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ABSTRACT

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The Pictorial-Rating-Scale Sociometric: A Comparison of Two Forms of Administration

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Abstract

A pictorial-rating-scale sociometric instrument was administered to 91 middle-SES first- and third-grade children two times, four weeks apart under two conditions, using a three-step and a five-step rating scale. No significant overall differences in reliability was found between the three-step and the five-step scale. However, in the first-grade classes, the five-step scale was more reliable. The three-step instrument was shown to have reliability comparable with that found using similar procedures with preschool children. The question of sex bias in the instrument was also examined. Although same-sex peers rated children higher than opposite-sex peers, and the difference was even greater at the third-grade level, the same-sex scores correlated highly with the combined score from both sexes.

The Pictorial-Rating-Scale Sociometric: A Comparison of Two Forms of Administration

Sociometric methodology has been shown to be valid and reliable for identifying children as "at risk" in their peer relations (Asher & Hymel, 1981). Moreno (1934) developed the most commonly used sociometric assessment instrument. In Moreno's procedure, as described by Asher, Singleton, Tinsley, and Hymel (1979), children were asked to choose three preferred classmates, in rank order, according to some specific criterion (e.g., playmate, seating companion). A child's score is based on the number of nominations he or she receives from peers. Negative criteria (e.g., don't like) have also been used with nomination sociometrics. Moreno's technique was investigated for reliability with school-age children by Busk, Ford, and Schulman (1973), who found over an eight-week interval test-retest reliability coefficients of .76 for fourth-grade children and .84 for sixth-grade students.

Because the use of this procedure produced lower reliability for preschool children than for elementary-age children, McCandless and Marshall (1957) developed a modification for use with preschoolers. Their technique, devised to prevent a memory overload for young children, involved using the children's photographs instead of their names. Using the positive nomination procedure, they found the instrument moderately reliable for

3- to 5-year-olds; the reliability coefficients being .66 and .71 at 10-day intervals and .45 at a 20-day interval.

Asher et al. (1979) further modified the instrument, replacing the partial-rank-order nominations used by McCandless and Marshall (1957) and Moreno (1934) with a rating scale. In this method children were asked to rate each classmate on a scale according to how much they would like to participate with the classmate in a specified activity. The three steps on the scale were identified by smiling, neutral, and sad faces, and the children sorted their classmates' photographs into boxes labeled with the three faces.

Asher et al. (1979) used the rating scale to test two classes of 4-year-olds, one from a university preschool serving predominantly middle-class children, and the other from a private community day care center serving a working class population from diverse ethnic groups and having a higher turnover rate. The instrument was found to have a high test-retest correlation over a four-week period; the reliabilities being .81 for the university preschool class and .74 for the private center.

Similar rating scales, using names rather than photographs, have been used with older elementary-age children by Singleton and Asher (1977), Oden and Asher (1977), and Thompson and Powell (1951). Thompson and Powell (1951) were the only investigators among these to report test-retest reliability. They found reliabilities ranging from .94 to .95 for four classroom groups ranging in size from 31 to 38.

Asher et al. (1979) used a three-step rating scale in the preschool instrument with choices of like, neutral, and dislike for the photograph-sorting method of adminstration. With older children, Singleton and Asher (1977) used a five-step rating scale with choices of like a lot, like, neutral, dislike a little, and dislike a lot. The rationale for limiting the choices to three for the preschoolers in the Asher et al. (1979) study was not given, but it may have been based on the anticipated difficulty that young children would have in making the fine discriminations required by many categories.

Guilford (1954) cited studies indicating that an advantage is found in using more steps in Likert-type scales, such as that used by Asher et al. (1979), because increasing the number of steps increases the reliability. The reliability of individual rating scales, according to Guilford (1954), is a monotonically increasing function of the number of steps. According to Nunally (1978), the amount of discrimination provided by psychophysical scales increases with the number of scale steps, up to 20 steps. Their finding suggests that the reliability of the rating scale may be imporved by increasing the number of choices on the scale and that the five-step scale used with older elementary children would be more reliable than the three-step scale previously used with 4-year-olds.

Another problem in the sociometric testing of this age group is that of sex bias. Singleton and Asher (1977) found

sex bias present in their study of third-graders, but none was found in the Asher et al. (1979) preschool data. The latter authors recommend use of ratings from same sex peers when sex bias is present.

