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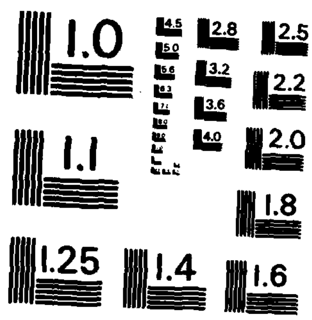

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Operationalizing Halo: Problems with the Computation of a Standard Deviation Across Dimensions Within Ratees

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The use of a standard deviation across rating dimensions for each ratee as a measure of halo is criticized for those cases in which the average of the ratings on each dimension is not equal. Standardizing the data within each dimension prior to computing the standard deviation across dimensions corrects this problem. Further, an example is presented in which this "standardized standard deviation" is shown to be correlated nearly 1.00 with the average intercorrelation among rating dimensions and the average difference between the over

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true and observed dimension intercorrelations. Correlations between the commonly used unstandardized standard deviation and the other operationalizations of halo were approximately .80.

Operationalizing Halo: Problems with the Computation of a Standard Deviation Across Dimensions Within Ratees

Conceptual discussions of halo have been relatively free of inconsistencies. For example, halo has been defined as a tendency to attend to a global impression of each ratee rather than to carefully distinguish among levels of different performance dimensions (Borman, 1975); a rater's inability or unwillingness to distinguish among the dimensions of a ratee's job behavior (DeCotiis, 1977); and a tendency to place a given ratee at the same level on different dimensions (Bernardin, 1977). Thus, the halo effect is generally considered as a rater's failure to discriminate among conceptually distinct and possibly independent aspects of a ratee's performance which, in turn, results in higher dimension intercorrelations than the "true" level of these intercorrelations.

Although there is substantial agreement concerning the conceptualization of halo, there is little consensus concerning how it should be measured. For instance, one approach is to examine the interdimension factor structure. To the degree that this structure is dominated by a general factor accounting for an appreciable portion of the rating variance, halo is thought to be present (Kraut, 1975). A second approach is based on a Rater x Ratee x Dimension analysis of variance (Guilford, 1954; Kavanagh, MacKinney, & Wollins, 1971), in which a statistically significant Rater x Ratee interaction (especially one that explains a large proportion of the variance) is indicative of halo. Some authors have suggested, however, that this method is somewhat of an oversimplification (Stanley, 1961; Willingham & Jones, 1958). A third approach is to calculate the interdimension correlations and to draw inferences about whether or not these intercorrelations are higher than what is thought to be their "true" value (Thorndike, 1920). A fourth, a perhaps the most common, way of measuring halo is to calculate the standard deviation (SD) associated with a given rater's ratings of a particular ratee across all performance dimensions (Bernardin & Pence, 1979; Bernardin & Walter, 1977, Borman, 1975).

A major problem surrounding these operationalizations of halo is that none of them considers nor can they consider the degree to which the rating dimensions are <u>actually</u> correlated. Hence, the adequacy of these measures for assessing valid versus invalid halo is suspect. Further, as Saal, Downey, and Lahey (1980) and Cooper (1981) have noted, these measures are neither conceptually nor empirically equivalent. Regarding the latter two approaches, for example, the SD method measures the degree to which ratings are the same across the dimensions, such that those which contain complete halo have a variance of zero within ratees. Alternatively, the correlational approach equates halo with dimension intercorrelations equal to 1.00. There is also a significant problem with the SD measure of halo in that it will be nonzero simply as a function of actual mean differences across the rating dimensions. However, as is shown here, use of the SD criterion with data that have been standardized within rating categories such that the dimension means and standard deviations are equivalent corrects this oversight.

The purpose of the present paper was to examine differences between computations of standardized and unstandardized SD criteria relative to a third measure of halo which considered the true level of intercorrelation among the dimensions. Specifically, the SD and standardized SD measures were correlated with the average difference between the true and observed dimension intercorrelations (an operationalization of halo more directly consistent with conceptual discussions). It is shown by example that standardizing the scores within dimensions prior to computing the SD measure across dimensions for each ratee not only takes into account irrelevant mean differences among rating categories, but it also yields a halo measure that is perfectly correlated with the difference between the "true" and observed dimension intercorrelations for a given rater.

Method

Subjects

One hundred and eight undergraduate students enrolled in an industrial/organizational psychology course participated in the study. The total sample consisted of 58 males and 50 females, whose mean age was 20.64 years.

Rating Task

Subjects viewed 5- to 9-minute videotapes of six managers talking with a problem subordinate. Ratings of each manager's performance were made using five behaviorally-based rating scales representing the following dimensions of the manager's job:

1. Structuring and Controlling the Interview
2. Establishing and Maintaining Rapport
3. Resolving Conflict
4. Motivating the Subordinate
5. Developing the Subordinate

Each dimension was defined by an overall defining statement as well as by seven, scaled behavioral anchors describing different effectiveness levels.

Videotaped performances were used because they enabled the calculation of "true" performance for each ratee and hence the true levels of intercorrelation between the rating dimensions. The videotapes used here were carefully developed so as to insure that the performances represented a variety of effectiveness levels on different rating dimensions. Specific details regarding the development of the tapes, the rating scales, and the procedure used to generate true scores of performance for each manager can be found in Borman (1977).

