A Latent Variable Model of the Family-of-Origin Scale for Adolescents

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The Family-of-Origin Scale (FOS) is a recently developed 40-item instrument originally designed to assess adults' perceptions of the family in which they were raised. A modified version of the FOS has shown promise for assessing adolescents' perceptions of the extent to which their family fosters autonomy and intimacy. The current study involved administration of the FOS to a large sample of adolescents currently residing with their family of origin. Confirmatory factor analysis supports the scale's original 13 theoretical constructs and establishes factorial validity. Follow-up hierarchical tests indicate the current confirmatory model provides a significant refinement over other plausible models proposed by several different authors finding a similar unitary factor employing exploratory factor analyses.

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INTRODUCTION

The Family-of-Origin Scale (FOS; Hovestadt et al., 1985) was originally developed to assess adults' perceptions of their family in which they were raised. The FOS is founded upon a conceptual model asserting that psychologically healthy individuals grew up in families that featured an optimal balance of autonomy and intimacy. The scale is based upon psychodynamically oriented family therapy that emphasizes the role of introjected family relationships in individual well being (Framo, 1976).

The FOS, with its foundation in object relations theory, attempts to link intrapsychic representations of the family with current individual psychological health (Fine, 1988; Gavin and Wamboldt, in press). A number of studies have suggested that the two dimensions of Autonomy and Intimacy that form the FOS are of particular importance for adolescent development (Grotevant and Cooper, 1986; Leaper et al., 1989). Hauser (1976) has presented a model of adolescent ego development that centers around the capacity to integrate interpersonal relatedness with personally held values. The highest of the three levels of ego functioning, the post-conformist, successfully integrates individuality with close relationships (Hauser, 1976). Research on parent–adolescent communication patterns has found that parent's ability to transmit warmth while simultaneously encouraging independence has been positively associated with adolescent social competence (Grotevant and Cooper, 1986). In contrast to other self-report measures of family functioning, the FOS provides a unique perspective particularly relevant to adolescent development.

Initial research findings with the FOS were promising (Hovestadt et al., 1985), and indicated that the instrument was both reliable and valid. One of the psychometric studies (Hovestadt et al., 1985) that has been conducted to date indicated that the scale has a test–retest reliability of .97 (p < .001) over an interval of two weeks and internal consistency shown by a coefficient alpha (Lord and Novick, 1977) of .75. The FOS was also found to differentiate between marriages in which alcohol abuse was and was not an ongoing concern (Holter, 1982). Adult children of alcoholics were found to perceive their family of origin as less healthy than those without alcoholic parents (Andrasi, 1986). More recently, Mangrum (1989) reported significant differences in the familial perceptions of male prison inmates and college students. Lee, Gordon, and O'Dell (1989) found clinical patients to view their family of origin more negatively than the nonpatients on the FOS. However, there was no information about the type, success, or focus of treatment provided to the previously treated group.
Model of the Family-of-Origin Scale

The present authors have been assessing the value of a nonretrospective version of the FOS that is administered to adolescents currently residing with their family. Preliminary results appear promising. The adolescent version of the FOS has been found to exhibit excellent internal consistency and test–retest reliability, .96 and .95, respectively (Manley, Searight, Skitka, Russo, and Schudy, 1990). Taken together, the high retest reliability of the adult and adolescent versions of the FOS lend some credence to the thought that the scale is measuring stable traits over finite periods of time. Also, the current version of the FOS has been found to differentiate between adolescents currently in treatment for substance abuse and non-clinical adolescents (Searight et al., 1991). In addition, the adolescent version of the FOS has been found to be meaningfully correlated with conceptually similar subscales of the Family Environment Scale (Moos and Moos, 1981; Manley, 1990). This study will further examine the construct validity of the adolescent version of the FOS through factor analysis.

Lee et al. (1989) initiated this type of research effort \( n = 100 \), nonclinical adults) using exploratory principal components analysis (PC). Based upon PC analysis, Lee et al. (1989) found that the subscales of the FOS yielded only one-factor with an eigenvalue \( > 1 \). They concluded the following: (1) that the FOS had a single-factor rather than being a multidimensional instrument as described by Hoestadt et al. (1985), (2) that the unidimensional results represented a general halo effect in which the family of origin is globally evaluated, (3) that the FOS demonstrated poor construct validity, and (4) that the FOS did not exhibit adequate psychometric integrity for use as either a clinical or research instrument.

