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Factor Structure Within and Across Three Family-Assessment Procedures

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Higher order factor structures within and across the Family Environment Scale (FES), Family Assessment Measure (FAM), and Family Adaptability and Cohesion Evaluation Scales III were examined. A sample of 138 families was obtained; separate analyses were conducted for mothers, fathers, and their adolescent children. Factor structures were assessed with exploratory and confirmatory procedures. The FES exhibited 3 factors consistent with the domains of its underlying model, whereas the FAM exhibited a single factor pertaining to affect. When combined, the instruments exhibited 3 factors pertaining to affect–cohesion, family activities, and control. Correspondence across the instruments was confined to the affect–cohesion and control dimensions. Although results were generally consistent across family members, some differences were noted; most important, mothers had more differentiated factor structures than did fathers or children.

During the past decade, there has been increasing interest in the development and evaluation of theoretical models that describe whole-family functioning (e.g., Moos & Moos, 1981; Olson, Portner, & Lavee, 1985; Steinhauer, Santa-Barbara, & Skinner, 1984). Several of these efforts articulated specific clinical–theoretical approaches to family assessment and treatment or tried to integrate constructs from diverse theoretical bases. Significant progress has also been made in the development of self-report instruments to measure key constructs within these various frameworks. Notwithstanding these gains, several studies suggested that such instruments may measure far fewer independent constructs than purported by the underlying models and that further investigation of instrument dimensionality and cross-instrument correspondence may be of great importance to a wide range of family-research endeavors (Fowler, 1981; Jacob & Tennenbaum, 1988; Skinner, 1987). The present study examined three self-report instruments intended to operationalize whole-family models: the Family Environment Scale (FES; Moos & Moos, 1981), the Family Assessment Measure (FAM; Skinner, Steinhauer, & Santa-Barbara, 1983), and the Family Adaptability and Cohesion Evaluation Scales III (FACES III; Olson et al., 1985).

The FES (Moos & Moos, 1981) operationalizes the typology of family social environments (Moos & Moos, 1976). Based on an interactionist perspective (e.g., Endler & Magnusson, 1976), this model assumes that the family is a social environment with relatively stable characteristics. Although the family environment may be described along various dimensions, Moos and Moos emphasized the description and measurement of family "social climate." Specifically, the FES measures social climate in three domains: Relationships, Personal Growth, and System Maintenance. Each domain contains at least 2 subscales for a total of 10 constructs assessed.

A second multidimensional assessment procedure, the FAM (Skinner et al., 1983), was developed to operationalize the process model of family functioning (Steinhauer et al., 1984). Drawing on small-group theory, this model posits that families exist because members share common goals. Most important, the family "provides for the biological, psychological and social development, and maintenance of family

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members, thus ensuring the survival of both the family and the species" (Steinhauer et al., 1984). As family members meet goals, they perform a variety of maintenance, developmental, and crisis tasks. Although tasks change over the life cycle, they involve the same basic processes that comprise the model's seven dimensions.

A third approach to whole-family assessment is illustrated by the FACES III (Olson et al., 1985). The FACES III operationalizes the two dimensions of the circumplex model of marital and family systems developed by Olson and colleagues (Olson, Russell, & Sprenkle, 1983; Olson, Sprenkle, & Russell, 1979). The circumplex model was rationally derived after a review of the family therapy, family sociology, and small-group literatures. Conceptual analysis of these literatures indicated that most concepts could be subsumed within two independent dimensions: Adaptability and Cohesion.

In summary, the FES, FAM, and FACES III represent quite different approaches to the study of whole families, each reflecting a unique conceptualization of the family and each developed according to different assumptions and methods. Despite such diversity, however, these instruments contain a number of similarly described subscales. Each instrument, for example, contains a bonding subscale: Cohesion in the FES and FACES III and Affective Involvement in the FAM. Control is also represented in each instrument: Control in the FES and FAM and Adaptability in the FACES III. Finally, two of the instruments contain subscales pertaining to communication: Expressiveness and Conflict in the FES and Communication and Affective Expression in the FAM.

Such areas of correspondence may well reflect primary dimensions of family process. Models of interpersonal relations, for example, have often emphasized processes related to affect, control, and communication (e.g., Benjamin, 1974; Leary, 1957; Parsons & Bales, 1955). Literature specific to family relations has also suggested that a variety of behaviors can be organized along a few primary dimensions (e.g., Angell, 1936; Hill, 1949; Olson et al., 1979). As suggested by Jacob and Tennenbaum (1988), most of the literature on family influences in psychopathology has focused on four dimensions: affect, control, communication, and systems properties.

