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AUTHOR Murray, Norman B.
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ABSTRACT

Someone who wants to measure affect in a local setting must construct his own instrument since there are few if any such instruments available from outside sources. The Thurstone attitude test constitutes one alternative operational definition of affect which can be used to accomplish this measurement task. There is a large array of specific skills which constitute the ability to construct a valid Thurstone test. Since these skills are not generally available, a training package has been prepared to train the average college graduate to be able to prepare a Thurstone attitude test. Some of these skills involve voluninous arithmetic calculations for which the package provides two alternatives. Our method uses special computation sheets on which the calculations can be done by hand. The other employs data processing techniques making the tasks much easier. Results of a limited tryout (N = 15) are reported. A copy of a Thurstone affective instrument is appended. (Author/CK)

CONSTRUCTION OF A THURSTONE ATTITUDE TEST

Norman B. Murray

Brigham Young University

Provo, Utah

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Measurement of Attitude

The attitudes of an individual are frequently observed and subjectively evaluated in order to indicate something about his present or future performance. Parents evaluate the attitudes of their children; employers, of their employees; officers, of their subordinates; and teachers, of their pupils. Many of those doing the evaluating rely on simple methods such as adjective checklists or scales, personal observation and self-report. When resources are available and a more precise measurement is desired, the evaluator is able to make use of one of the more sophisticated methods which employ a paper-and-pencil instrument as the operational definition of attitude.

Instructional sequences have been prepared by the author and are currently being tested which train an individual to perform the skills necessary to construct an attitude test according to one of these methods. The principal steps pertaining to the method selected are briefly described below. The instructional sequences train subjects in all of these competencies. However, before launching into a description of the procedures a few words about validity must be emphasized.

Each of the several operational definitions of attitude is based on some hypothetical notion of the nature of attitude and derives validity largely from a corresponding set of procedures. Nearly all sets of procedures, if followed, result in a paper-and-pencil instrument (attitude test) which may be administered to a subject whose attitude is being

evaluated. A particular attitude test is valid only when the procedures specified for its preparation are followed. One would not want to estimate the materials for a new house in terms of meters and then record the estimates on a bill of materials in yards without making the proper adjustments to account for the differences in the standards of measurement. Even so one would not want to alter the set of procedures of an operational definition of attitude without recognizing that something different is being measured by using the altered procedures.

To summarize, alterations of specified procedures should not be made in any situation unless they are justified on some grounds and unless the resulting changes in measurement are taken into account.

Method and Procedures

Before writing a program of instruction to train people how to construct an attitude test, one must decide upon a suitable method for measuring attitude. The method proposed by Thurstone (4, 1929) was selected by the author mainly because of its wide degree of acceptance and use. Most publications dealing in general with attitude measurement at least mention this method (3, pp. 11, 12, 1969) and (1, 1971). This method is based on the notion that someone's attitude is "reflected by the opinions he endorses" (1, 1971). A number of statements of opinions about the particular psychological object are selected, assigned scale values and assembled in the form of a paper-and-pencil test. An example of such an instrument having people at school as the psychological object

is appended below. This instrument was made for subjects who are about sixteen years of age. The instrument yields a measurement of attitude toward a particular psychological object in terms of a continuous score which ranges between 1.0 and 11.0 depending on whether the subject's attitude is unfavorable or favorable, respectively.

The mechanics of preparing and administering the instrument are easily performed. But there are procedures dictated by the method and the task that must be followed carefully. First, it is especially true in measuring attitude that the act of measuring affects the measurement. All possible steps should be taken to avoid creating expectations in the subject which affect his responses. For example, if the subject expects a particular attitude to be rewarded or punished and if he understands the method of measurement, then he will respond so as to gain the reward or avoid the punishment. This situation invalidates the measurement unless the reward or punishment are always present.

Another feature of the preparation and administration phase concerns the requirements placed on the subject for responding to the various items. The subject must be required to indicate agreement or disagreement with each item. The instrument must be prepared so as to provide places for these responses to be recorded.

