A Confirmatory Analysis of the Dyadic Adjustment Scale

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The dyadic adjustment scale is critically evaluated by reconsidering the factor structure of the scale and its subscales using a maximum likelihood, confirmatory factor-analysis procedure. A new sample is studied three years later from the same geographical area. High reliability was confirmed for the overall scale. The four subscale factors appear robust and account for 94% of the covariance among the items, although subscale affiliations were not perfectly replicated in the confirmatory factor solution. The findings of the re-evaluation are encouraging, suggesting that confidence in the scale is warranted for subsequent users.

The dyadic adjustment scale (Spanier, 1976) has been widely used in marriage research since its publication. More than 300 researchers have contacted its developer indicating that they wished to use the scale in a research study, and many completed studies that use the scale have already found their way into the research literature. Given such widespread adoption of an instrument, it is important to evaluate further the assumptions, methodology, and conceptual foundations which underlie the scale. Systematic evaluation of widely used measures is sorely lacking in the field. Researchers studying the quality of marriage have been especially reluctant to challenge the traditional measures on which the research literature has been built.

This research note reconsiders the factor structure of the Dyadic Adjustment Scale (DAS) and its subscales, using a maximum likelihood, confirmatory factory-analysis procedure. The sample studied was drawn three years later from exactly the same geographical area as was the original sample; however, only individuals who have been recently separated are currently studied.

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OVERVIEW OF THE SCALE

The dyadic adjustment scale (Spanier, 1976, 1979) was designed to assess the quality of marriage and similar dyads. It is a 32-item paper and pencil measure for use with either married or unmarried cohabiting couples. It also may be used as part of an interview schedule. The scale has been adopted in several studies with recently separated or divorced samples by asking the respondents to answer the items in relation to the most recent month, months, or year that they were together with their (former) spouse. The measure was developed in the tradition of earlier marriage-adjustment scales; however, care was taken to develop a measure which was more theoretically grounded, relevant, valid, and reliable than previous measures. Content, criterion-related and construct validity were reported; and the scale was found to have an overall reliability of .96, using Cronbach's coefficient alpha (Spanier, 1976).

In addition to the overall 32-item scale, through an exploratory analysis, Spanier found a factor pattern that described dyadic consensus, dyadic satisfaction, dyadic cohesion, and affectional expression subscales. The original analysis was based on a combined

sample of married and divorced individuals. Divorced respondents were included to facilitate the assessment of criterion-related (concurrent) validity.

The primary purpose of this paper is to examine the suitability of the factor structure with a more homogeneous (all respondents recently separated) sample than that used in the previous study. In addition, internal consistency reliability is re-evaluated.

SAMPLING AND DATA COLLECTION

The data for this study are part of a larger, longitudinal study of adjustment to marital separation, divorce, and remarriage. The data used in the present analysis were collected during the spring of 1977 through in-depth, structured, face-to-face interviews. The population for this study consisted of all those separated persons in Centre County, Pennsylvania, whose separation had taken place between January, 1975 and the time of the interview in 1977.

Locating and recruiting a sample of separated and divorced individuals is a heroic task because of their reticence and mobility (Dean and Bresnahan, 1969). Nonprobability, purposive sampling techniques were used in this study. Eligible respondents were located in various ways. Feature articles in several local newspapers, letters to attorneys in the county, and contacts with the domestic relations office staff at the county courthouse produced a few respondents. The primary method for obtaining participants involved procurement of names and addresses of those who had recently separated or divorced from public documents in the county courthouse. From these files eligible respondents were persons still living within 50 miles of the county who had either: (a) filed for divorce but not yet received a decree, (b) obtained a divorce decree, or (c) separated and filed (or were filed against) for custody or support.

Nine hundred eighteen potential respondents were identified in the county. Letters were sent to all possible participants describing the study and requesting a response. After three follow-up letters and numerous attempts by telephone, 344 of the potential respondents were contacted. Of these persons 210 agreed to and actually completed the interview. Those interviewed comprised 23% of the 918 potential respondents. Five interviews were discarded after it was determined that the persons had been separated for longer than 26 months.

The dyadic adjustment scale was administered in interview format with the help of response cards. Participants were asked to respond to the questions on the basis of the last few months that they had lived with their spouse before their final separation.