In support of a primary-factor approach to family assessment, empirical studies suggested that family instruments based on multidimensional models contain far fewer dimensions than proposed. Skinner (1987), for example, reported substantial intercorrelation among the FAM subscales, suggesting that the FAM may measure a single factor, possibly related to affect. Factor-analytic studies of the FES suggest that this instrument may also measure relatively few dimensions (Fowler, 1981; Oliver, May, & Handal, 1988). Although the considerable subscale intercorrelations found in the FAM and the FES may be due to limitations of self-report methodology (e.g., it may not be possible for respondents to differentiate between closely related items), it is also possible that the underlying models are overly complex.

Finally, support for the contention that a limited number of dimensions may capture the most relevant aspects of family relations can be drawn from studies that have examined cross-instrument correspondence. Miller, Epstein, Bishop, and Keitner (1985) examined relationships between the FACES II (Olson, McCubbin, Barnes, et al., 1983) and a precursor to the FAM, the Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983). Most important, results indicated that Adaptability and Cohesion were significantly correlated with nearly all FAD subscales. Substantial correlation between the FACES II and the FAD was also reported by Fristad (1989), who examined the self-report and clinical rating scales from these instruments. In a final study, Edman, Cole, and Howard (1990) reported that FACES III Cohesion was correlated with a FES cohesion index (composed of Cohesion and Independence) and that FACES III Adaptability was correlated with a FES adaptability index (composed of Organization and Control). Thus, subscales pertaining to family cohesiveness and flexibility from the FACES III and FES were substantially related.

Although the available research literature suggests that different family-assessment instruments may measure a number of the same constructs, limitations in the literature are noteworthy: Much of the extant research was not designed to assess instrument correspondence; studies usually presented correlations between subscales as a small part of reliability and valid-

ity assessments; and most studies focused only on bivariate correlations between instrument subscales.

In the current study, which is concerned with identifying the major dimensions exhibited by the FES, FAM, and FACES III, exploratory and confirmatory procedures were used to examine the higher order factor structures within and across the instruments. Specifically, principal-components analysis was used to develop hypotheses about instrument factor structure followed by confirmatory factor analysis to test these hypotheses. Before conducting the exploratory analyses, general hypotheses regarding the number and type of factors that would be obtained were made. Given the descriptive overlap across the three instruments, it was predicted that the subscales would be substantially correlated and that relatively few factors would be obtained. It was further predicted that the obtained factors would be similar to the major dimensions found in the literature on family and other interpersonal relations. Thus, factors were expected to reflect broad dimensions pertaining to affect, communication, and control.

Method

Sample

The sample was obtained as part of a larger study concerned with the development and evaluation of family-assessment methods (Jacob, 1989). The sample consisted of 138 family triads, composed of a mother, father, and one adolescent between the ages of 12 and 18 years. To participate, all family members had to have at least a sixth-grade reading level, English had to be the first and primary language spoken at home, and parents had to have been married for at least 2 years. All families were recruited with newspaper advertisements and were paid $25.00 for their participation.

Procedure

Announcements that included a brief description of the study were placed in local newspapers. During an initial contact, interested families were screened and procedures were described. If a family met all study criteria and agreed to participate, a packet containing the FES, FAM, and FACES III was mailed to their home. During the first contact, families were also told to not complete the instruments until after a staff member had called to discuss instructions. These instructions were repeated in a packet cover letter.

Several days after mailing the packet, a staff member called the family to discuss instructions with each participant. Family members were told that they should complete their forms independently, that all information would be confidential, and that the family would be paid after the packet was returned. Copies of the instructions were included in the packet. When all instruments were completed, the packet was returned using a postage-paid envelope. Of 182 families who agreed to participate, 24% dropped out after receiving the instruments and 76% completed the study.

Instruments

Each family member completed the FES Real Form (Moos & Moos, 1981), the FAM General Scale (Skinner et al., 1983), and the FACES III (Olson et al., 1985). Brief demographic questions were also completed by each parent.