Initial responses to the claims of Lee et al. (1989) were made by Manley et al. (1990), Mazet et al. (1990), and Gavin and Wamboldt (in press). Most of these factor analytic studies utilized appropriately larger samples and found multiple factors. However, these factors differed somewhat from those proposed by the original authors of the FOS. Thus sample size accounted for some of the uni- vs. multidimensional differences, but the more recent factor analyses were also limited by the other methodological limitations as in Lee et al.'s (1989) study.

These research findings are similar in that when exploratory factor models are used, the first component extracted explains much of the variability in scores. While Lee et al. (1989) found only one eigenvalue greater than 1, it may be argued that the small sample size \( (N = 100) \) prohibited the identification of any additional factors. In the remaining studies, more than one significant eigenvalue occurred. Extraction of these additional orthogonal factors added little to the total variability accounted for by the
model. While some researchers would interpret this finding as conclusive evidence of the presence of one and only one-factor, methodological discussions of the interpretability of derived factor solutions have focused on the true factor structure in the data (Mulaik, 1988). Put briefly, a plot of the number of factors by eigenvalues may be quite useful in identifying the number of factors if the researcher is willing to assume a priori that all factors that are extracted are orthogonal. Relative magnitude of eigenvalues, however, is not useful when the state of nature producing the data is composed of two or more highly correlated factors; the pattern of eigenvalues in a plot of eigenvalues by factors will continue to indicate only one large first eigenvalue.

Given this point, the present study seeks to enunciate a family-of-origin model that provides a reasonable scenario for the factors of interest in the FOS based on the theoretical rationale for the construct. This model represents an exercise in construct validation of the relative strength and interrelationships of the individual factors of the FOS. As such, it is not expected that an exploratory factor analysis of the data presented here would yield results different from those reported by previous researchers. While this approach is a useful step, future researchers will want to establish the construct and predictive validity of the factors identified here, given their plausible existence. It is particularly important to make a robust examination of the conceptual organization of the FOS into three superordinate dimensions and ten subscales.

METHOD

Participants

The normative sample was drawn from five midwestern high schools, one in southwestern Illinois ($n_1 = 254$, 17.14% sample of total enrollment) and the other four in eastern Missouri ($n_2 = 215$, 20.67% sample; $n_3 = 80$, 4.50% sample; $n_4 = 35$, 4.67% sample; $n_5 = 78$, 4.52% sample). These five high schools are all within a 50-mile radius of a major metropolitan area in eastern Missouri. The 664 participants in this study were obtained from a nonclinical sample that consisted of 252 male and 412 female adolescents currently enrolled in high school. The mean age of these adolescents was 16.73 years old ($SD = .957$ years), and their ages ranged between 13 and 19 years. Sixty-five percent of the participants reported that their parents were married, 12.8% had divorced parents, 1.7% had separated parents, 4.4% had parents who were never married, 13.1% reported that there was a stepparent in the home, and 2.6% had widowed parents.
Model of the Family-of-Origin Scale

Instrument

The FOS (Hovestadt et al., 1985) is a 40-item face-valid instrument measuring a global perception of one's family health, with two additional primary dimensions: Autonomy and Intimacy. These dimensions are seen as existing in an optimal balance among psychologically healthy individuals. The Autonomy Concept contains the Clarity of Expression, Responsibility, Respect for Others, Openness to Others, and Acceptance of Separation and Loss subscales. The Intimacy Concept consists of Range of Feelings, Mood and Tone, Conflict Resolution, Empathy, and Trust subscales.

The Autonomy subscales assess the respondent's perception of family members' capacity for clear, effective, and responsible communication. Other Autonomy items reflect the family's perceived capacity to openly address events such as interpersonal loss and the family's tolerance for individual differences. The Intimacy subscales assess the perception of the family climate as cohesive and supportive. In addition, these items address family members' perceived conflict resolution abilities and interpersonal sensitivity (Hovestadt et al., 1985; Lee et al., 1989).

Each of the 40 FOS items were rewritten in the present tense for this study. These 40 items are actually two sets of 20 questions that differ only by either positive or negative scaling. That is, each question type consists of two identical items, except for differences in wording (positive or negative). These FOS observed variables are theoretically grouped into the hierarchy of ten subscales, two superordinate dimensions, and a global measure.

When scoring the FOS, it was necessary to reverse the scores of the negatively scaled items in order to achieve a uniform direction of scores. Therefore, each item had a highest health response of 5 and a lowest family health response of 1. This yielded a possible range of 40–200 for the individual's global score.