Items are selected for the instrument on the basis of S-values and Q-values. An S-value and a Q-value are computed for each prospective item. This phase of the construction constitutes the chief disadvantage of the Thurstone method since it can be extremely time consuming and subject to

error. However, these difficulties can be avoided if definite procedures are developed and followed uniformly. One major advantage of the programmed sequence mentioned in the opening paragraphs is that it incorporates such procedures.

Two different methods have been developed to accomplish computation of the S-values and Q-values. The first utilizes machine-scored answer forms and a computer program made for the IBM 360/50 Operating System. This method enables one person to accomplish all necessary computations in one day if he has access to the scoring equipment and computer system. In addition to the necessary computations of S-values and Q-values the computational program has been augmented with subprograms which perform various functions helpful in analyzing and using the resulting data. One subprogram causes the S-values and Q-values to be printed in such a way that items can be chosen most easily. Another computes a statistic which indicates the performance of each individual author of prospective items. And another computes a statistic which indicates the performance of each individual author of prospective items. And another computes a statistic which indicates the performance of each judge, whose function will be discussed below.

The other computational method accomplishes only the necessary computation of S-values and Q-values by use of hand computation. Preprinted computation sheets and associated data collection forms minimize errors and serve a record-keeping function.

The raw data necessary for computing S-values and Q-values is obtained during a judging session wherein a number of trained judges appraise the

favorability of each prospective item toward the stipulated attitudinal object. During this session each judge classifies each prospective item in some interval on the eleven-interval Thurstone scale. The judges must be trained to perceive the Thurstone scale correctly so that each can record his appraisal accurately. One segment of the sequence of instruction trains the subject to judge prospective items and also trains him to train others to do the same.

Results of the judging session and the quality of the final instrument can be improved if the prospective items are critiqued and edited before they are judged. A prospective item should (1) be a short sentence with the main verb or verbs in the present tense; (2) constitute a value judgement of the attitudinal object; and (3) be nonfactual and unambiguous. Edwards (2, 1957) gives a longer list of attributes which a prospective item should have. However, some of those he specifies overlap. A prospective item which posesses the three properties given above will almost always satisfy all those stipulated by Edwards for a prospective item. The collection of prespective items can be improved by rewriting unsatisfactory ones before they are submitted to the judges.

Considerations regarding the population with which the final instrument will be used play a most important role in writing prospective items. The best method found to date to prepare prospective items is to select a sample from the same population to write the prospective items. These authors of prospective items can be either trained to generate statements which satisfy the three conditions given above or else they can be placed into a structured situation and required to write several short sentences.

These sentences will usually be satisfactory prospective items if the situation is properly structured. The latter of the two procedures is the better because it requires less time of the authors. However, the sentences must be critiqued and edited in order to realize the full benefits.

Before the prospective items are written the population and attitudinal object must be identified. The identities of the population and attitudinal objects are immediately obvious if the Thurstone instrument is being prepared as part of a trial solution to a bona fide problem. Otherwise, they are arbitrary. However, the results of the final instrument can be improved by selecting an attitudinal object which can be defined uniformly in the minds of the subjects. Nebulous objects yield meaningless results. Well defined components of a nebulous object should be identified and a separate instrument prepared for each one. Items from each separate instrument could be assembled into one final instrument to yield one which considers various dimensions of a nebulous attitudinal object.

Criterion Test and Results

The instructional sequences mentioned above have been assembled and administered to several groups of subjects during the process of developmental testing. For the last such group of 15 subjects a post-test was prepared to measure performance of most terminal behavior. A copy of the post-test appears below in the Appendix. Each subject completed the instructional sequence independently on his own time without supervision.

All of the subjects were assembled to administer the post-test under a time restriction of 120 minutes. The number of subjects satisfying criteria is depicted in Figure 1.