The FES contains 90 items scored according to a true–false format. As noted, the instrument assesses social climate in three domains: Relationships, Personal Growth, and System Maintenance. Each domain contains at least 2 subscales for a total of 10 constructs assessed. Internal consistency reliability estimates (coefficient alpha) for the subscales were reported as ranging from .64 to .78 (Moos & Moos, 1981). Test–retest reliabilities have been reported as ranging from .73 to .78 (Bagarozzi, 1984). Subscale intercorrelations have been reported as low to moderate, with an average value of .20 (Moos & Moos, 1981). An extensive number of studies supported the external validity of the FES (see Druckman, 1979; Karoly & Rosenthal, 1977; Moos & Moos, 1981, 1984; Scoresby & Christensen, 1976).

The FAM General Scale contains 50 items scored according to a 4-point Likert-type scale (*strongly agree*, *strongly disagree*). The instrument contains seven subscales to assess model constructs (Task Accomplishment, Role Performance, Communication, Affective Expression, Affective Involvement, Control, and Values and Norms) and two subscales to assess response style bias (Social Desirability and Denial–Defensiveness). Internal consistency reliability estimates (coefficient alpha) were reported as .93 for the General Scale (Skinner et al., 1983). Studies focused on external validity indicated that the FAM is capable of differentiating between distressed and nondistressed families (Skinner et al., 1983).

The FACES III is a 20-item instrument that assesses Adaptability (10 items) and Cohesion (10 items). Items are scored according to a 5-point Likert-type scale (*almost never*, *almost always*). Internal consistency reliability estimates have been reported as .62 for Adaptability and .77 for Cohesion, and the correlation between Adaptability and Cohesion has been reported as virtually zero (Olson et al., 1985). Validation studies of the FACES III are currently underway; studies that focused on the original FACES and the FACES II indicated that these instruments adequately discriminated between distressed and nondistressed families (see Olson et al., 1985).

Results

Sample Characteristics

The parents were primarily White, fairly well educated, middle class, and middle-aged. Ninety percent of the mothers were White; 34% were high school graduates and 41% had completed at least 1 year of college; and 79% were employed outside the home. Ninety-one percent of the fathers were White; 27% were high school graduates and 34% had completed at least 1 year of college; and 95% were employed outside the home. The majority of the families were in the middle (30%) and upper-middle classes (37%) as measured by the Hollingshead (1975) Four-Factor Index of Social Status (a weighted index of husband and wife education and occupation). The average age of the mothers was 40.3 years, and the average age of the fathers was 42.5 years. Demographic information on the participating child was limited to sex and age: 57% of the children were female, and the average age for female and male children combined was 14.8 years (R = 12–18, SD = 1.73).

Major Analyses

All analyses were conducted separately for mothers, fathers, and children. Before conducting the factor analyses, subscales with internal consistency reliability estimates (coefficient alpha) below .50 were eliminated. Principal-components analyses were then used to generate hypotheses about instrument factor structure followed by confirmatory factor analyses to test these hypotheses. The exploratory and confirmatory procedures were conducted for the FES and FAM separately to examine the factor structures within these instruments. Because the FACES III contained only two subscales, this instrument was not analyzed separately. The procedures were then applied to the FAM, FES, and FACES III combined to examine cross-instrument factor structure and correspondence.

FES

Several subscales with unacceptable internal consistency were eliminated. For mothers, Expressiveness (.43), Independence (.36), and Achievement Orientation (.39) were eliminated; reliability estimates for the remaining subscales ranged from .58 to .73. For fathers, Independence (.37) and Achievement Orientation (.45) were eliminated; reliability estimates for the remaining subscales ranged from .58 to .76. Similarly, Independence (.44) and Achievement Orientation (.37) were eliminated for children; reliability estimates for the remaining subscales ranged from .57 to .82.

Results of the exploratory analyses were highly consistent across family members. For each respondent, the FES exhibited three factors that accounted for a substantial proportion (≥69%) of the variance. Composition of the obtained factors across family members, although not identical, was highly similar. Generally, Factor I was defined by Conflict, Cohesion, and Organization; Factor II by Intellectual–Cultural Orientation, Active-Recreational Orientation, and Moral–Religious Emphasis; and Factor III by Organization, Control, and Moral–Religious Emphasis.[1]

The confirmatory analyses compared two FES models: a null model in which it was hypothesized that each subscale reflected an independent factor, and an alternative model based on the exploratory results for each respondent. In specifying the alternative models, subscales were generally constrained to load on one factor. However, the factors were allowed to correlate. Covariance matrixes were used as data for all analyses. Results of these procedures are reported next for mothers, fathers, and children separately.

Mothers. Maximum likelihood (ML) estimates for the three-factor alternative model are reported in Table 1.

