

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

U·M·I

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

Order Number 1345367

**Dimensionality of three family assessment instruments: FAM,
FES, and FACES**

Gondoli, Dawn Marie, M.S.
The University of Arizona, 1991

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

DIMENSIONALITY OF THREE FAMILY ASSESSMENT INSTRUMENTS:
FAM, FES and FACES

by

DAWN MARIE GONDOLI

A Thesis Submitted to the Faculty of the
SCHOOL OF FAMILY AND CONSUMER RESOURCES
In partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA

1 9 9 1

STATEMENT BY AUTHOR

This thesis has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this thesis are allowable without special permission, provided accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in her or his judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: Dawn M. Hendal

APPROVAL BY THESIS DIRECTOR

This Thesis has been approved on the date shown below:

Theodore Jacob
T. Jacob
Professor of Family Studies

June 13, 1991
Date

ACKNOWLEDGEMENTS

I would like to express my gratitude to the many people who helped make this thesis successful. First, I would like to thank the members of my committee for their excellent ideas and support: Ted Jacob, David Rowe, and Varda Salomon. Thanks are especially due to my major advisor, Ted Jacob, for the opportunities he has provided, his flexibility, and his patience.

Next, I would like to thank the 138 families who participated in this research. All of these individuals agreed to complete lengthy forms, requiring a good deal of reflection about themselves and their families. I am very grateful for their time and their openness.

Finally, I would like to thank my husband, Brad, and my peers in the Department of Family Studies, for their love and encouragement throughout the thesis process.

D E D I C A T I O N

With love,

To

Bradley Stephen Gibson

TABLE OF CONTENTS

	Page
LIST OF TABLES	7
ABSTRACT	8
CHAPTER I: INTRODUCTION	9
CHAPTER II: REVIEW OF LITERATURE	15
Introduction	15
Circumplex Model	15
Process Model	17
Family Environment Model	19
Correspondence Across the Three Models	21
Theory Related to Model Dimensionality	22
Empirical Studies of Instrument Dimensionality	23
Empirical Studies of Instrument Correspondence	25
Summary	27
CHAPTER III: METHODS	30
Sample	30
Procedure	30
Instruments	32
FACES III	32
FAM	35
FES	38
CHAPTER IV: RESULTS	43
Characteristics of the Sample	43
Results of Exploratory Factor Analysis	44
Overview of Procedures	44
Results for Mothers	47
Results for Fathers	55
Results for Children	61
Results for Daughters vs Sons	66
Comparison of Factor Structures Across Samples	72
Summary	75

TABLE OF CONTENTS (Continued)

CHAPTER V: SUMMARY AND DISCUSSION	77
Summary	77
Discussion	78
Limitations	87
Conclusions and Recommendations	89
REFERENCES	92

LIST OF TABLES

Table		Page
1.	Initial Factor Structure for Mothers	48
2.	Final Factor Structure for Mothers	53
3.	Initial Factor Structure for Fathers	56
4.	Final Factor Structure for Fathers	60
5.	Initial Factor Structure for Children	62
6.	Final Factor Structure for Children	65
7.	Final Factor Structure for Daughters	68
8.	Final Factor Structure for Sons	70
9.	Initial Comparison Across Family Members	73
10.	Final Factor Structures Across Family Members	76

ABSTRACT

This research identifies the major dimensions exhibited across three self-report family assessment instruments: the FAM, FES and FACES. The instruments were administered to 138 families, consisting of a mother, father, and one child between 12-18 years old. Principal components analysis was used to identify dimensions across instruments. As dimensions were identified, correspondence across the instruments was assessed. Results indicated that the 19 instrument subscales could be organized along three factors, labeled Affect, Activities, and Control. Factor composition for different family members, although not identical, was highly similar. Results also indicated that there was relatively little correspondence across the three instruments. Lack of correspondence appeared to be largely caused by the limited dimensionality of the FACES III and FAM. In contrast, the FES demonstrated greater range, contributing substantially to all three factors. Additionally, the obtained factors corresponded to the domains of the Family Environment Model: Relationships, Personal Growth, and System Maintenance.