The purposes of this research were: (a) to establish test-retest reliability on a pictorial rating-scale sociometric instrument with a different population and age group than previously investigated, (b) to compare the reliability of two forms of administration of the rating-scale sociometric, each from using a different number of steps; and (c) to evaluate sex bias on the rating scale by comparing same-sex versus opposite-sex ratings.

Method

Subjects

The subjects were 91 children, 90 white and 1 black, in three classes in a suburban elementary school serving a middle- to upper-middle-SES population. Two first-grade classes having 23 and 40 students each and a third-grade class having 28 students were used. Of the total group, 53 were boys and 38 were girls.

Procedures

An adaptation of the sociometric-pictorial-rating scale developed by Asher et al. (1979) was administered to the children two times, four weeks apart, by their student teachers, who were trained by the investigator and given explicit written

instructions and scripts for the administration of the instrument. Individual photographs were taken of all the children. Each child was taken out of the classroom and, to assure the understanding of the procedure, given instructions and practice in sorting objects and pictures into boxes labeled with the faces of various expressions that were to be used in the sociometric sorting. One-half of the boys and one-half of the girls in each class were randomly assigned to the three-step-choice condition and the other one-half of each gender was assigned to the five-step-choice condition. In the three-step-choice condition, the children were asked to sort photographs of their classmates into three boxes labeled with a happy, a neutral, and a sad face. The experimenter verbally labeled the happy-face box for photographs of children the child "likes to play with a lot," the neutral-face box for photographs of children the child "feels so-so about playing with," and the sad-face box for photographs of children the child "does not like to play with." In the five-step choice condition, the experimenter verbally labeled the five boxes as above, adding faces between the extreme faces and the neutral face. Figure 1 shows the faces used as labels, the verbal label given, and the score given for the selection of the face.

Insert Figure 1 about here

After the children had an opportunity to practice sorting objects and pictures, they wre asked to sort their classmates'

photographs into the boxes according to how much they liked to play with the child in each photograph. Responses were scored from 1 to 5, as shown in Figure 1. In order to compare the reliabilities for the three-step- and five-step-choice conditions, two mean scores were computed for each child, one of scores received from children who rated in the three-step procedure and the other from children who rated in the five-step procedure.

To compare same- versus opposite-sex scores, the scores received under the three-step and the five-step conditions on the first administration of the instrument were combined, and means of scores received from same-sex peers, and of scores received from opposite-sex peers were computed.

Results and Discussion

In order to compare reliabilities of the three-step- and the five-step-choice conditions, test-retest correlation coefficients were computed for each condition, and the difference between the two correlations was tested for significance. With both grade levels combined, the correlation for the three step condition was r (89) = .80, $p < .001$, and the correlation for the five-step condition was r (89) = .88, $p < .001$. These two correlation coefficients did not differ significantly, indicating no difference in test-retest reliability between the five-step and the three-step conditions. However, when separate correlations were computed for each grade level, a significant

difference, $z = 2.415$, $p < .01$, was found between the test-retest correlations for the three-step, r (61) = .78, $p < .01$, and five-step, r (61) = .91, $p < .001$, conditions for the first-grade children, the five-step correlation being significantly higher.

The means and standard deviations for the three-step- and the five-step-choice conditions are presented in Table 1.

Insert Table 1 about here

The discrepancy between the grades is difficult to explain if we assume that younger children would be more confused by the larger number of steps than older children, and thus make more random responses. However, it does substantiate the expectation from measurement theory that more steps would tend to make a scale more reliable. Thus, there would be an advantage, because of its greater simplicity, in using the three-step scale with lower elementary age children of mixed grades and there would be no loss of reliability in decreasing the number of steps from five to three for this population.

To test the hypothesis that reliability of the three-step method of administration with the first- and third-grade children would be comparable to reliabilities obtained with preschoolers by Asher et al. (1979), a test-retest correlation for the three step condition was computed. Since this correlation, r (89) = .80, $p < .001$, was comparable to the reliability reported by Asher et al. (1979), the hypothesis was supported,

and the measure can be considered a reliable tool for an increased age range.