SELECTED SAMPLE CHARACTERISTICS

The sample consisted of 50 (24%) separated persons and 155 (76%) divorced persons. About 9% ($N = 18$) of the divorced persons had remarried by the time of the interview. The length of time from final separation to the interview ranged from one to twenty-six months, with a mean length of ten months. Forty-four percent ($N = 91$) of the sample was male and 56% ($N = 114$) was female. The ages of respondents ranged from 20 to 67 with a mean of 30 years of age. Sixty-two percent ($N = 128$) of the respondents had children, while 38% ($N = 77$) were childless.

The sample was 12% Roman Catholic and 60% Protestant. Nine percent stated other religious preferences, and 19% were atheist, agnostic, or had no religious preference. The yearly income for both spouses combined, before separation, was less than $5,000 for 10% of the sample. Twenty-three percent of the respondents had a yearly family income between $5,000 and $9,999, while 25% had an income range of $10,000 to $14,999. Twenty-two percent reported an income between $15,000 and $19,999, and the remaining 20% of the respondents had family incomes greater than $20,000 per year before the separation.

RESULTS

Internal consistency reliability for the scale was assessed using Cronbach's coefficient alpha, the procedure used in the original study. Coefficient alpha for this sample was .91 for the total scale.

The entire sample of 205 men and women was used to generate a correlation matrix of the 32 items for factoring. The correlations are presented in Table 1. A confirmatory factor analysis was performed (Jöreskog and Sörbom, 1978a), hypothesizing Spanier's (1976) reported four-factor solution. The following specifications were made: factor loadings equal to or greater than .2 in

TABLE 1. CORRELATION MATRIX FOR ITEMS OF DYADIC ADJUSTMENT SCALE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	—																															
2	35	—																														
3	32	28	—																													
4	26	42	24	—																												
5	33	39	25	26	—																											
6	22	27	18	59	21	—																										
7	28	40	31	43	45	30	—																									
8	30	31	30	41	25	37	40	—																								
9	24	27	30	20	28	19	11	30	—																							
10	36	33	14	30	20	39	32	43	15	—																						
11	26	35	15	39	22	29	25	28	23	21	—																					
12	49	36	39	40	35	33	49	37	23	33	30	—																				
13	25	27	26	26	22	25	34	17	15	30	16	31	—																			
14	29	63	28	40	38	30	44	35	19	37	44	44	40	—																		
15	35	16	13	27	14	31	23	22	17	41	22	33	34	33	—																	
16	06	09	01	15	11	22	07	11	11	12	25	15	-06	19	04	—																
17	21	24	24	06	40	-05	19	-03	17	10	12	22	12	23	10	18	—															
18	32	14	09	26	22	33	28	24	16	32	21	19	17	30	20	28	13	—														
19	27	26	13	26	24	22	31	26	21	32	17	28	24	29	26	07	15	45	—													
20	33	28	15	28	31	24	27	16	28	24	21	35	14	35	26	21	23	40	42	—												
21	39	18	20	14	30	13	29	12	22	22	26	36	04	28	22	22	39	31	23	32	—											
22	37	27	16	27	38	24	40	24	22	32	30	45	17	33	20	29	33	47	40	38	54	—										
23	19	13	04	21	13	30	18	05	04	14	08	18	21	18	10	25	02	36	31	28	18	31	—									
24	18	36	16	34	25	16	28	20	22	27	26	32	33	42	19	05	12	27	34	32	16	34	31	—								
25	23	28	21	30	13	18	28	35	26	28	21	24	29	36	21	03	19	36	38	29	19	23	28	35	—							
26	18	18	23	28	18	21	27	26	23	24	15	27	21	25	18	09	20	34	38	31	13	28	43	40	55	—						
27	26	22	29	25	22	16	31	21	16	24	20	26	27	32	19	01	34	24	33	23	23	31	16	25	51	48	—					
28	22	22	19	17	18	15	19	25	20	33	15	22	14	30	30	07	20	22	26	19	15	22	07	23	42	32	45	—				
29	06	07	05	10	10	23	03	04	11	03	13	05	04	11	15	05	02	14	05	08	08	05	-08	06	00	01	10	08	—			
30	13	18	12	33	16	30	09	15	15	13	24	06	12	12	18	06	11	25	19	29	14	17	04	09	22	17	17	05	36	—		
31	20	21	15	30	12	31	30	23	12	30	21	25	13	35	28	30	21	47	31	34	32	35	28	30	41	39	29	27	02	20	—	
32	19	10	09	10	22	13	12	10	09	25	-02	12	08	11	04	20	16	32	36	27	12	20	23	21	15	25	16	18	04	07	21	—

Spanier's original solution were left free to vary, and loadings less than .2 were fixed at zero; factor variances were fixed at unity to scale the solution; factor intercorrelations and unique variances for the items were left free to vary, while covariances among the unique aspects of items were fixed at zero.