Procedure

Consent to collect data at five midwestern high schools was obtained from the school district and the principals of the respective schools. Those students who signed the informed consent and obtained their parents' permission were asked to participate in the study. Participation was completely voluntary, and 664 students completed the FOS in classroom settings by students enrolled in social science classes. These data were then subjected to preliminary screening prior to the latent variable modeling.
RESULTS

Initially, the data for the latent variable model was transformed utilizing the following procedures: (1) The negatively scaled items were reversed scored in order to assure unidirectionality, (2) The 40 FOS items were reduced into item combination scores (Vs) for the 20 types of FOS questions by consolidating the respective two items for each type. Refer to Table I for those original FOS items that were combined into each V. These combination scores allowed for better model specification, (3) The raw score matrix (20 × 664) was then standardized to clarify any possible violations in multivariate normality due to the inherent nature of Likert scaling methods. Thus, the transformed data had initial statistics of $M = 0.00$ and $SD = 1.00$ for each of the 20 FOS Vs.7

After the preliminary data transformations and testing of the assumptions, a latent variable model was developed for confirmatory factor analysis based on the theoretical concepts of the FOS.8,8 This multidimensional factor model was based on several examples of multimode and higher order latent variable models (Hoyle, 1991; Bentler et al., 1988; Loehlin, 1987). The Vs (V1–V20) are the observed combination scores for the 20 FOS question types. These 20 Vs each have an influencing error term (e1–e20). Each group of two conceptually related Vs made up one of the ten latent

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7The univariate statistics for skewness and kurtosis indicated all of the 20 Vs had marginal normality. The Vs, their labels, and initial statistics are reported in Table I. A Mardia’s (1974) coefficient of multivariate kurtosis of 87.69 and a normalized estimate equal to 38.09 indicated moderate non-normality within the data. However, there are latent variable model estimation methods, such as generalized least squares, that are specifically designed to control for non-normally distributed data.

8Other criterion to assess the appropriateness for factor analysis is Kaiser’s (1970) Measure of Sampling Adequacy (MSA). This is a numeric measure of the extent to which variables belong together and whether the area of interest has not been undersampled. Kaiser’s decision rules state that a MSA of .90 and greater demonstrates excellent sampling adequacy. The overall MSA for the FOS was highly acceptable, MSA = 97.05. No item had an unsatisfactory MSA level of less than 0.5. Therefore, the MSA results suggest that no items needed to be eliminated from the analysis.

9According to Dziuban and Shirkey (1974), another measure for assessing correlation matrices for acceptability before applying factor analysis is Bartlett’s (1950) test of sphericity. Bartlett’s test is a global test of independence and also tests whether the correlations are nontrivial. Therefore, the larger the value of Bartlett’s test the stronger the evidence is that the correlation matrix have nonzero off diagonals, or in other words, that the items are not independent. If the FOS items are uncorrelated, attempting a factor analysis would be of questionable value. Bartlett’s (1950) test of sphericity for the FOS item correlation matrix was found to equal 14,844.965, $p < .001$. Although this test is sensitive to sample size, the finding is more than adequate as a criterion for proceeding with the factor analysis. Taken together, the above preliminary data screenings suggested that a factor analysis was warranted.


