2.3	1.0
22.	Eye Disorders and Blindness	2.3	1.2
23.	Biological and Chemical Warfare	2.3	1.2
24.	Air Pollution	2.3	1.0
25.	Being Burned	2.3	1.1
26.	Suicide	2.3	1.0

Item		Mean	Standard Deviation
27.	Water Pollution	2.3	1.3
28.	Drowning	2.2	1.2
29.	Starvation and Malnutrition	2.2	1.2
30.	Airplane Accidents	2.2	1.1
31.	"Colds"	2.2	1.2
32.	Sterility	2.2	1.0
33.	Drug Abuse	2.2	1.0
34.	Emphysema or Respiratory Disease	2.1	1.2
35.	Firearm Accidents	2.1	1.3
36.	Combat	2.1	1.2
37.	Headache	2.0	1.0
38.	Homosexuality	2.0	1.3
39.	Kidney Disease	2.0	1.0
40.	Mental Illness	2.0	1.1
41.	Mononucleosis ("mono")	2.0	1.0
42.	Radiation	2.0	1.0
43.	Liver Disease	2.0	1.0
44.	Nausea	1.8	1.0
45.	Population Explosion	1.8	1.0
46.	Accidents due to Electric Current	1.7	1.0
47.	Tuberculosis ("TB")	1.6	0.9
48.	Riots	1.6	0.9
49.	Poisoning by Snakes	1.5	0.9
50.	Masturbation	1.3	0.7