The purpose of this initial confirmatory analysis was to verify statistically the solution found through exploratory factor analysis in another sample. The program provides a chi-square with degrees-of-freedom, which reflects how well the hypothesized model fits the current data. The probability level of the chi-square also is given. This is interpreted as the probability of getting a chi-square value larger than the one obtained, given that the hypothesized structure is true. Thus, small probability values correspond to poor fit, and large values to a good fit (Jöreskog, 1969). In this case the chi-square was 765, with 443 degrees of freedom, and had a probability of less than .001. It is very likely that another solution would reproduce more closely the data matrix.

Is the structure inadequate, and how can a more acceptable solution be found? The poor fit may be due to the fact that either the number of factors is untenable or the proposed structure is untenable, or both. The utility of the confirmatory factor-analytic model is not in its ability to provide an accept-reject decision on a hypothesized structure; a more useful emphasis for the model is on the relative value of a particular structure in relation to alternative structures. This strategy of comparing alternative structures to arrive at a solution that better fits the current data was adopted.

The appropriate number of factors was verified through an exploratory maximum likelihood factor analysis (Jöreskog and Sörbom, 1978b). The analysis generated solutions with one through six factors. Three criteria were used to decide on the number of factors: (a)relative change in chi-square for solutions with different numbers of factors, (b)Tucker-Lewis reliability coefficients (Tucker and Lewis, 1973), and (c)interpretability. The chi-square values and reliabilities for solutions with one through six factors are presented in Table 2. The probabilities linked with shift in chi-square (distributed as a chi-square) with each additional factor show that each factor significantly improves the fit between the observed and reproduced correlation matrices. The relative shift in chi-square drops, however, after four factors have been extracted. The incremental change in the reliability coefficient follows a similar pattern with the four-factor model marking an acceptable solution ($r = .94$). Four factors account for 94% of the covariance among the items. Finally, the five-factor solution showed signs of "overfactoring," with a doublet factor emerging and factors no longer being distinctly defined by variables. Four factors are tenable for this data set, so we turned to the factor pattern to further approximate an acceptable solution.

The goal of the remainder of the analysis was (a)to identify where the proposed pattern is too restrictive and (b)to arrive at a final solution in which all nonzero estimates—factor loadings, factor intercorrelations, and unique variances for items—are statistically significant and zero estimates are nonsignificant. Jöreskog (1969) offers several strategies for spotting inadequacies in the hypothesized structure and arriving at a final solution. These strategies include examining the residual correlations, utilizing the first derivatives of fixed parameters, and computing confidence intervals for free parameters using standard errors of estimates. The latter two strategies were used in this analysis.

Derivatives corresponding to fixed parameters are useful in deciding how to modify the model to improve fit (Sörbom, 1975). A large derivative reflects an inappropriate restriction and indicates that the parameter fixed at zero ought to be relaxed. In a series of modifications, zero loadings in the factor pattern were individually relaxed based on the largest derivatives. The largest derivative in the factor-pattern matrix was freed first, and the effect was assessed by the change in chi-square with its single degree of freedom. Then, the loading with the next highest derivative was relaxed until a significant improvement in fit was not achieved by freeing an additional parameter. Fourteen zero loadings in the pattern were freed to estimate in this way. At this point the solution had a chi-square of 667, with 429 degrees of freedom and a probability of less than .001. Changes in factor loadings would no longer improve the fit of the model with the data.