Model of the Family-of-Origin Scale

<table>
<thead>
<tr>
<th>Model and theoretical labels</th>
<th>FOS item nos.</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Skewness</td>
</tr>
<tr>
<td>V1 Clarity of expression (1)</td>
<td>(24+9)</td>
<td>-0.427</td>
</tr>
<tr>
<td>V2 Clarity of expression (2)</td>
<td>(34+16)</td>
<td>-0.265</td>
</tr>
<tr>
<td>V3 Responsibility (1)</td>
<td>(11+5)</td>
<td>0.042</td>
</tr>
<tr>
<td>V4 Responsibility (2)</td>
<td>(38+18)</td>
<td>-0.585</td>
</tr>
<tr>
<td>V5 Respect for others (1)</td>
<td>(15+4)</td>
<td>-0.611</td>
</tr>
<tr>
<td>V6 Respect for others (2)</td>
<td>(19+28)</td>
<td>-0.584</td>
</tr>
<tr>
<td>V7 Openness to others (1)</td>
<td>(6+23)</td>
<td>-0.511</td>
</tr>
<tr>
<td>V8 Openness to others (2)</td>
<td>(14+37)</td>
<td>-0.576</td>
</tr>
<tr>
<td>V9 Acceptance of loss (1)</td>
<td>(10+20)</td>
<td>-0.308</td>
</tr>
<tr>
<td>V10 Acceptance of loss (2)</td>
<td>(36+25)</td>
<td>-0.243</td>
</tr>
<tr>
<td>V11 Range of feelings (1)</td>
<td>(1+32)</td>
<td>-0.766</td>
</tr>
<tr>
<td>V12 Range of feelings (2)</td>
<td>(12+39)</td>
<td>-0.482</td>
</tr>
<tr>
<td>V13 Mood and tone (1)</td>
<td>(29+2)</td>
<td>-0.651</td>
</tr>
<tr>
<td>V14 Mood and tone (2)</td>
<td>(40+22)</td>
<td>-0.796</td>
</tr>
<tr>
<td>V15 Conflict resolution (1)</td>
<td>(27+7)</td>
<td>-0.463</td>
</tr>
<tr>
<td>V16 Conflict resolution (2)</td>
<td>(31+13)</td>
<td>-0.167</td>
</tr>
<tr>
<td>V17 Empathy (1)</td>
<td>(21+17)</td>
<td>-0.402</td>
</tr>
<tr>
<td>V18 Empathy (2)</td>
<td>(35+30)</td>
<td>-0.722</td>
</tr>
<tr>
<td>V19 Trust (1)</td>
<td>(3+26)</td>
<td>-0.460</td>
</tr>
<tr>
<td>V20 Trust (2)</td>
<td>(8+33)</td>
<td>-0.489</td>
</tr>
</tbody>
</table>

*All variables have mean = 0.000 and standard deviation = 1.000.

b (I) Question type 1; (2) question type 2.
Fig. 1. A higher order latent variable model for the FOS.
variables (Fs) corresponding to the ten FOS subscales. These ten first-order factors (Fs) were labeled F1–F10 and each has an attached factor disturbance (D1–D10).

The model was further specified by two second-order factors (Fs) coinciding with the two superordinate dimensions of the FOS (F11–F12). Autonomy (F11) consists of the first-order Fs, F1–F5; and Intimacy (F12) contains F6–F10. These two second-order Fs contributed equally to the third-order factor (F13), which is the FOS global factor. A graphic representation of this latent variable model is shown in Fig. 1.

The next step in the data analysis was to evaluate the fit of this model by the structural equations program, EQS (Bentler, 1989). The EQS program for this model is shown in the Appendix. In order to logically identify the confirmatory solution, it was necessary to constrain certain solution parameters. In addition to the usual mathematical constraints, it was necessary to constrain some of the second-order factor loadings to be equal. Conceptually, the loadings these second-order factors represent unstandardized internal consistency estimates for the FOS as a whole. A confirmatory factor model specifying a generalized least squares (GLS) estimation was chosen because the GLS solution has more power in certain situations (Browne, 1977, 1984). The confirmatory (GLS) model was executed with the usual mathematical constraints: (1) the global third-order factor (F13) variance, variance of the first-order factor disturbances, and observed variable error loadings were all fixed to be 1; (2) the first-order factor loadings of each set of two related question types were constrained to be equal; and (3) the third-order factor loadings (F11, F12) were constrained to be equal. As well as those constraints, an examination of the relative strength of the second-order factors, three additional constraints were imposed on the second-order factors (setting two-factor loadings to be equal on the Autonomy dimension, and three factor loadings on the Intimacy dimension to be equal and setting the factor loading for F1 to be 1), the model converged, yielding a Bentler–Bonett (1980) Normed Fit Index (NFI) of .99. Furthermore, the Wald test for exclusion of parameters suggested no parameters needed to be dropped, and the Lagrange Multiplier test suggested relaxing three of the equality constraints on the first-order factors (see Appendix). With these minor empirically suggested modifications implemented, the model was retested. This final model adequately reflected the data as shown by a Satorra–Bentler (1988) $\chi^2(170) = 366.31, p < .001$, and a NFI = .99. In order to assess the generalizability of these results, an maximum likelihood (ML) solution of the data was also attempted. The ML solution was empirically identified, yielding a similar NFI (.93) to that obtained with the GLS solution. Since the GLS and ML solutions were so similar, the results of only the GLS solution are presented.
here. In addition, examination of the small standard errors for the model parameters indicated that the distributional assumption for this model was not severely violated, providing further support for the use of the GLS estimation (Browne, 1977, 1984). All hypothesized factor loadings were significant. The standardized factor and residual loadings are summarized in Tables II and III.