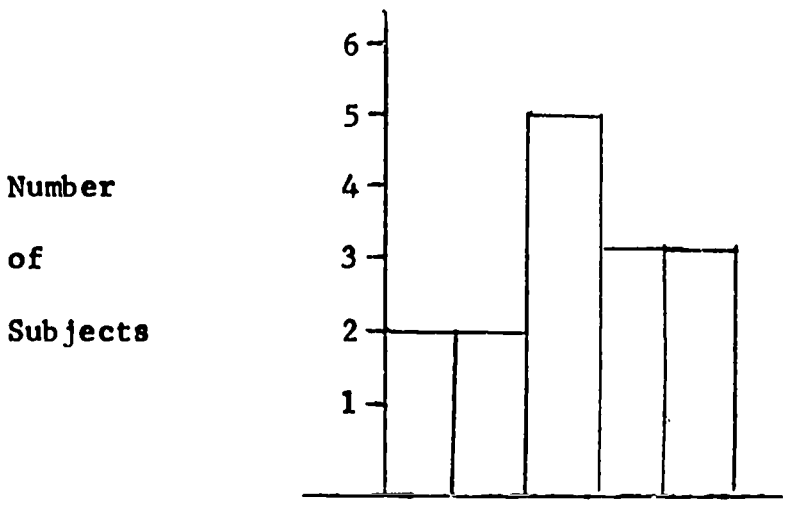

Figure 1. Distribution of Post-test Scores

The results depicted in Figure 1 indicate that few subjects performed at a truly acceptable level. However, 20 percent of the subjects satisfied criteria on all of the five post-test items. And the results by no means categorically descredit the instructional sequence for several reasons. First, subjects executed the instructional sequence independently so that there was no opportunity for feedback to be given them except what has been built into the program. Second, each of the five items on the post-test requires a certain degree of transfer of learning. Each is a substantial task. Third, the criteria for assessing performance on each item were stringent. Performance on this same post-test would be materially

(80 percent with no errors) if the instruction had been accomplished in a workshop setting with more appropriate practice and immediate feedback built into the sequence.

Data collected during the developmental stages indicate that it is possible to train relatively naive subjects to produce valid attitudinal instruments by training them to follow previously validated procedures.

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APPENDIX

THURSTONE AFFECTIVE INSTRUMENT

Instructions: Please write your name in the space at the top of this page. Read each of the statements listed below and decide whether you agree or disagree with it. If you agree with the statement, put a check mark (✓) in the blank below "Agree." If you disagree, put a check mark in the space below "Disagree." Please do this for all of the statements.

Agree	Disagree		
____	____	1.	Most of the kids at school are good kids. (1)
____	____	2.	I like many of the students at school. (5)
____	____	3.	Anyone who goes to school is "dumb." (7)
____	____	4.	"Get out of here you stupid idiot."--That's what the people say to you at school. (16)
____	____	5.	Some of the people at school I know are just awful. But most of them are real good guys. (21)
____	____	6.	I like as many people at school as I hate. (27)
____	____	7.	The people at school are all stuck up. (28)
____	____	8.	Some are so ignorant but a lot of them are nice at school. (29)
____	____	9.	The people at school are fun to be with. (31)
____	____	10.	They're a good bunch of people at school. (32)
____	____	11.	I hate school, I hate kids, I hate everything. (36)
____	____	12.	People at school say things that I don't like. (47)
____	____	13.	They're really neat people at school. You can talk to them and they are friendly. (52)

(Go to the next page.)

Agree	Disagree		
____	____	14.	Some of the people I know at school are nice, some are ignorant, some are cool, some are smart, and some are "dumb." (53)
____	____	15.	I think they are all flunkies at this school. (57)
____	____	16.	The people at school are too mean. (63)
____	____	17.	People at school are good looking. (64)
____	____	18.	These kids at school aren't very nice. (69)
____	____	19.	The people at school are too immature. (73)
____	____	20.	People are great at school. (78)

(End)

Name_____

CONSTRUCTION OF A THURSTONE ATTITUDE TEST - POSTTEST

(10 minutes) March, 1971

1. Using the attached computation sheet, compute the S-value and Q-value for a statement having the following judges' responses.