CHAPTER I
INTRODUCTION

During the past decade, there has been continued development of theoretical models that describe family functioning as a whole. Such "whole family" models focus on the family system, rather than on individual health and pathology. Typically, such models conceptualize the family as a group of interacting personalities, and posit that there are critical areas of functioning that every family must address. Although they are not formal theories, several of the more highly developed models reflect specific theoretical and clinical approaches to family assessment and treatment. Often, whole family models attempt to integrate constructs from diverse theoretical bases, including systems, communication, and small-group theory, as well as concepts from the marital and family therapy literatures.

Recently, a number of whole family models have been operationalized by self-report instruments. The Family Environment Scale (FES) (Moos & Moos, 1981), for example, contains ten subscales intended to measure the dimensions of The Typology of Family Social Environments. Similarly, the Family Assessment Measure (FAM) (Skinner, Steinhauer & Santa-Barbara, 1983) contains seven subscales intended to measure the dimensions of the Process Model. A somewhat

different approach is illustrated by the Family Adaptability and Cohesion Evaluation Scales III (FACES III) (Olson, Portner & Lavee, 1985), which operationalizes the two dimensions of the Circumplex Model.

As whole family models and their associated instruments have become more popular, questions have been raised about instrument dimensionality. A number of recent empirical studies, for example, suggest that instruments based on multidimensional models (such as the FES and FAM) may exhibit fewer dimensions than proposed. Based on subscale intercorrelations, Skinner (1987), for example, reported that the FAM may measure only one dimension. Similarly, recent factor analytic studies of the FES (e.g., Fowler, 1981, 1982; Oliver, May & Handal, 1988) suggest that this instrument measures only two or three independent dimensions.

Limited dimensionality of family assessment instruments may be caused by limitations of self-report methodology. Thus, respondents may be unable to differentiate between closely related, yet distinct items or subscales. Alternatively, the underlying models for multidimensional instruments may be overly complex. In reality, family relations may be best described with a limited number of broad dimensions (see Jacob & Tennenbaum, 1988). Such

primary factor models of family relations have appeared in the literature since the 1930's, including Angell's (1936) concepts of family Integration and Adaptability, Parsons and Bales' (1955) concepts of Instrumental and Socioemotional role functions within the family, and Olson's (1979, 1983) updated concepts of Cohesion and Adaptability. Additionally, models of more general interpersonal relations have often been based on broad dimensions such as hostility-affection, and control-independence (e.g., Benjamin, 1974, 1975; Leary, 1957). Thus, it is possible that improved models of family functioning are not necessarily more complex; rather, the best models may be the most parsimonious ones.

Given that family functioning is best described with a limited number of dimensions, the next task is to identify the most relevant dimensions. It is possible that such dimensions are those that tend to appear across diverse models and instruments. Thus, dimensions might be identified by assessing both descriptive and empirical correspondence across models and instruments.

Although this literature is not extensive, a few studies have examined instrument correspondence. Miller and colleagues (1985), for example, examined relationships between the FACES II (Olson & McCubbin, 1983), and the

Family Assessment Device (FAD) (Epstein, Baldwin & Bishop, 1983). Although correlational analyses indicated substantial relationships between FACES II and FAD subscales, these relationships were not always in the predicted direction. Fristad (1989), also compared the FACES II and FAD, and found that the FACES II subscales correlated with nearly all of the eight FAD subscales. In interpreting these findings, Fristad suggested that the multivariate nature of the FACES II subscales might have been responsible for the observed correlations. Finally, Edman, Cole, and Howard (1990) compared subscales from the FACES III (Olson, et al., 1985), and the FES (Moos & Moos, 1981). Results of this effort indicated that FACES III Cohesion was correlated with a FES cohesion index (composed on FES Independence and Control), and that FACES III Adaptability was correlated with a FES adaptability index (composed of FES organization and Control). Based on these results, Edman and colleagues concluded that both instruments appeared to measure dimensions related to family cohesion and flexibility.

In summary, existing research suggests that different instruments may measure the same small set of primary constructs. Limitations in the literature, however, prevent firm conclusions regarding the extent of correspondence

across given instruments. Much of the relevant research, for example, was not designed to measure instrument correspondence. Instead, correlations between instrument subscales have usually been presented as a small component of reliability and validity assessment. Additionally, most studies have focused only on bivariate correlations between instrument subscales, and have not used more powerful methods such as factor analysis. Finally, there are no reported studies that examine correspondence across three of the more widely used instruments: The FACES III (Olson, et al., 1985), the FAM (Skinner, et al., 1983), and the FES (Moos & Moos, 1981).