The higher order latent variable model consisting of thirteen factors not only meets the interpretability criterion (Kim and Mueller, 1978) of having a feasible solution based on the current understanding of the model of family functioning described by Hovestadt et al. (1985), but post hoc testing of the model’s internal consistency lends additional support for retaining this higher order model. This factor model had the following coefficient alphas (Lord and Novick, 1977): F1, \( \alpha = 0.75 \); F2, \( \alpha = 0.70 \); F3, \( \alpha = 0.77 \); F4, \( \alpha = 0.74 \); F5, \( \alpha = 0.78 \); F6, \( \alpha = 0.72 \); F7, \( \alpha = 0.86 \); F8, \( \alpha = 0.84 \); F9, \( \alpha = 0.80 \); F10, \( \alpha = 0.71 \); F11, \( \alpha = 0.88 \); F12, \( \alpha = 0.91 \); F13, \( \alpha = 0.95 \). One further post hoc test, a jackknife simulation, was performed to explore the possibility of outliers in the data set. This method of resampling made over 200 replications, and no significant outliers were found. Thus, this latent variable model seems to be appropriate and parsimonious for data from the nonretrospective form of the FOS. These factors, with their theoretical meanings and each factor’s internal consistency as determined by coefficient alpha (Lord and Novick, 1977), are presented in Table III.

Hierarchical Analysis

Using the current adolescent data, a concluding comparison between the unidimensional model (FOS1) proposed by Lee et al. (1989) and the current confirmed multidimensional model (FOS13) was made. Lee et al.’s (1989) model suggested all of the 40 FOS items loaded on one latent variable. This model was tested and found to have a \( \chi^2(180) = 674.77 \), \( p < .001 \), and a NFI=.98. Another possible latent model might consist of the two superordinate dimensions of the FOS (FOS2). Testing this model yielded a \( \chi^2(179) = 670.67 \), \( p < .001 \) with a NFI=.99. An incremental comparison between uni-, bi-, and multidimensional latent variable model \( \chi^2 \)'s revealed significant differences between all the models: FOS1 and FOS2 \( \chi^2(1) = 4.10 \), \( p < .001 \); FOS2 and FOS13 \( \chi^2(9) = 304.36 \), \( p < .001 \). These findings suggest the multidimensional model is a substantially better fit for the given data.
## Model of the Family-of-Origin Scale

### Table II. Standardized Factor and Error Loadings for Adolescent FOS Data

<table>
<thead>
<tr>
<th>Model and theoretical labels</th>
<th>Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor</td>
</tr>
<tr>
<td>V1  Clarity of expression (1)</td>
<td>0.685</td>
</tr>
<tr>
<td>V2  Clarity of expression (2)</td>
<td>0.877</td>
</tr>
<tr>
<td>V3  Responsibility (1)</td>
<td>0.740</td>
</tr>
<tr>
<td>V4  Responsibility (2)</td>
<td>0.737</td>
</tr>
<tr>
<td>V5  Respect for others (1)</td>
<td>0.815</td>
</tr>
<tr>
<td>V6  Respect for others (2)</td>
<td>0.811</td>
</tr>
<tr>
<td>V7  Openness to others (1)</td>
<td>0.820</td>
</tr>
<tr>
<td>V8  Openness to others (2)</td>
<td>0.779</td>
</tr>
<tr>
<td>V9  Acceptance of loss (1)</td>
<td>0.807</td>
</tr>
<tr>
<td>V10 Acceptance of loss (2)</td>
<td>0.815</td>
</tr>
<tr>
<td>V11 Range of feelings (1)</td>
<td>0.745</td>
</tr>
<tr>
<td>V12 Range of feelings (2)</td>
<td>0.751</td>
</tr>
<tr>
<td>V13 Mood and tone (1)</td>
<td>0.837</td>
</tr>
<tr>
<td>V14 Mood and tone (2)</td>
<td>0.906</td>
</tr>
<tr>
<td>V15 Conflict resolution (1)</td>
<td>0.863</td>
</tr>
<tr>
<td>V16 Conflict resolution (2)</td>
<td>0.851</td>
</tr>
<tr>
<td>V17 Empathy (1)</td>
<td>0.837</td>
</tr>
<tr>
<td>V18 Empathy (2)</td>
<td>0.847</td>
</tr>
<tr>
<td>V19 Trust (1)</td>
<td>0.818</td>
</tr>
<tr>
<td>V20 Trust (2)</td>
<td>0.682</td>
</tr>
</tbody>
</table>

*(1) Question type 1; (2) question type 2.*
Table III. Factor Internal Consistencies and Standardized Inter-Factor and Disturbance Loadings