To test the hypothesis that sex bias is present in the rating-scale scoiometric, the mean scores received by children from same-sex and opposite-sex peers on the first administration of the measure were compared by means of a two-way analysis of variance, with a repeated measure. The between subjects variables were ratings by sex and grade, and the within subjects variables were same-sex and opposite-sex peer rater. A difference was found between the same-sex and opposite-sex scores: F (1,87) = 504, $p < .0001$. Because the F-ratio was so extraordinarily high, the scatterplot of scores was examined, and a t-test run on the two sets of scores. The means and scatterplot showed a consistent pattern of peer ratings approximately 1.5 points higher for same-sex versus opposite-sex ratings. The t-tests shows a t-ratio comparable to the F-ratio, t (90) = 18.55, $p < .001$. According to Glass and Stanley (1970), the square of a t-variable with n degrees of freedom is an F-variable with 1 and n degrees of freedom. The difference between the square of the t-ratio (344) and the F-ratio (504) can be explained by the difference in degrees of freedom and the error term.

A significant interaction was found between the repeated measure and grade, F (1,87) = 38, $p < .0001$. Table 2 shows

Insert Table 2 about here

means and standard deviations received from same and opposite sex peers. The graph in Figure 2 shows a disordinal interaction between grade and same-opposite sex rating. Third-graders tended to rate same-sex peers higher and opposite-sex peers lower than first-graders.

Insert Figure 2 about here

To determine whether the rating of both sexes can be used as a measure of a child's social acceptance in a classroom, the same-sex peer rating was correlated with the rating by both sexes combined. The correlation was extremely high, r (89) = .82, $p < .001$. Even though this part-whole correlation may be spuriously high, it is the part-whole correlation that is the question of interest here. The conclusion can be drawn from this correlation that ratings obtained by both sexes can be used interchangeably with same sex ratings. The use of combined sex scores would be more efficient as separate computations for the sexes would be unnecessary.

The presence of sex bias is clear for both grade levels, and is even greater at the third-grade than at the first-grade level. Because only three classes were used and variables such as class size and teacher characteristics may have influenced results, the ANOVA was performed with the class variable as well, and nonsignificant results were obtained. It seems that preference for same sex peers is well established by the first grade and increases by third grade.

Whether or not this leads to the recommendation that same-sex ratings should be used when using the instruction as an indication of a child's peer acceptance is questionable. Since the same-sex scores correlate well with scores from both sexes, both measures give a picture of the general likeability of a child, and whether to use same-sex or both-sex ratings is answered by the nature of the research question. The investigator must decide whether the question is how much a child is liked by same-sex peers or by all classmates. Sex bias might change a child's overall ranking, however, if there were a much larger number of one sex than another in the class group.

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Table 1

Sociometric Ratings by Three-Step or Five-Step-Choice Condition

		Time 1		Time 2	
	N	$\bar{X}$	SD	$\bar{X}$	SD
Three-Step-Choice Condition					
Both Grades	91	3.38	.63	3.42	.70
Grade 1	63	3.32	.62	3.03	.73
Grade 3	28	3.54	.63	3.67	.58
Five-Step-Choice Condition					
Both Grades	91	3.31	.60	3.45	.59
Grade 1	68	3.30	.69	3.37	.67
Grade 3	28	3.35	.31	3.61	.31

Table 2

Sociometric Ratings by Same-Sex or Opposite-Sex Peers on the First Administration

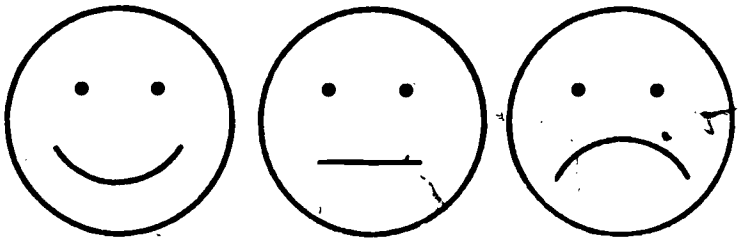
	N	$\bar{X}$	SD
Same-Sex Peers			
Both Grades	91	4.02	.68
Grade 1	63	3.93	.71
Grade 3	28	4.49	.39
Opposite-Sex Peers			
Both Grades	91	2.66	.68
Grade 1	63	2.74	.73
Grade 3	28	2.47	.51

Figure Captions

Figure 1. Labels used for sociometric sorting.

Figure 2. Mean ratings of children by grade and same-opposite sex peers.