The current research was intended to address these limitations. Exploratory factor analysis was used to identify the major dimensions exhibited by the FACES III, FAM, and FES. As dimensions were identified, correspondence across the instruments was assessed.

In general, it was predicted that descriptively similar subscales from the three instruments would be correlated. It was further predicted that the 19 subscales from the three instruments could be organized with a limited number of factors. Although the exact factor structures could not

be predicted, it was expected that the obtained factors would reflect major dimensions found in the literature on family and other interpersonal relations.

CHAPTER II

REVIEW OF LITERATURE

In this Chapter, the Circumplex, Process, and Family Environment models are reviewed. As each model is presented, its theoretical base and major constructs are described. The chapter continues with a discussion of the descriptive overlap across the models, and presents existing literature focused on model correspondence. The chapter concludes with a brief description of the current research, including discussion of current hypotheses.

The first model to be reviewed is the Circumplex Model of Marital and Family Systems, developed by David Olson and colleagues (Olson, Sprenkle & Russell, 1979; Olson, Russell & Sprenkle, 1983). The Circumplex Model was rationally derived, following review of the family therapy, family sociology, and small group literatures. Conceptual clustering of the major concepts in these literatures indicated that many concepts could be subsumed under the dimensions of cohesion and adaptability. Olson et al. (1979), for example, noted over forty concepts that related to family cohesion, including Wynne and colleagues' (1958) concepts of pseudohostility, mutuality, and pseudomutuality, Hess and Handel's (1959) concepts of separateness and connectedness, Bowen's (1961) concepts of

emotional divorce, differentiation, and fusion, and Minuchin's (1974) concepts of boundaries, disengagement, and enmeshment. Many concepts in the literature were also related to family adaptability, including the systems concepts of morphogenesis and morphostasis, concepts related to spousal flexibility and change (e.g., Kiernan & Tallman, 1972), and concepts related to flexibility in family roles, leadership, and control (e.g., Group for the Advancement of Psychiatry, 1975). Thus, the Circumplex Model is unique in that its constructs were developed by integrating the major dimensions found in the marital and family process literatures.

The Circumplex Model defines Cohesion as "the emotional bonding that family members have toward one another" (Olson, et al., 1983, p. 70). Cohesion ranges from disengaged (very low) to separated (low to moderate) to connected (moderate to high) to enmeshed (very high). Adaptability is defined as "the ability of a marital or family system to change its power structure, role relationships, and relationship rules in response to situational and developmental stress" (p. 70). Adaptability also has four levels, ranging from rigid (very low) to structured (low to moderate) to flexible (moderate to high) to chaotic (very high). By combining the four levels of Cohesion and Adaptability, sixteen distinct types of marital and family systems can be

described. According to the model, there is a curvilinear relationship between Cohesion, Adaptability, and family functioning, such that healthy families are characterized by moderate levels of the two dimensions, and unhealthy families are characterized by extreme levels of the two dimensions. Because most models of family functioning posit a linear relationship between model dimensions and health, Olson and colleagues' curvilinear hypothesis has been the subject of much debate (e.g., Beavers & Voeller, 1983; Bibro & Dreyer, 1981; Lee, 1988). It should be noted that Olson et al. (1983), have stated that extreme families can function well, provided all family members believe extreme behavior is desirable.

Finally, the model is dynamic, assuming that families can and will adjust levels of Cohesion and Adaptability in response to developmental change and situational stress. Communication, although not a dimension within the model, is assumed to facilitate such adjustments.

The second model to be reviewed is the Process Model of Family Functioning, developed by Steinhauer, Santa-Barbara, and Skinner (1984). As an extension of the McMaster Model (Epstein, Bishop & Levin, 1978), the Process Model was developed to provide a dynamic, process-oriented model of family functioning that was distinct from a clinical

treatment approach (Steinhauer, 1987).

Drawing on small-group theory, the Process Model assumes that family members share common goals, without which the family would not exist. According to the model, "The overriding goals of the family are to provide for the biological, psychological, and social development and maintenance of family members, thus ensuring the survival of both the family and the species" (Steinhauer, et al., 1984, p. 78). In order to meet its goals, the family performs a variety of maintenance, developmental, and crisis tasks. Although these tasks change over the life cycle, they involve the same basic skills and family processes.