The final step was to verify that all nonzero

TABLE 2. CHI-SQUARE, RELIABILITY, AND CHANGE IN CHI-SQUARE FOR EXPLORATORY FACTOR SOLUTIONS OF DYADIC ADJUSTMENT SCALE

Number of Factors	Chi-square	*df*	*p*	Reliability	Change in Chi-square	Change in *df*	*p*
1	1014	464	.001	.81			
2	852	433	.001	.85	162	31	.001
3	708	403	.001	.90	144	30	.001
4	571	374	.001	.95	137	29	.001
5	499	346	.001	.96	72	28	.001
6	430	319	.001	.98	69	27	.001

estimates—factor loadings, factor intercorrelations, and unique variances of items—are significant. This was accomplished by constructing confidence intervals around estimates using the standard errors generated by the program. The sequential elimination of "negligible" coefficients should not significantly change the overall fit of the model. In this way estimates which were not significantly different from zero were fixed at zero. One by one, five loadings in the factor pattern and three factor intercorrelations were set equal to zero; all of the unique variances of items were significantly different from zero. In the final solution, all nonzero coefficients are significant at less than the .05 level, and all zero coefficients are nonsignificant. The final solution for the confirmatory factor analysis appears in Table 3 and has a chi-square of 679, with 437 degrees of freedom and a probability of less than .001. The reported solution represents the best fit available under the proviso that there are four factors and that the unique components of the items are uncorrelated.

Table 3 includes a comparison of the subscale assignment for items from Spanier's (1976) solution with the current solution. The solutions are similar. Except for the defection of four items, the largest loadings for all items are on the hypothesized factor. The factors are not as distinctly defined, however, as in the previous solution.

The first three factors—consensus, satisfaction, and cohesion—are replicated fairly well. Factor 1, consensus, is clearly verified. Consensus, or agreement, has been a robust factor for over two decades (Locke and Williamson, 1958).

Factor 2, satisfaction, is marked by items 16, 17, 20, 21, and 22. These items reflect the negative aspects of marriage. Rather than satisfaction, an accurate label for this factor in the current solution might be dyadic tension or discord. The items reflecting the positive and global satisfactions of marriage did not align with this factor as proposed. The global indicators of dyadic adjustment (items 18, 31, and 32) do not distinguish among the factors. It is reasonable that these general assessments would not affiliate with more specific components of adjustment. Spanier (1976) has suggested that these items (particularly item 32) measure the individual's adjustment to the relationship rather than perceptions of the relationship's functioning. Frequency of kissing also does not discriminate well among factors; this item (23) did not discriminate well in the original solution either. Frequency of confiding in one's mate defected from the satisfaction factor to cohesion.

Cohesion, factor 3, is marked by items 24 through 28, as it is in the original solution. This factor reflects the sharing of pleasant activities. The current addition of item 29—confiding in one's mate—coincides with this theme.

It is not unusual for a negative (displeasures, tensions) and a positive (pleasures, satisfactions) factor to emerge among items and behaviors which evaluate marriage (Gottman, 1979; Orden and Bradburn, 1968). There is controversy, however, about whether or not these two dimensions provide a comprehensive assessment of marital functioning (Marini, 1976). The findings suggest that there is more to dyadic adjustment than these two dimensions.

The verification and interpretation of the fourth factor, affectional expression, are more equivocal than the other factors. The two items referring to sexual concerns clearly align with this factor, although the loading for item 29 is not high. The two affectional items (4 and 30) do not mark the factor uniquely. The factor is further plagued by small, but significant, loadings for items that stray from their primary factors; these loadings dilute the

TABLE 3. FINAL SOLUTION FOR CONFIRMATORY FACTOR ANALYSIS OF DYADIC ADJUSTMENT SCALE

Item Number	Item Content	Factor Pattern 1	2	3	4	Factor Intercorrelations 1	2	3	4	Unique Variance
1	Agree on handling family finances	**.34**	.32							.67
2	Agree on matters of recreation	**.67**								.55
3	Agree on religious matters	**.47**								.78
4	Agree on demonstrations of affection	.59			**.44**					.47
5	Agree on friends	**.34**	.30							.68
6	Agree on sex relations	.45			**.72**					.29
7	Agree on correct or proper behavior	**.53**	.18							.59
8	Agree on philosophy of life	**.54**			.20					.67
9	Agree on dealing with parents	**.38**								.86
10	Agree on aims and goals	**.52**			.20					.69
11	Agree on amount of time together	**.48**			.16					.75
12	Agree on major decisions	**.53**	.23							.53
13	Agree on household tasks	**.49**				1.0				.76
14	Agree on leisure time activities	**.73**								.47
15	Agree on career decisions	**.43**			.17	.55	1.0			.79
16	Consider terminating relationship		**.35**		.21					.83
17	Leave the house after a fight		**.47**		-.28	.60	.42	1.0		.71
18	Things between partners going well	-.22	**.50**	.41	.28					.50
19	Confide in mate		**.28**	.43		.00	.00	.00	1.0	.63
20	Regret that you married		**.41**	.27						.66
21	Quarrel		**.67**							.55
22	Get on each other's nerves		**.79**							.38
23	Kiss		**.20**	.31	.20					.76
24	Engage in outside interests together	.31		**.32**						.69
25	Stimulating exchange of ideas			**.76**						.42
26	Laugh together			**.72**						.48
27	Calmly discuss something			**.64**						.60
28	Work together on a project			**.52**						.73
29	Being too tired for sex a problem				**.25**					.94
30	Not showing love a problem			.26	**.32**					.83
31	Happiness in marriage		**.27**	.41	.21					.62
32	Commitment to marriage		**.22**	.22						.86