<table>
<thead>
<tr>
<th>Model and theoretical labels</th>
<th>Alphas</th>
<th>Factor</th>
<th>Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1 Clarity of expression</td>
<td>0.749</td>
<td>0.958</td>
<td>F11+0.285</td>
</tr>
<tr>
<td>F2 Responsibility</td>
<td>0.698</td>
<td>0.895</td>
<td>F11+0.446</td>
</tr>
<tr>
<td>F3 Respect for others</td>
<td>0.768</td>
<td>0.980</td>
<td>F11+0.201</td>
</tr>
<tr>
<td>F4 Openness to others</td>
<td>0.738</td>
<td>0.980</td>
<td>F11+0.201</td>
</tr>
<tr>
<td>F5 Acceptance of loss</td>
<td>0.783</td>
<td>0.715</td>
<td>F11+0.700</td>
</tr>
<tr>
<td>F6 Range of feelings</td>
<td>0.721</td>
<td>0.961</td>
<td>F12+0.277</td>
</tr>
<tr>
<td>F7 Mood and tone</td>
<td>0.859</td>
<td>0.975</td>
<td>F12+0.222</td>
</tr>
<tr>
<td>F8 Conflict resolution</td>
<td>0.840</td>
<td>0.975</td>
<td>F12+0.222</td>
</tr>
<tr>
<td>F9 Empathy</td>
<td>0.797</td>
<td>0.975</td>
<td>F12+0.222</td>
</tr>
<tr>
<td>F10 Trust</td>
<td>0.713</td>
<td>0.884</td>
<td>F12+0.467</td>
</tr>
<tr>
<td>F11 Autonomy</td>
<td>0.882</td>
<td>1.000</td>
<td>F13</td>
</tr>
<tr>
<td>F12 Intimacy</td>
<td>0.910</td>
<td>1.000</td>
<td>F13</td>
</tr>
<tr>
<td>F13 FOS Global</td>
<td>0.951</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

A GLS confirmatory factor analysis was conducted on the nonclinical adolescent data collected from a nonretrospective form of the FOS. The 20 questions of the FOS loaded on the thirteen theoretical factors, which suggest the following factor meanings: Clarity of Expression, Responsibility, Respect for Others, Openness to Others, Acceptance of Separation and Loss, Range of Feelings, Mood and Tone, Conflict Resolution, Empathy, and Trust subscales; the Autonomy and Intimacy superordinate dimensions; and the FOS global measure of one's perceived family health. This factor solution duplicates the initial theoretical constructs presented by Hovestadt et al. (1985) and provides an excellent validation of the proposed original dimensions of the FOS.
Methodological Considerations

These findings differ significantly from those of Lee et al. (1989) and others who have found that only one-factor accounted for a significant amount of the FOS variance in a nonclinical sample. Two reasons exist for this discrepancy between the two studies: (1) the statistical power of exploratory factor analysis in small samples, and (2) conceptual advantages of a confirmatory as opposed to an exploratory factor approach. These will be discussed in turn below.

Inadequate Sample Size

The sample size employed in the present study is more appropriate for establishing the presence of a multifactor structure than that employed by Lee et al. (1989). While the design of factor analytic studies is often a matter of experience and expert judgment, some guidelines for sample size have appeared. Bentler (1976), for example, gives the general guideline that there be at least five subjects per test item. Boomsma (1982) reports computational problems such as mathematical convergence, and negative variances that can arise in samples of size 100 and smaller, although he notes that such problems are to some extent a function of the magnitude of the factor loadings of the observed variables. Others (Comrey, 1988; Gorsuch, 1983; Loehlin, 1987) have suggested that a sample size of at least 400–500 is often necessary when a complex factor model is being investigated. In Lee et al.’s (1989) study, the ratio of subjects to test items was relatively low (2.5:1). In the present study, a more appropriate ratio of subjects to test items was much higher (16.6:1).