The Process Model describes functioning in seven interrelated dimensions: Task Accomplishment, Values and Norms, Role Performance, Communication, Affective Expression, Affective Involvement, and Control. The superordinate goal of family functioning is assumed to be accomplishment of a variety of tasks (Task Accomplishment). Although some tasks are culturally defined, others reflect the family's particular ideals (Values and Norms). Such values and norms are influenced by the parents' internalized experiences of their families of origin, by the shared history of the nuclear family, and by the wider culture. Specific tasks are accomplished through the successful operation of a variety of roles (Role Performance). In

turn, effective role performance depends upon Communication, including the communication of affect (Affective Expression). Additionally, family members' degree of interest in one another (Affective Involvement), and ways of influencing each other (Control), may facilitate or impede task accomplishment (Steinhauer, et al., 1984).

The final model to be reviewed is Moos and Moos' Typology of Family Social Environments, developed in the late 1970's (Moos & Moos, 1976, 1981). This model, and its associated instrument, the Family Environment Scale (FES) (Moos & Moos, 1981), was developed along with several other instruments purporting to measure the social-environmental characteristics of situations. The model is based on an interactionist perspective, which posits that behavior is a joint function of the person and the environment (e.g., Endler & Magnusson, 1976; Mishel, 1973). According to this perspective, situations and environments (including families) have relatively stable characteristics or "personalities." Although environmental characteristics may be described in many ways, description has most often focused on "social climate." Thus, Moos and Moos' typology is intended to describe the social climate of different types of family environments.

The typology focuses on family social climate in three

domains: Relationships, Personal Growth, and System Maintenance. Each of these domains contains at least two dimensions. The relationship domain, for example, contains Cohesion, Expressiveness, and Conflict. Cohesion assesses the degree of commitment, concern, and support family members show for each other. Expressiveness measures how much family members are encouraged to act openly and express feelings directly. Conflict assesses the amount of openly expressed anger, aggression, and conflictual interactions among family members (Moos & Moos, 1981).

The Personal Growth domain contains Independence, Achievement Orientation, Intellectual-Cultural Orientation, Active Recreational Orientation, and Moral-Religious Emphasis. Independence assesses the extent to which family members are encouraged to be assertive, self-sufficient, and make their own decisions. Achievement Orientation measures the extent to which activities (such as school or work) are cast into an achievement-oriented or competitive framework. Intellectual-Cultural Orientation assesses degree of family interest in political, social, intellectual, and cultural activities. Active-Recreational Orientation assesses the extent to which the family participates in sports and other recreational activities. Moral-Religious Emphasis assesses the family's emphasis on ethical and religious issues and values (Moos & Moos, 1981).

Finally, the System Maintenance domain includes Organization and Control. Organization measures the importance of order and clarity in structuring family activities, rules, and responsibilities. Control measures the extent of hierarchical organization, rigidity of rules and procedures, and the extent to which family members order each other around (Moos & Moos, 1981).

In summary, the Circumplex, Process, and Family Environment models appear to be quite diverse; each draws on a different theoretical perspective, each reflects a unique conceptualization of the family, and each was developed according to different assumptions and methods. Despite this diversity, however, the models also contain a number of similarly described dimensions. Each model, for example, contains a dimension pertaining to bonding; "Cohesion" in the Circumplex and Family Environment models, and "Affective Involvement" in the Process Model. Control is also represented in each model; Adaptability in the Circumplex model, and "Control" in the Process and Family Environment models. Finally, two of the models contain a dimension pertaining to family communication, including the expression of affect; "Communication" and "Affective Expression" in the Process Model, and "Expressiveness" and "Conflict" in the Family Environment Model.

The areas of correspondence across the three models appear to reflect basic or primary family processes: bonding, communication, affect, and control. That overlap should occur in these areas is not surprising, given findings from the literature on family and other interpersonal relations. Several models of interpersonal process, for example, contain a small number of dimensions reflecting cohesion, affect, and power (e.g., Benjamin, 1974, 1977; Leary, 1957; Parsons & Bales, 1955). Leary (1957), for example, described a personality system in which many specific interpersonal behaviors were organized along two broad axes, labeled dominance-submission, and hostility-affection. Another two-factor model was developed by the sociologists Parsons and Bales (1955), who described instrumental (problem solving) and expressive (socioemotional) role functions as the primary dimensions of family and other small group process.