Halo Measures

Standard Deviations (measure often used). Operationally, halo has been discussed in terms of standard deviations across dimensions within ratees (e. g., Borman, 1975). A standard deviation was thus computed for each target ratee, reflecting the spread in their ratings across the dimensions. Subjects' standard deviations for each of the six ratees were then averaged to provide the final halo measure. In previous studies, a low standard deviation across dimensions has been indicative of more halo, while a high standard deviation has been indicative of less halo.

Standardized Standard Deviations. For the five performance dimensions, ratings were standardized across ratees, resulting in dimension means of zero and standard deviations of one. Standard deviations were then calculated across the five standardized dimensions for each ratee. Finally, these six (each rater viewed six videotaped interviews) standard deviations were averaged to provide the final measure of the degree to which each rater's ratings contained halo error as defined above.

Dimension Intercorrelations. The third measure of halo was calculated by computing a correlation matrix between the five dimensions for each subject's ratings of the six ratees. These dimension intercorrelations were then subtracted from the true dimension intercorrelations, yielding 10 difference scores for each subject. Prior to subtracting the matrices, all correlations were transformed to z scores using Fisher's r-to-z transformation. The difference scores were then averaged, providing a mean measure of the difference between the true and observed intercorrelations across dimensions. To the degree that this average deviated from zero in a positive direction, the subject's ratings were less correlated than the true ratings. To the degree that this average deviated from zero in a negative direction, greater halo was evidenced.

Results and Discussion

Presented in Table 1 are the correlations between the three halo measures described above. As can be seen from this table, the standardized standard deviation and the difference between true and observed intercorrelation measures of halo are nearly perfectly correlated. The absence of a 1.00 correlation between these measures is likely due to rounding error. Further, the relationship between these two measures and the standard deviation operationalization of halo is less (approximately .80).

Insert Table 1 about here

Inspection of the rating dimension means revealed the following: Structuring and Controlling the Interview ($x = 4.16$), Es blishi and Maintaining Rapport ($x = 4.38$), Resolving Conflict (x = 3.65), Motivating the Subordinate (x = 4.12), and Developing the Subordinate (x = 3.98). Although there was some variation in these means, extreme differences were not present. However, given relatively equal standard deviations within the dimensions, larger mean differences would have resulted in a lower correlation between the standardized and unstandardized standard deviation measures of halo. Therefore, the differences that we observed were likely to be small compared to what would be observed in many studies.

With a correlation of at least .80 between the halo measures, the practical differences associated with using one measure versus another may not seem particularly important. However, the data reported here were collected as part of a training study in which a significant main effect for accuracy training, F (1, 106) = 7.06, $p < .05$, resulted for the SD (average standard deviation within ratees) measure of halo, but a nonsignificant main effect, F (1, 106) = .08, ns., resulted for the average difference between true and observed dimension intercorrelations measure of halo (Pulakos, 1983).

The arguments and data presented here suggest that measuring halo by calculating a standard deviation within ratees is not entirely appropriate. This operationalization neither takes into account irrelevant dimension mean differences nor is it entirely consistent with conceptual discussions of halo (i. e., higher observed dimension intercorrelations than the "true" levels of these intercorrelations). However, by standardizing a rater's ratings within each dimension prior to calculating standard deviations across the dimensions for each ratee, a measure of halo results that is equivalent to (i. e., perfectly correlated with) the average difference between true and observed dimension intercorrelations. This latter measure is also perfectly correlated with the absolute level of intercorrelation of the dimensions for a given rater (the relationship between the average absolute level of intercorrelation and the average difference between the true and observed dimension intercorrelations in the present data was $r = 1.00$). This, of course, is a result of the fact that subtracting constants (i. e., the true intercorrelations) does not affect the nature of the relationship itself.

In conclusion, then, equivalent measures of halo are obtained by using any of three operationalizations of the error: 1) by computing the average standard deviation for each rater across standardized within dimension scores; 2) by calculating a rater's average level of observed dimension intercorrelation; or 3) by calculating the average difference between the true and observed dimension intercorrelations for a given rater. Further, although the unstandardized SD measure of halo may be substantially correlated with these measures, practically important differences can result (as shown here) in statistical analyses using this operationalization versus one of the other three. Thus, the frequently used SD measure of halo is not recommended for future assessments of the error.

Although computing the SD across standardized dimensions is a better operationalization of halo than computing a SD across unstandardized dimensions, a cautionary note seems warranted. That is, the actual level of halo is indeterminant in the absence of the true intercorrelations among dimensions. Thus, even in using a standard deviation calculated from standardized dimension scores, it is still not known whether or not a given SD (e. g., .50) is too large or too small. Similarly, if a measure is truly multidimensional, an average intercorrelation among dimensions of 1.00 is obviously too high; but, without knowledge of the true intercorrelations among the dimensions, whether or not an observed intercorrelation of .80 or .30, for example, is too large or small is equally ambiguous. Thus, data generated with these measures can only be discussed in relative terms rather than in terms of the level of invalid versus valid halo present in the ratings.

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Table 1

Correlations Between the Halo Measures

	SD	SSD	DI
Standard Deviation (SD)			
Standardized Standard Deviation (SSD)	.81		
Observed-True Dimension Intercorrelations (DI)	-.80	-.99	

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