Assumptions of Exploratory as Opposed to Confirmatory Factor Models

Some of the discrepancy between Lee et al.’s (1989) results and the present study are probably also due to the factor model that was employed. Exploratory Principal Components (PC) is a procedure designed to explain the total variance of manifest variables by reference to one or more independent (and therefore uncorrelated) latent variables (Aaker, 1980; Bentler, 1976). Exploratory factor models using principal components with unspecified models, as in Lee et al.’s (1989) study, may provide plausible constructions of the data, but may also obscure valuable information by attempting to find the fewest number of uncorrelated factors to explain the covariances between observed variables.
The problems associated with an exploratory as opposed to a confirmatory approach carry over into the decision regarding the number of factors. Lee et al. (1989) relied exclusively on two of the criteria commonly employed by many standard statistical computer packages to determine the number of retained factors. These criteria were the Kaiser–Guttman rule (Loehlin, 1987) and the criterion of substantive importance (Kim and Mueller, 1978). The Kaiser–Guttman rule allows only eigenvalues ≥1.00 to be entered into the solution. The criterion of substantive importance sets a criterion of minimum variance explained to 100/k, where k is the number of variables in the analysis. Researchers who rely on these criteria alone are not desirable in many situations, since factor analyses based on random data (i.e., no “true factor structure”) may also produce eigenvalues significantly greater than one (Loehlin, 1987) and some of these spurious “factors” may meet the substantive importance criterion as well. To give a concrete example, if the true state of nature is composed of two unobserved latent variables that are highly correlated, it is likely that a one-“factor” solution will result using exploratory principal components, with a second factor being much smaller, or not present at all, depending on the sample size employed. These reasons are at the heart of many conceptual and philosophical preferences for confirmatory as opposed to exploratory factor models in psychological research (Mulaik, 1988).

A confirmatory factor model allows for tests of competing hypotheses about the data where elements of the factor structure are more completely specified than under exploratory PC. Like exploratory PC, a confirmatory model assumes that observed variables are a function of unobserved latent variables and unique error components. Unlike exploratory PC, however, confirmatory approaches assess the degree of congruence of the theoretical constructs with empirical data within a multidimensional latent variable model (Bagozzi, 1981). While the comparison of Lee et al.’s (1989) unidimensional model with the present model indicates that the multidimensional model is more elegant, the single-factor solution is still a credible fit for these data. Latent variable models based on theoretical constructs in which the primary factors are further differentiated into other meaningful factors can be tested with confirmatory approaches and provide additional important statistical and conceptual information not available from the exploratory PC alone. In this case, the confirmatory factor analysis statistically tested and supported the adequacy of the original theoretical hypotheses proposed by Hovestadt et al. (1985), under the assumption that the proposed factors are correlated by virtue of their correlation with a higher order factor.
Limitations

As noted in Results, it was necessary to impose several equality constraints on the model in order for the solution to be mathematically identified. While the final model demonstrates the possible hierarchical nature of the factor structure of the FOS, researchers who wish to better determine the relative contribution of the first-order factors to subsequent higher order factors will need to sample more items dealing with the first-order factors. The jackknife statistics and the similarity between the GLS and ML solutions lend additional evidence for the robustness of the final model.

Although the present model outlines support for the higher order model relative to the one-factor model proposed by Lee et al. (1989), the present research is not exhaustive of all possible one-factor models that can be advanced. For example, a Schmid–Leiman (1957) transformation of the multidimensional model would also be considered. Under the Schmid–Leiman transformation, all items are thought to be a function of a single underlying factor, with additional factors present for some items to account for similarities of content area. While the Schmid–Leiman transformation shows some methodological equivalence with the multi-dimensional model presented here, the multidimensional model is a useful delineation of patterns of meaningful factors consistent with current family of origin theory.

Future Research Issues

A contextual issue is that greater validity may be found when samples are drawn composed of persons currently living with their family of origin. Lee et al.’s (1989) suggestion that the scale might have more value when used in a nonretrospective manner since views of the family of origin may become more uniformly positive or negative with the passage of time. This matter could be partially addressed by making a direct factor analytic comparison of the data from the current adolescent sample and the original adult sample of Hovestadt et al. (1985). However, for the nonretrospective version of the FOS, one should note the possible confound of state vs. trait items within the FOS. The current results seem to indicate that some factors, such as Acceptance of Separation and Loss, may deal with transient occurrences in the family while other factors could be measuring more stable characteristics. As mentioned before, researchers who wish to better assess the relative importance of the FOS’s first-order factors as well as their stability may find these questions better answered through longitudinal studies utilizing the appropriate factor analytic techniques (see Corballis, 1973).
To date, FOS validity studies have utilized comparisons to other self-report measures of family functioning (e.g., Manley, 1990) or compared clinical and nonclinical adolescents in a contrasted groups strategy (e.g., Searight et al., 1991). A valuable and useful next step in validation of the FOS would be to determine its relationship to observed family interactions in naturalistic and/or laboratory settings. For example, Grotevant and Cooper (1985) have developed a set of laboratory tasks and accompanying behavioral coding system that appears to assess constructs very similar to FOS Autonomy and Intimacy. Studies of this nature would provide important convergent validity (Campbell and Fiske, 1959) for the FOS.