Judge Number	Number of Interval Where Judge Classified the Statement
1	3
2	4
3	4
4	5
5	5
6	5
7	6
8	7
9	10
10	11

(10 minutes)

2. Show that you are able to construct a Thurstone attitude test once the items have been chosen by designing the layout for the first page. Use the back of this page for your work. Since you are not given the actual test items for this problem, you must simulate them in some way. Design the instrument to be used with twelve-year-old subjects. A naive proctor should be able to administer your instrument with your first page as it stands.

(5 minutes)

3. Choose as many statements as possible for use as items on a Thurstone attitude test, on the basis of the scale values and Q-values given below. Use the criteria presented in your training sequence. Indicate your choice by placing an asterisk (*) to the left of the statement number of the statement chosen.

TABLE OF SCALE VALUES AND Q-VALUES

Statement Number	Scale Value	Q-Value	Statement Number	Scale Value	Q-Value	Statement Number	Scale Value	Q-Value
14	1.18	0.72	67	4.00	1.25	40	8.63	1.73
29	1.33	1.03	78	4.00	2.04	41	8.75	1.44
60	1.75	1.25	75	4.67	3.04	6	8.80	1.58
50	2.06	1.03	31	4.88	2.38	30	8.89	0.93
36	2.11	0.93	21	5.91	0.68	11	8.92	1.40
59	2.14	1.31	28	6.05	0.97	9	9.00	3.00
10	2.19	1.41	1	6.29	1.20	57	9.00	1.90
74	2.19	1.41	71	6.29	1.50	58	9.08	1.40
69	2.20	2.15	62	6.31	1.11	76	9.08	1.38
8	2.20	1.51	17	6.31	1.41	53	9.19	1.20
51	2.25	1.63	33	6.43	1.69	27	9.20	1.57
77	2.25	2.19	66	6.58	1.96	52	9.25	2.51
22	2.29	1.31	38	6.89	1.06	42	9.25	2.94
35	2.29	1.31	47	7.11	0.87	2	9.33	2.69
63	2.33	2.06	48	7.19	1.09	39	9.38	1.90
65	2.43	1.42	15	7.80	1.53	26	9.63	2.13
70	2.63	2.15	44	8.00	2.67	73	9.71	1.13
13	2.67	2.13	25	8.00	2.63	43	9.75	0.94
45	2.67	2.31	61	8.00	2.63	20	9.85	1.31
37	2.69	1.22	5	8.20	1.51	24	9.85	1.14
16	2.71	1.50	64	8.20	1.63	56	9.92	0.58
72	2.80	1.53	68	8.20	1.69	46	10.20	1.50
4	3.00	2.50	18	8.25	2.56	12	10.42	1.17
3	3.38	1.88	54	8.29	1.50	32	10.56	1.95
55	3.71	2.17	23	8.29	1.20	49	10.75	1.25
34	3.80	1.65	79	8.60	1.39	7	10.92	0.58
19	3.92	1.50	80	8.60	1.50			

(15 minutes)

4. You have been given five 4 x 6 file cards numbered from one through five, respectively. Write your name on each card.

   On each card write exactly one statement suitable for use on a Thurstone attitude test using "mathematics" or "math" as the verbal representation of the attitudinal object. Apply the following criteria or conditions in writing these statements.

   a. The statement need not be a simple sentence.

   b. "Mathematics or "math" need not be the subject of the sentence.

   c. In a few minutes you will be judging the statements written by the class. Scale values will be computed from the data obtained. Write your five statements so that they will have scale values as close as possible to the target scale values listed in the table below.

   Note that each of your five cards has a card number. The target scale values in the table below correspond to the card numbers. When you write a statement which you hope will have one of the target scale values listed below, be sure you write it on the card whose card number corresponds with the target scale value.

TABLE

CARD NUMBER	TARGET SCALE VALUE
1	_____
2	_____
3	_____
4	_____
5	_____

(60 minutes)

5. Judge each of the statements just generated by the class members. If you are unable to properly classify a statement, then respond by placing a mark in column number on the IBM Form 553. Columns are numbered from left to right from one through eleven.