The Sex Knowledge and Attitude Test

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The Sex Knowledge and Attitude Test (SKAT) was developed as a means of gathering information about sexual attitudes, sexual knowledge, and degree of experience in a variety of sexual behaviors (Miller & Lief, 1979). It was hoped that the SKAT would be of value as a teaching aid in courses dealing with human sexuality and serve as a research instrument for educators, social scientists, and health professionals. Since its publication in 1972, the SKAT has been administered to thousands of undergraduate, graduate, nursing, and medical students and other health professionals. The test has been used in many countries and has been translated into a variety of languages.

Description

The SKAT is an omnibus instrument: It consists of an attitudes section, a knowledge section, and two sections dealing with background data and sexual experiences. The SKAT contains 149 multiple-choice questions. Part I (Attitudes) is composed of 35 five-alternative, Likert-type items. Part II (Knowledge) contains 71 true/false items, and in Parts III and IV the number of response alternatives per item ranges from 2 to 10 (Table 1). In addition to item-response data, scores on four attitudinal scales and two knowledge scales may be obtained. The SKAT attitudinal scales are not designed to assess or to diagnose individuals as such. They should be used in a survey fashion—to describe groups of respondents.

Beginning in 1965, Lief and Reed assembled a pool of questionnaire items drawn primarily from three sources: (a) a survey of relevant literature, (b) clinical experience, and (c) socially controversial sex-related topic areas. This pool of questions gave the SKAT its essential character in the sense of content areas to be covered and item formats to be adopted. Several early decisions were made: (a) The SKAT would consist entirely of multiple-choice and true/false items and would be scorable; (b) there would be measurement of a number of variables through groups of items (e.g., scales); and (c) the SKAT would be potentially usable throughout the range of post-high school higher education.

A 180-item draft questionnaire was assembled. The preliminary version was administered to 834 students in three countries: 300 in England, 34 in Sweden, and 500 in the United States. These data led to the second experimental version (SKAT, Form I). During 1969-1970, the revised SKAT was completed by 2,274 medical students at 43 institutions. Examination of this second round of data led to the present SKAT.

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Table 1 Content of the Sex Knowledge and Attitude Test

- A. Part I—Attitudes (35 items)
  - *Topic areas*
    1. Sexual activities outside marriage
    2. Sexual activities within marriage
    3. Sexual activities before marriage
    4. Sexual variance, causative agents, and remedial or punitive actions
    5. Auto eroticism: male, female, group
    6. Abortion: medical-legal aspects; personal freedom
- B. Part II—Knowledge (71 items)
  - *Topic areas*
    1. Physiological aspects
    2. Psychological aspects
    3. Social aspects
- C. Part III—Basic Information (12 items)
  - *Topic areas*
    1. Basic Information
       - a. Age
       - b. Sex
       - c. Race
       - d. Marital status
    2. Personal Background
       - a. Father's occupation
       - b. Parents' education status
       - c. Religious affiliation
       - d. Earliest sex education
- D. Part IV—Frequency of Sexual Encounters (31 items)
  - *Topic areas*
    - a. Heterosexual encounters
    - b. Dating, etc.
    - c. Autoerotic activities

The 1972 version of the SKAT represents essentially an abridgement of the previous experimental versions. At the same time, it stands as the outcome of more than 7 years of continuous research, development, and deliberation.

The development of the SKAT attitudinal scales. The final form and item composition of the attitudinal section of the SKAT (Form 2) is the direct result of an empirical analysis of the 50 attitudinal items contained in its predecessor, the SKAT (Form I). Factor analysis (with oblique rotation) of the item responses of 1,137 freshmen through senior medical students (oblique solution for simple loadings), using the simplest criterion for determining the number of factors to rotate (the number of eigenvalues above 1), identified four factors underlying the Attitudes section of the SKAT (Form I): Liberalism (renamed Heterosexual Relations), Acceptance of Sexual Myths, Abortion, and Autoeroticism. Scale scores on these factors were obtained by summing within each scale those items that had factor loadings above

.30. Internal consistency reliability was estimated for each of these scales through the calculation of alpha coefficients. These results were cross-validated with a separate sample of 1,137 freshmen through senior medical students. Although there was very little shrinkage upon cross-validation, several of the scale reliabilities were fairly low (.50-.70). The current revision of the Attitudes section of the SKAT (Form 2) was undertaken in an attempt to further refine the empirically derived scales from the SKAT (Form I).