The null and the three-factor model were evaluated with the chi-square test statistic and three goodness-of-model-fit indices. On the basis of chi-square, both models had an unacceptable fit to the data. For the null model, $\chi^2(21, N = 138) = 203.38$, $p < .01$, and for the three-factor model, $\chi^2(10, N = 138) = 27.37$, $p < .01$. In practice, however, chi-square may be overly restrictive, that is, significant even

[1] The exploratory factor analyses were conducted using SPSS-X Data Analysis System, Release 3.0 (Statistical Package for the Social Sciences, Inc., 1988). The extraction method was principal-components analysis, the criterion for extraction was eigenvalues greater than or equal to 1.0, and the rotation method was varimax. The confirmatory analyses were conducted using LISREL VII (Jöreskog & Sörbom, 1988).

Table 1
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Mothers' Three-Factor Family Environment Scale Model

Subscale	Factor I	Factor II	Factor III
	Maximum likelihood estimates		
Cohesion	.711	—	—
Conflict	−.706	—	—
Intellectual–Cultural Orientation	—	.764	—
Active-Recreational Orientation	—	.627	—
Moral–Religious Emphasis	—	.354	—
Organization	.729	—	.433
Control	—	—	.806
	Factor intercorrelations		
I	—	—	—
II	0.53	—	—
III	−0.20	0.02	—

when differences between observed and expected covariance matrixes are trivial. In addition, chi-square may be affected by sample size. Therefore, three fit indices that are less restrictive and less affected by sample size were also examined: the goodness-of-fit index (GFI), the adjusted GFI (AGFI), and the root-mean-square residual (RMR). The GFI is the ratio of the minimum fit function after a model is fitted to the minimum fit function before a model is fitted. The AGFI is the GFI adjusted for degrees of freedom. Both indices yield values between 0.0 and 1.0, with unity indicating perfect fit (Jöreskog & Sörbom, 1988). Although there is no statistical test for the adequacy of these indices, cutoffs of .90 for the GFI and .80 for the AGFI have been suggested in the literature (e.g., Anderson & Gerbing, 1984). The RMR indicates the average size of the fitted residuals and is interpreted in relation to the size of observed variances and covariances (Jöreskog & Sörbom, 1988).

On the basis of the goodness-of-model-fit indices, the three-factor model had a good fit (GFI = .951; AGFI = .864; RMR = .067). In contrast, the fit of the null model was poor (GFI = .673; AGFI = .564; RMR = .246).[2] As a final step in the comparison between models, the normed fit index (NFI) was calculated. The NFI estimates improvement in fit and is calculated by comparing relative sizes of chi-square for a null model versus an alternative model. The index is "normed" to yield values between 0.0 and 1.0. Although exact cutoffs have not been established, an alternative model is seen as offering substantial improvement if the NFI exceeds .90 (Bentler & Bonett, 1980). The NFI for the current analysis was .865, indicating that the three-factor model offered improvement over the null model.

Fathers. A three-factor model similar to that tested for mothers was examined. This model could not be tested, however, because the obtained solutions contained negative variance estimates or "Heywood cases." When examined, these improper solutions appeared to be the result of a lack of multiple, reliable indicators to measure adequately Factor III. Because no additional indicators could be developed for the third factor, it was decided to exclude it and attempt to confirm only Factor I and Factor II. Thus, a new model that contained six subscales and two factors was devised. The two-factor model was then compared with a null model in which it was hypothesized that each subscale reflected an independent factor.

[2] As discussed by Jöreskog and Sörbom (1988), the RMR is best interpreted when all variables are standardized; that is, when correlation coefficients are used as data. Therefore, all reported values for the RMR were generated from separate analyses using correlation matrixes.

ML estimates for the two-factor alternative model are reported in Table 2.

On the basis of chi-square, both the null model and the two-factor model had an unacceptable fit to the data. For the null model, $\chi^2(15, N = 138) = 283.31, p < .01$; for the two-factor model, $\chi^2(8, N = 138) = 18.31, p < .01$. On the basis of the goodness-of-model-fit indices, however, the two-factor model had a good fit (GFI = .956; AGFI = .884; RMR = .046). In contrast, the fit of the null model was poor (GFI = .512; AGFI = .316; RMR = .369). Furthermore, the NFI was .935, indicating that the two-factor model offered substantial improvement over the null model.

