TECHNIQUE FOR WEIGHTING OF CHOICES AND ITEMS ON I.B.M. SCORING MACHINES

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A technique has been developed which permits the weighting of responses of test items on the I. B. M. scoring machine on the initial scoring, heretofore impossible. This is done by making the length of the response lines on the answer sheet longer or shorter as weights are needed. It is anticipated that this method will prove useful wherever differential weighting serves to increase the validity of tests.

Introduction
In the past, weighting of answers to items on a questionnaire or test by scoring machines has been very difficult if not prohibitive. In a single run through the I.B.M. scoring machine, weights of \(-1\), \(0\), and \(+1\) only can be used. The addition of merely one more weight requires an extra run through the machine. In two runs a range of nine weights can be obtained, while a range of nineteen weights can be obtained in three runs. The technique here permits the weighting of responses to test items without requiring additional runs through the machine at least for the same marks on the answer sheet. In order to understand this procedure, a brief explanation of the I.B.M. scoring machine is needed.

I. B. M. Procedures
To obtain any score on the machine, a separate answer sheet is provided on which the testee fills in his choices with a graphite lead pencil. Each marked-in space on the answer sheet completes a circuit across one set of contact plates on the sensing unit. This current goes through a set of resistors to a key-set-unit. There is a pin on the key-set unit corresponding to each set of contact plates on the sensing unit.

When a blank stencil prepared for scoring is inserted in the front leaf of the stencil holder and pressed against the key-set-unit by means of an adjustment of the frame, the pins are pressed all the way in. When a graphite mark occurs on the answer sheet to complete the circuit, the dial will register a minus weight. When a stencil
is punched, it allows the pins to go all the way through. If a mark occurs on the answer sheet in this position, the weights will be plus. If the pin is pushed only halfway in, the item is entirely eliminated. This is done by putting a stencil in the front leaf of the holder with the desired eliminated items and the plus items punched. In the back leaf of the holder, a stencil is inserted with only plus items punched. This allows the pins of the eliminated items to go only halfway, while the pins of the positively weighted items go completely through.

Weighting

In weighting responses to tests of specific knowledge (physics, mathematics, or any factual material), the validity of each item must be established before proper weights can be assigned. It is necessary that each answer space be printed uniformly and that the subject's response line, regardless of the weight assigned by the test constructionist, fill the complete space. This is imperative in order that the testee be unaware that his responses are weighted. The weighting is effected by the intricate manipulation of the key-set-unit.

This technique of weighting can be advantageously employed in perceptual and judgment fields, where degrees of correctness are of importance. Here, too, it is necessary that answer spaces be uniform and that each response cover the complete space.

On questionnaires and on tests of personality or emotion, in which the subject's intensity of response is desired, the procedure is reversed and the subject assigns his own weights by the length of his pencil mark. Regardless of the range of weights used, each question should have response spaces of uniform length.

Weighting the Individual Items of a Test with Specific Weights for Each Item

Presuppose a test where the validity has been established for each response and a range of five weights has been decided on. An answer sheet such as that shown in Figure 1, A, will be used. On this answer sheet, the response line is twice the length of the presently used form. Thus, it will be seen that the testee must mark a line for each item that is long enough to extend over the space occupied by two sets of contact plates. Let us assume that the assigned weights for question one are plus two for response "A," plus one for "B," zero for "C," minus one for "D," and minus two for "E." Following the principles explained in preceding paragraphs, it is necessary to punch out on the stencil to go into the front leaf all those choices which are weighted plus and those eliminated as shown in Figure 2, A. On the example used, A, B, and C will be punched as shown. Since choice D is weight-