Because the SKAT was conceived as an instrument for describing groups rather than individuals, it was concluded that the number of items per scale could be relatively small (with a consequent loss in reliability of individual scores). With the items from the SKAT (Form I) as a nucleus, new items were constructed.

In the fall of 1971, the SKAT (Form 2) was administered to 850 freshmen through senior medical students in 16 medical schools throughout the United States. Respondents within this group were randomly assigned to either the experimental or the cross-validation samples. The results confirmed the four factors developed from the SKAT (Form I). The item means, standard deviations, and item-scale correlations of those items loading significantly on each factor in the SKAT (Form 2) are presented in Table 2. Item statistics were based on complete data within a scale. Repeating the process articulated earlier, scale scores were calculated for each of the four scales for all members of the experimental sample, and internal consistency reliability estimates (coefficient alpha) were computed. These results were then verified on the cross-validation sample. The raw scale score means, standard deviations, sample sizes, and coefficient alpha reliability estimates for each scale in both the experimental and cross-validation samples are presented in Table 3.

The data presented in Table 3 are clear evidence for the high stability and internal consistency of the SKAT (Form 2) attitudinal scale scores. The varying number of subjects within each scale is the result of incomplete data.

Table 2 Item Statistics for the Sex Knowledge and Attitude Test (Form 2) Attitudes Questions

Question	*Scale*	*Direction*[a]	*M*	*SD*	*Item-total correlation*
1	SM	F	3.40	1.17	.50
2	SM	F	3.51	0.98	.48
3	HR	F	2.89	1.22	.52
4	A	R	3.88	1.24	.78
5	SM	F	3.86	1.05	.56
6	M	R	3.63	0.91	.72
7	HR	F	3.98	1.11	.79
8	SM	F	3.88	0.99	.53
9	M	F	4.11	0.88	.77
10	HR	R	3.27	1.07	.76
11	A	F	4.12	1.10	.71
12	M	F	4.20	0.85	.76
13	A	R	3.21	1.40	.64
14	SM	F	4.31	0.83	.54
15	A	R	3.39	1.24	.65
16	HR	F	4.04	1.12	.81
17	SM	F	4.21	0.82	.55
18	A	R	3.22	1.36	.69
19	M	F	4.26	0.81	.74
22	A	F	4.66	0.66	.42
23	HR	R	3.54	1.10	.75
24	M	R	2.45	0.85	.59
25	A	F	3.11	1.08	.46
26	SM	F	3.91	0.88	.57
27	HR	R	4.10	1.01	.77
29	SM	F	4.05	0.81	.56
30	SM	F	3.53	0.89	.55
31	A	F	4.22	1.02	.69
32	M	F	3.31	0.97	.62
33	HR	F	3.54	1.11	.70
34	HR	R	2.81	1.06	.53
35	M	R	3.58	0.93	.71

Note. Questions 20, 21, and 28 are not included in the scoring. SM = Sexual Myths; HR = Heterosexual Relations; A = Abortion; M = Masturbation/Autoeroticism.

a. R = reverse scored; F = scored forward.

The knowledge section. Part II combines 21 true/false items chosen specifically for the heuristic (teaching) value and 50 true/false questions selected on the basis of purely psychometric considerations. Those items designated as teaching items were selected from the larger item pool using the following criteria. First, any item designated as a teaching item had to be one that the authors considered all medical or graduate students should know, but that previous research had indicated that at least 10% failed to answer correctly. In most cases, over 25% of these students failed to answer correctly the teaching items. Second, the content of any item designated as a teaching item had to be of such a nature that it could serve as the focal point for either a lecture or a group discussion.

Items included in the 50-question sex knowledge test were selected using purely psychometric criteria: item dif-

Table 3 Raw Score Means, Standard Deviation, Sample Sizes, and Coefficient Alpha Reliability Estimates for the Sex Knowledge and Attitude Test (Form 2) Attitudinal Scales

	Experimental sample				*Cross-validation sample*			
Scale designation	*M*	*SD*	*N*	α	*M*	*SD*	*N*	α
Heterosexual Relations	28.10	6.41	420	.86	28.35	6.19	420	.86
Sexual Myths	34.72	4.62	422	.71	334.82	4.48	420	.68
Abortion	29.70	6.08	423	.80	29.99	5.66	418	.77
Autoeroticism	25.65	4.20	424	.81	25.63	4.55	418	.84

ficulties ranging from .25 to .75, point biserial correlations of .30 or greater, and each item adding a positive increment to the consistency of the overall test.