Children. Again, a three-factor model similar to that tested for mothers was examined. As with results for fathers, however, this model resulted in negative variance estimates. Again, the improper solutions appeared to be the result of a lack of multiple reliable indicators for the third factor. Because no additional indicators could be developed for Factor III, it was decided to exclude it and attempt to confirm only Factor I and Factor II. Thus, as with the procedure for fathers, a new model that contained seven subscales and two factors was devised. The two-factor model was then compared with a null model in which it was hypothesized that each subscale reflected an independent factor.

ML estimates for the two-factor model are reported in Table 3.

Table 2
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Fathers' Two-Factor Family Environment Scale Model

Subscale	Factor I	Factor II
Maximum likelihood estimates		
Cohesion	.901	—
Expressiveness	.605	—
Conflict	−.638	—
Intellectual–Cultural Orientation	—	.777
Active–Recreational Orientation	—	.728
Organization	.608	—
Factor intercorrelations		
I	—	—
II	0.73	—

On the basis of chi-square, both the null model and the two-factor model had an unacceptable fit to the data. For the null model, $\chi^2(21, N = 138) = 327.01, p < .01$; for the two-factor model, $\chi^2(13, N = 138) = 28.62, p < .01$. On the basis of the goodness-of-fit indices, however, the two-factor model had a good fit (GFI = .947; AGFI = .885; RMR = .052). In contrast, the fit for the null model was quite poor (GFI = .514; AGFI = .351; RMR = .344). Finally, the NFI was .912, indicating that the two-factor model offered substantial improvement over the null model.

FAM

Task Accomplishment was eliminated for mothers because of unacceptable internal consistency (coefficient alpha = .47). The remaining subscales had reliability estimates ranging from .63 to .76. No subscales were eliminated for fathers or children; reliability estimates for these family members ranged from .63 to .80.

Results of the exploratory analyses were highly consistent across family members; for each respondent, the FAM contained one factor that accounted for a substantial proportion (≥66%) of the variance. The confirmatory analyses compared two FAM models: a null model in which it was hypothesized that each subscale

Table 3
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Childrens' Two-Factor Family Environment Scale Model

Subscale	Factor I	Factor II
Maximum likelihood estimates		
Cohesion	.972	—
Expressiveness	.555	—
Conflict	−.645	—
Intellectual–Cultural Orientation	—	.694
Active–Recreational Orientation	—	.671
Moral–Religious Emphasis	—	.504
Organization	.615	—
Factor intercorrelations		
I	—	—
II	0.76	—

Table 4
Standardized Maximum Likelihood Estimates for the One Factor Family Assessment Measure

Subscale	Mothers	Fathers	Children
Task Accomplishment	—	.799	.737
Role Performance	.725	.800	.772
Communication	.723	.816	.841
Affective Expression	.724	.843	.762
Affective Involvement	.743	.838	.813
Control	.887	.853	.880
Values and Norms	.800	.818	.876

reflected an independent factor, and an alternative one-factor model based on the exploratory results for each respondent. Covariance matrixes were used as data for all analyses.

Mothers. ML estimates for the one-factor model are reported in Table 4.

Again, the models were evaluated using the chi-square test statistic and the three goodness-of-model-fit indices. On the basis of chi-square, both models had an unacceptable fit to the data; for the null model, $\chi^2(15, N = 138) = 459.46$, $p < .01$, and for the one-factor model, $\chi^2(9, N = 138) = 20.99$, $p < .01$. On the basis of the goodness-of-fit indices, however, the one-factor model had a good fit (GFI = .952; AGFI = .887; RMR = .037). In contrast, the fit for the null model was poor (GFI = .363; AGFI = .109; RMR = .500). Additionally, the NFI was .954, indicating that the one-factor model offered substantial improvement over the null model.

Fathers. ML estimates for the one-factor model are reported in Table 4. On the basis of chi-square, both the null model and the one-factor model had an unacceptable fit to the data; for the null model, $\chi^2(21, N = 138) = 742.36$, $p < .01$, and for the one-factor model, $\chi^2(14, N = 138) = 27.97$, $p < .01$. On the basis of the goodness-of-fit indices, however, the one-factor model had a good fit (GFI = .945; AGFI = .890; RMR = .027). In contrast, the fit of the null model was poor (GFI = .265; AGFI = .020; RMR = .588). In addition, the NFI was .962, indicating that the one-factor model offered substantial improvement over the null model.