Finally, the obtained differences between adolescents in this study and other adult samples (viz., Lee et al., 1989; Mazer et al., 1990; Gavin and Wamboldt, in press) may be a function of specific developmental issues unique to each age group. These developmental differences may, in turn, influence how the family is perceived. Developmental theorists such as Erickson (1968) describe the autonomy-intimacy tension as particularly salient for adolescents. One might also consider that differences may be due to an adolescent psychosocial moratorium (Erickson, 1980) in which the adolescent is not ready to assume adult commitments such as marriage and employment.

In summary, the current findings show that the factors emerge in a pattern of three superordinate dimensions and ten subscales in a manner consistent with Hovestadt et al. (1985). This is a plausible model for the FOS. Given the methodological strengths of this analysis and its larger sample size, the current findings provide support for the construct validity of the FOS. As such, the model outlined here forms a promising basis for further psychometric and empirical development of the construct.

APPENDIX

>Title
Confirmatory Factor Analysis for the Family-of-Origin Scale;
/Specifications
cases = 664; variables = 20; me = ml, gls, robust; matrix = raw;
/Labels
v1 = clar1; v2 = clar2; v3 = resp1; v4 = resp2; v5 = rscpt1; v6 = rscpt2;
v7 = open1; v8 = open2; v9 = acpt1; v10 = acpt2; v11 = feel1; v12 = feel2;
v13 = mood1; v14 = mood2; v15 = cnflct1; v16 = cnflct2; v17 = emph1;
v18 = emph2; v19 = trust1; v20 = trust2;
Model of the Family-of-Origin Scale

f1 = clar; f2 = resp; f3 = rspect; f4 = open; f5 = accep; f6 = feel; f7 = mood; f8 = cnlict; f9 = empth; f10 = trust; f11 = autonomy; f12 = intimacy; f13 = fos;

Equations

\[ v1 = 0.7f1 + e1; \]
\[ v2 = 0.7f1 + e2; \]
\[ v3 = 0.7f2 + e3; \]
\[ v4 = 0.7f2 + e4; \]
\[ v5 = 0.7f3 + e5; \]
\[ v6 = 0.7f3 + e6; \]
\[ v7 = 0.7f4 + e7; \]
\[ v8 = 0.7f4 + e8; \]
\[ v9 = 0.8f5 + e9; \]
\[ v10 = 0.8f5 + e10; \]
\[ v11 = 0.7f6 + e11; \]
\[ v12 = 0.7f6 + e12; \]
\[ v13 = 0.8f7 + e13; \]
\[ v14 = 0.8f7 + e14; \]
\[ v15 = 0.8f8 + e15; \]
\[ v16 = 0.8f8 + e16; \]
\[ v17 = 0.8f9 + e17; \]
\[ v18 = 0.8f9 + e18; \]
\[ v19 = 0.7f10 + e19; \]
\[ v20 = 0.7f10 + e20; \]
\[ f1 = f11 + d1; \]
\[ f2 = f11 + d2; \]
\[ f3 = f11 + d3; \]
\[ f4 = f11 + d4; \]
\[ f5 = f11 + d5; \]
\[ f6 = f12 + d6; \]
\[ f7 = f12 + d7; \]
\[ f8 = f12 + d8; \]
\[ f9 = f12 + d9; \]
\[ f10 = f12 + d10; \]
\[ f11 = f13; \]
\[ f12 = f13; \]

Variances

e1 to e20 = 0.3; d1 to d10 = 1; f13 = 1;

Constraints

\( (v1, f1) = (v2, f1); \)
\( (v3, f2) = (v4, f2); \)
\( (v5, f3) = (v6, f3); \)
\( (v7, f4) = (v8, f4); \)
(v9, f5) = (v10, f5);
(v11, f6) = (v12, f6);
!(v13, f7) = (v14, f7);
(v15, f8) = (v16, f8);
(v17, f9) = (v18, f9);
!(v19, f10) = (v20, f10);
(f3, f11) = (f4, f11);
(f7, f12) = (f8, f12);
(f7, f12) = (f9, f12);
(f11, f13) = (f12, f13);
/Print
effect = yes; covariance = yes;
/Simulation
replications = 250; jackknife;
/Output
pa;
/Lmtest
/Wtest
/End

REFERENCES


Statistical Software.


Model of the Family-of-Origin Scale