The raw correct score mean of the 50-item knowledge test, based on the entire sample of 851 medical students, is 38.81. The 50-item test has a standard deviation of 5.78 and a standard error of measurement of 2.75. The reliability (K-R 21) has been estimated to be .87.

Response Mode, Timing, and Scoring

On average, it takes about 30 minutes to complete the SKAT, less if only Parts I and II are used, as is often done. In the Attitudes section, respondents circle the number indicating their agreement or disagreement with each statement. The Knowledge section involves true/false responses. A scoring sheet for the true/false part of the test is supplied to the investigator. The scoring sheet differentiates the test items from the teaching items as well as indicates whether the item is true or false. On the section dealing with Attitudes, 14 of the 35 items are reverse scored (see Table 2).

With regard to missing data, the procedure adopted is to compute no Attitudes scale score when an individual has omitted more than one of the items within a scale. When one item is omitted, the mean of the answered item values is added to the sum of the answered items to obtain a total raw score estimate. Researchers using the scales should bear in mind that the scales in the SKAT must be regarded as ordinal measures only. That is, scale scores serve to order groups of students in higher-than or lower-than relationships on the dimensions measured by the scales.

As an aid to both classroom teachers and researchers, two scores can be used for each subject on the SKAT, Part II. One represents the total number of correctly answered items for all 71 items in Part II, and the other is a *T* score derived by standardization of the number of items correctly answered on the 50-item sex knowledge test.

Reliability and Validity

Internal consistency estimates (coefficient alpha), based on a sample of 425 medical students in 15 medical schools, are .86 for Heterosexual Relations, .71 for Sexual Myths, .80 for Abortion, and .81 for Autoeroticism. These reliabilities were used to calculate the standard error of measurement presented in Table 2.

Evidence for the construct validity of the SKAT Attitudes and Knowledge scales comes from two general types of evidence: (a) correlations between the SKAT scales and selected items within the SKAT, and (b) studies in which the SKAT was administered to respondents before and after some intervention expected to alter sexual attitudes and/or knowledge. Correlational studies based on a sample of 850 medical students demonstrated construct validity (Miller & Lief, 1979). Each of the four Attitudes scales is related to other SKAT responses in a way that supports the meaning and interpretation of the scales. For example, liberal attitudes about heterosexual relationships are associated with greater numbers of coital partners ($r = .39$) and a greater rejection of conservative social values ($r = .48$). An increased tendency to reject sexual myths is related to greater sexual knowledge ($r = .57$). Conservative attitudes about abortion are significantly associated with the Catholic religious preference ($r = .34$), and liberal attitudes toward masturbation are associated with greater frequency of masturbation in senior high school ($r = .23$). With a sample of 850, correlations of .10 are significant, $p < .01$.

Evidence for the validity of the Knowledge scale is more difficult to obtain from such an internal analysis of item interrelationships because it is less clear how one's knowledge about sexuality should relate to sexual values or behavior. It is noteworthy, however, that the highest correlation involving the Knowledge scale is that between the Knowledge scale and the Sexual Myths scale.

The second type of evidence for the construct validity of the SKAT scales, that obtained from SKAT testing before and after an intervention designed to change attitudes and/or knowledge, may be found in a number of published studies. Most, but not all, studies demonstrate an increase in sexual knowledge and liberalization of sexual attitudes as measured by the SKAT following educational experiences designed to produce such changes. Several relevant references are included in the list of references.

Other Information

About 35,000 medical students had taken the SKAT by 1979 when computer analysis was no longer included as a direct service to researchers. Since that time, it has been impossible to estimate the number of people who have taken the test, but there is no doubt that many thousands more have been given the SKAT. Not only has it been given to medical students, its primary population, but college students and their parents, nursing students, graduate students, graduate nurses, a variety of health professionals, handicapped adults, public school teachers, and even spouse-abused women have taken the test, and it has been administered to American, English, Swedish, Israeli, Arab, Colombian, Spanish, Indian, and Japanese medical students (and this list is probably not complete).

The SKAT is no longer available directly from the author. It is available on the Internet. The Web site is www.itgworld.com. The program is available on diskette. It is currently priced at $95 for a single-station license, $199 for a 5-station license, $295 for a 10-station license, and $495 for a site license. These prices are for having the program shipped. If it is downloaded from the Web site, the single station is discounted. Prices and additional information can be obtained from either the Web site or by email at the following address: dan@itgworld.com.

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