Children. ML estimates for the one-factor model are reported in Table 4. As with the results for parents, chi-square indicated that both the null model and the one-factor model had an unacceptable fit to the data. For the null model, $\chi^2(21, N = 138) = 719.82$, $p < .01$, and for the one-factor model, $\chi^2(14, N = 138) = 29.50$, $p < .01$. On the basis of the goodness-of-fit indices, however, the one-factor model had a good fit (GFI = .949; AGFI = .898; RMR = .027). In contrast, the fit for the null model was poor (GFI = .275; AGFI = .034; RMR = .574). Additionally, the NFI was .959, indicating that the one-factor model resulted in substantial improvement over the null model.

Cross-Instrument Analyses

All subscales with acceptable reliabilities were included in the following analyses. For mothers, 10 subscales were included: 2 from the FACES III, 7 from the FES, and 1 from the FAM (a composite measure created by adding the raw scores of the 6 included subscales). For fathers and children, 11 subscales were included: 2 from the FACES III, 8 from the FES, and a FAM composite (created by adding the raw scores of all 7 subscales).[3]

Results of the exploratory procedures were highly consistent across family members. For each respondent, the instruments exhibited three factors that accounted for a substantial

[3] On the basis of conceptual and methodological considerations, we decided to use a FAM composite rather than enter all subscales separately in the confirmatory analyses. Results of our exploratory analyses were unequivocal in suggesting that the FAM was unidimensional. Furthermore, when separate FAM subscales were used in the confirmatory procedures, high multicollinearity resulted in improper solutions. Although creation of FES composites would have made the analyses more consistent, we were interested in exploring the relationships between the different FES subscales and the FAM and FACES III.

proportion (≥62%) of the variance. Composition of the obtained factors across respondents was highly similar; Factor I was defined by the FAM composite, FACES III Cohesion, and FES Conflict, Cohesion, and Organization; Factor II by FES Intellectual–Cultural Orientation, Active–Recreational Orientation, and Moral–Religious Emphasis; and Factor III by FES Organization and Control and FACES III Adaptability.

The exploratory models were subsequently tested for each respondent. In specifying the models, subscales were generally constrained to load on one factor. However, the factors were allowed to correlate. To standardize the subscale variances across instruments, correlation matrixes were used as data for all analyses.

Mothers. ML estimates for the three-factor model are reported in Table 5. The model was evaluated using the chi-square test statistic and the three goodness-of-model-fit indices. On the basis of chi-square, the model had an unacceptable fit to the data; $\chi^2(31, N = 138) = 58.17$, $p < .01$. On the basis of the three goodness of fit indices, however, the model had a good fit (GFI = .924; AGFI = .864; RMR = .062).

Fathers. As with results for the FES, the cross-instrument confirmatory analysis resulted in negative variance estimates. Again, the problem appeared to be the result of a lack of reliable indicators to measure adequately Factor III. Because no additional indicators could be developed for the third factor, we decided to exclude it and focus only on Factor I and Factor II. Thus, a new model that contained nine subscales and two factors was devised.

ML estimates for the two-factor model are reported in Table 6. On the basis of chi-square, the two-factor model had an unacceptable fit to the data; $\chi^2(26, N = 138) = 54.82$, $p < .01$. On the basis of the goodness-of-fit indices, however, the model had a good fit (GFI = .924; AGFI = .868; RMR = .051).

Children. As with results for fathers, the initial confirmatory analysis resulted in negative variance estimates. Again, the problem appeared to be the result of a lack of multiple reliable indicators for Factor III. Because no additional indicators could be developed for the factor, we again decided to exclude it and to attempt to confirm only Factor I and Factor II. Thus, a new model that contained nine subscales and two factors was devised.

ML estimates for the two-factor model are reported in Table 7.

Table 5
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Mothers' Three-Factor Cross-Instrument Model

Scale	Factor I	Factor II	Factor III
Maximum likelihood estimates			
Family Environment Scale			
Cohesion	.772	—	—
Conflict	−.654	—	—
Intellectual–Cultural Orientation	—	.768	—
Active–Recreational Orientation	—	.621	—
Moral–Religious Emphasis	—	.358	—
Organization	.646	—	−.444
Control	—	—	−.549
Family Assessment Measure: Composite	−.761	—	—
Family Adaptability and Cohesion Evaluation Scales III:			
Cohesion	.688	—	—
Adaptability	—	—	.518
Factor intercorrelations			
I	—	—	—
II	0.55	—	—
III	0.07	0.02	—