3-Step Labels

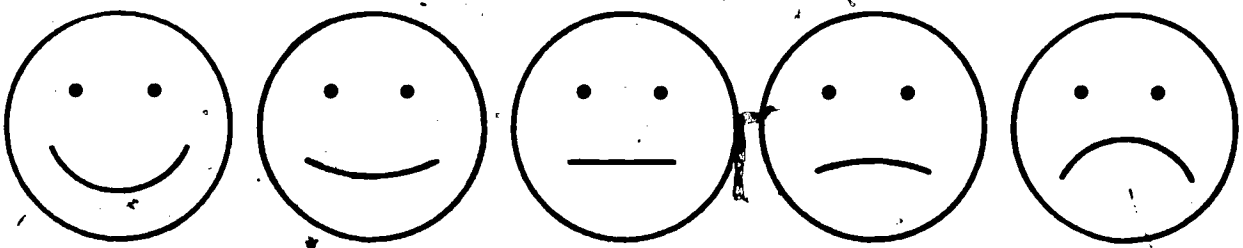


like a lot
5

feel so-so
3

don't like
1

5-Step Labels



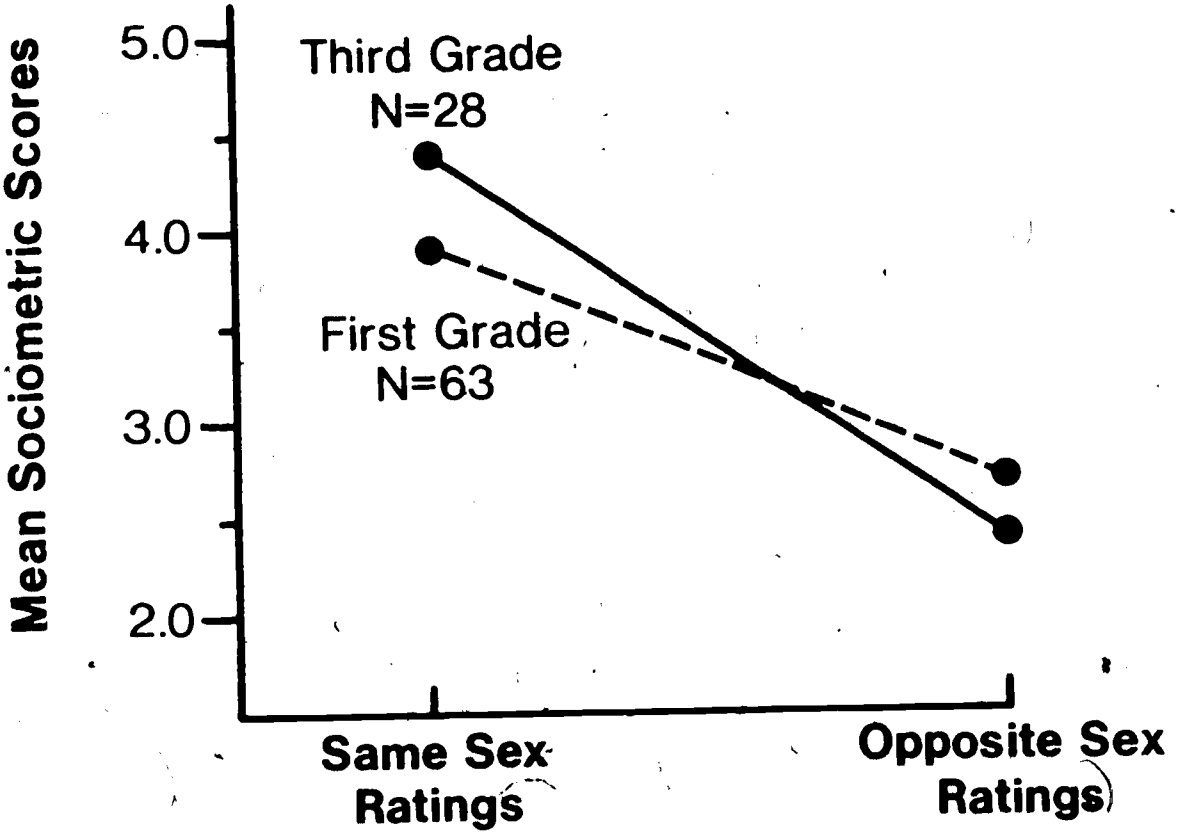
like a lot
5

like some
4

feel so-so
3

don't like much
2

don't like at all
1


Mean Sociometric Scores
5.0
4.0
3.0
2.0
Third Grade
N=28
First Grade
N=63
Same Sex
Ratings
Opposite Sex
Ratings