Note: The numerical values are the final solution for the confirmatory factor analysis—factor pattern, factor intercorrelations, and unique variances of items. All unspecified values in the factor pattern are equal to zero. Boldface indicates subscale assignment for items from Spanier's (1976) solution; factors 1 through 4 are consensus, satisfaction, cohesion, and affectional expression, respectively.

interpretation of the affectional expression factor. Still, based on the salient loadings, affectional expression is a reasonable label for this factor.

The factor intercorrelations reported in Table 3 demonstrate that factors 1 through 3—consensus, satisfaction, and cohesion—are substantially related to each other. It is not surprising to find such interrelatedness among the dimensions of a global concept such as dyadic adjustment. The correlations among these factors are not so high as to question the existence of separate dimensions. The distinctness of the loadings on factors 1 through 3 supports this conclusion. Factor 4 is statistically orthogonal to the other three factors in the final solution. This does not mean, however, that affectional expression is conceptually unrelated to the other dimensions of dyadic adjustment. The covariance among the items of the DAS displays itself in both the loading pattern and the factor intercorrelations. The strategy of allowing the pattern to deviate from simple structure resulted in a number of items loading secondarily on factor 4. The affectional expression items, therefore, are related to specific items from the other dimensions, even though factor 4 is orthogonal to the other factors. If a future objective for measuring dyadic adjustment is greater distinction among dimensions, item selection and screening will have to be done accordingly.

DISCUSSION

Most researchers use the dyadic adjustment scale as a global assessment of marital functioning rather than concern themselves with the subscales. As such, the DAS is a reliable and valid measure. It was as a general assessment of dyadic adjustment that the scale was developed and validation criteria implemented. The various dimensions that comprise adjustment were considered in the original scale development study, but the domains of the specific dimensions were not sampled and screened with the intent of developing distinct measures of these facets. Nevertheless, the four factors appear robust. In subsequent analyses using the factors as predictors, the dimensions have been found to relate differentially with various criterion variables (Spanier and Thompson, 1982; Thompson and Spanier, 1983). This suggests that the dimensions have distinct meaning. Use of the distinct dimensions would enrich the study of dyadic adjustment, and refinement of the subscales is encouraged.

Future work should (a)weed out the items which do not reliably mark the factors across samples, (b)generate more items representing the affectional expression domain of relationship functioning, (c)attempt to construct a general factor made up of the global assessment items that do not discriminate well among the current factors, and (d)consider the possibility of method interference in factors. This latter suggestion refers to the tendency for factors of the dyadic adjustment scale to represent method similarity as well as substantive similarity. That is, items which were constructed with the same response choices tend to load together on the same factor.

The initial dyadic adjustment scale development study used a combined sample of individuals from intact and dissolved marriages, whereas the present study uses a sample of recently separated men and women. Of course, differences in the marital status of the respondents may account in part for differences in the analysis. Since many variables, including marital status, can potentially influence findings about the structure of dyadic adjustment, it is important that there be a steady accrual of evidence across well-defined and diverse samples.

CONCLUSIONS

The findings of this reevaluation of the dyadic adjustment scale are encouraging, suggesting that confidence in the scale is warranted for subsequent users. Procedures of confirmatory and exploratory factor analysis rarely result in factor structures that are precisely identical to those found in earlier analyses. Thus, given the fairly similar results found in this reevaluation, users can be reasonably sure that the overall scale—and to a lesser but adequate degree, the subscales—continues to be appropriate for the evaluation of dyadic adjustment.

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