Table 6
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Fathers' Two-Factor Cross-Instrument Model

Scale	Factor I	Factor II
Maximum likelihood estimates		
Family Environment Scale		
Cohesion	.847	—
Expressiveness	.632	—
Conflict	−.645	—
Intellectual–Cultural Orientation	—	.820
Active–Recreational Orientation	—	.682
Moral–Religious Emphasis	—	.373
Organization	.656	—
Family Assessment Measure: Composite	−.810	—
Family Adaptability and Cohesion Evaluation Scales III: Cohesion	.663	—
Factor intercorrelations		
I	—	—
II	0.70	—

On the basis of chi-square, the model had an unacceptable fit to the data; $\chi^2(26, N = 138) = 58.68$, $p < .01$. On the basis of goodness-of-fit indices, however, the model had a good fit (GFI = .916; AGFI = .854; RMR = .051).

Discussion

The current study indicated that the FES and FAM exhibited fewer specific dimensions than proposed by their underlying models and that correspondence across the FES, FAM, and FACES III was somewhat limited. The FES, for example, exhibited two to three factors depending on respondent. Factor I was primarily defined by Cohesion, Conflict, and Organization and appeared to reflect affect and cohesion. Factor II was defined by Intellectual–Cultural Orientation, Active–Recreational Orientation, and Moral–Religious Emphasis and appeared to reflect family activities. Items from the subscales that load on this factor, for example, emphasize shared activities (e.g., "We often go to movies, sports events, camping"; "Family members attend church, synagogue, or Sunday school fairly often"; "We rarely go to lectures, plays, or concerts"). In addition, other items emphasize family communication (e.g., "We often talk about the religious meaning of Christmas, Passover, or other holidays"; "We often talk about politics or social problems"; "We hardly ever talk about important things").[4] Factor III, although identified for all respondents in the exploratory analyses, was confirmed only for mothers. This third factor was defined by Organization and Control and thus appeared to reflect organizational and control processes.

Current results for the FES are consistent with previous efforts, suggesting that this instrument measures a limited number of dimensions (Fowler, 1981; Oliver et al., 1988). In both the

[4] Although Factor I and Factor II for the FES are substantially correlated, we believe they are distinct enough to justify their interpretation as separate dimensions. Both dimensions appear to reflect family closeness or togetherness; however, Factor I appears to reflect the psychological aspects of closeness, whereas Factor II appears to reflect the behavioral aspects (i.e., family activities). Thus, an important distinction would be lost if the dimensions were combined. An alternative to interpreting highly correlated dimensions might be to constrain the solution to be orthogonal. Given the simultaneous and interrelated nature of much of family life, however, it is probably unreasonable, from a theoretical perspective, to force independence among major dimensions that characterize family interaction. Thus, in the current study, the correlation between Factor I and Factor II is to be expected to the extent that family members who share positive feelings tend to do things together.

Table 7
Standardized Maximum Likelihood Estimates and Factor Intercorrelations for Childrens' Two-Factor Cross-Instrument Model

Scale	Factor I	Factor II
Maximum likelihood estimates		
Family Environment Scale		
Cohesion	.884	—
Expressiveness	.626	—
Conflict	−.711	—
Intellectual–Cultural Orientation	—	.735
Active–Recreational Orientation	—	.640
Moral–Religious Emphasis	—	.490
Organization	.624	—
Family Assessment Measure: Composite	−.871	—
Family Adaptability and Cohesion Evaluation Scales III: Cohesion	.817	—
Factor intercorrelations		
I	—	—
II	0.72	—

current and previous studies, the FES was characterized by two or three factors reflecting affect, psychological and behavioral closeness, and organization–control. It should be noted, however, that the factors obtained in the current study do reflect the three domains of the FES. Affect and psychological closeness reflect the Relationships domain, family activities reflects the Personal Growth domain (perhaps better defined as "family growth"), and organization–control reflects the System Maintenance domain. Thus, although the FES did not exhibit 10 independent dimensions, it did appear to reflect the broader domains of its underlying model.

In contrast to results for the FES, the FAM exhibited one factor, results that are consistent with previous efforts focused on this instrument; most important, Skinner (1987) reported substantial intercorrelation among the FAM subscales, suggesting that the FAM may be measuring a single dimension related to affect. Thus, despite an intended emphasis on pragmatic aspects of family functioning (e.g., Task Accomplishment, Role Performance), the FAM appears to measure evaluative judgments of family members.

Our cross-instrument analyses indicated that the FES, FAM, and FACES III combined exhibited two to three factors. Factor I was defined by subscales from all three instruments and appeared to reflect affect and cohesion. Factor II was defined by FES Personal Growth subscales and appeared to reflect family activities. A third factor was identified in the exploratory analyses for all respondents but was confirmed only for mothers. This third factor was defined by FES Organization and Control and FACES III Adaptability and appeared to reflect firm versus lax control. Thus, correspondence across the three instruments was confined to areas of affect, cohesion, and control. This modest correspondence resulted from the limited dimensionality of the FAM, the FACES III, and, to a lesser extent, the FES. Hypothesized relationships between the FAM and the other instruments, for example, could not occur because the FAM was so strongly unidimensional.

Reasons for the limited dimensionality of apparently multidimensional instruments may be the result of error in the underlying theory, problems with self-report methodology, or both (Jacob & Tennenbaum, 1988). Regarding theoretical issues, it is possible that the models for instruments such as the FAM and FES are overly complex. In reality, family relations may be best described with a few primary dimensions as suggested by various two-factor models of general interpersonal relations (e.g., Benjamin,

1974; Leary, 1957; Parsons & Bales, 1955). Alternatively, it is possible that family relations are multidimensional but that self-report instruments cannot capture this complexity. Respondents, for example, may be unable to differentiate between closely related yet distinct items. In addition, more general evaluations of the family or of specific members may influence responses. Given such methodological problems, other approaches (e.g., observational techniques) may be needed to capture the different dimensions of family relations. To examine this possibility, however, multitrait–multimethod approaches are necessary (Campbell & Fiske, 1959).

Although the current study makes several important contributions to the literature, limitations do exist. Most important, our analyses did not use multitrait–multimethod data. Without such data, it is impossible to determine whether the limited dimensionality of the FAM and the FES is the result of theoretical or methodological problems. Future research would do well to assess theoretical constructs across several methods, including self-report, observational, and quasi-observational procedures. A related limitation concerns the high intercorrelations among several of the factors in the confirmatory analyses. Although we expected some correlation among dimensions that reflect family interaction (see footnote 4), these rather substantial correlations may be demonstrating a consistent method effect. Again, multitrait–multimethod data are necessary to explore issues related to method variance.

A third limitation concerns the issue of correspondence in factor structures across family members. Our decision to eliminate subscales on the basis of internal consistency criteria resulted in the elimination of different subscales for different members. In turn, these decisions precluded a standard multisample analysis to determine similarity of factor structures across members (see Jöreskog & Sörbom, 1988). Although results were highly consistent across respondents in the exploratory analyses, the same factor structures could not be confirmed for all family members. Instead, factor structures for mothers were more differentiated than those obtained for fathers and children. Specifically, organization–control emerged as a robust factor for mothers but not for fathers or children. Various explanations for this disparity can be suggested. Organization and control, for example, may be more salient to mothers to the extent that women have disproportionate responsibility for household management and care of children. Alternatively, it is possible that the organization–control factor would have been confirmed for fathers and children had the subscales that defined this factor been more reliable or had additional indicators of the factor been available.

The current study raises additional questions for the conceptualization and measurement of whole-family functioning. Although multidimensional instruments are prevalent in the existing literature, theoretical and empirical support for such approaches remains to be demonstrated. As noted, family relations may be best described with a few primary dimensions, suggesting that more attention should be paid to the development of primary-factor models and instruments and to the application of more general models of interpersonal process to family description. On the other hand, multidimensional models may eventually prove to be more accurate and valid perspectives for understanding complex family processes than simpler two- or three-factor models. To pursue this line of inquiry, however, more attention will have to be directed toward the operationalization of such models. Most important, self-report instruments must be subjected to more rigorous and parametric evaluation than has occurred thus far, and other methods of multidimensional assessment need to be explored within multitrait–multimethod research strategies.

In conclusion, future research on family assessment will need to balance the interrelated demands of theory and method. Multidimensional models, although conceptually appealing, may be limited to certain types of methodology. Conversely, primary-factor models, although perhaps easier to operationalize, need to be closely linked to family theory. Moreover, the similarities and differences between a primary-factor model specific to family relations (such as the circumplex model) and primary-factor models relevant to more general conceptualizations of interpersonal relations need to be articulated. Given such efforts, the conceptualization and measurement of the family as a whole should continue to increase in both richness and veracity.

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