Literature specific to family relations has also suggested that a variety of processes can be organized along a few primary dimensions. Models focused on the concepts of family Integration (Cohesion) and Adaptability, for example, have been features of the literature since the 1930's (see Angell, 1936; Beavers, 1976; Hill, 1949; Olson, et al 1979, 1983). Other broad dimensions of interpersonal process have been the focus of much of the research on family

interaction. In a review of family influences in psychopathology, Jacob and Tennenbaum (1988), for example, noted that much of this work has focused on but four dimensions: affect, control, communication, and systems properties.

Recent empirical studies also indicate that instruments based on multidimensional models may contain fewer dimensions than proposed. Skinner (1987), for example, reported substantial intercorrelation among the Family Assessment Measure (FAM) subscales, intended to measure the seven dimensions of the Process Model. According to Skinner, these results suggest that the FAM measures a single factor, possibly related to affect. Similarly, recent factor analytic studies of the Family Environment Scale (FES) suggest that this instrument may also measure fewer dimensions than purported. Fowler (1981, 1982), for example, factor analyzed the 10 FES subscales, using data reported in the preliminary FES manual (Moos, Insel & Humphrey, 1974). Results of this effort indicated that the FES contained only two factors, labeled Cohesion vs Conflict, and Organization-Control. Another factor analysis of the FES was conducted by Oliver, May and Handal (1988), using data provided in the revised FES manual (Moos & Moos, 1981). Analyses were conducted for both adult and adolescent normative samples. Results of this effort

indicated that the FES contained three factors. Factors for the adults were labeled Conflict vs Cohesion, Control vs Expressiveness, and Activities. Factors for the Adolescents were labeled Activities, Organization-Achievement, and Conflict. Although the subscale intercorrelations found in the FAM and the FES may be due to limitations of self-report methodology, (i.e., it may not be possible for respondents to differentiate between instrument subscales), it is also possible that the underlying models are overly complex. Thus, in reality, family relations may be best described along a few broad dimensions of interpersonal process (see Jacob & Tennenbaum, 1988).

In summary, theoretical and empirical literatures suggest that a limited number of dimensions may capture the relevant aspects of family functioning. Just what these dimensions are, however, is not entirely clear. It is possible that the most relevant dimensions are those that appear across different models and instruments. Thus, similar to the strategy employed by Olson and colleagues, relevant dimensions might be identified by assessing descriptive and empirical correspondence across models and instruments.

Although this literature is not extensive, a few studies have assessed the correspondence across different

instruments. Miller and colleagues (1985), for example, compared the Family Adaptability and Cohesion Scales II (FACES II) (Olson & McCubbin, 1983) and the Family Assessment Device (FAD) (Epstein, et al., 1982) in a sample of 45 nonclinical individuals. Briefly, correlational analyses indicated substantial relationships between the FACES II and the FAD, although not always in the predicted direction. Initially, it was predicted that Adaptability would be substantially correlated with FAD Problem Solving, Communication, Roles, Behavior Control, and an overall family health subscale called General Functioning. It was also predicted that Cohesion would be substantially correlated only with FAD Affective Involvement. Results indicated that Adaptability was significantly correlated with FAD Problem Solving, Communication, Affective Responsiveness, Affective Involvement, and General Functioning. Contrary to prediction, Adaptability was not significantly correlated with either Roles, or Behavior Control. Again, contrary to prediction, Cohesion was significantly correlated with several FAD scales, including Problem Solving, Communication, Affective Responsiveness, Affective Involvement, Behavior Control, and General Functioning (Miller, et. al., 1985).

Thus, despite differences in the underlying models, subscales from the FACES II and the FAD were highly related.

Contrary to prediction, Adaptability and Cohesion were significantly correlated with nearly all FAD subscales. One explanation for these findings is the multivariate nature of the FACES II subscales. Adaptability, for example, contains concepts pertaining to assertiveness, leadership, discipline, negotiation, roles, and rules. Cohesion also contains several concepts, including emotional bonding, supportiveness, family boundaries, and shared family activities. Thus, Adaptability and Cohesion each contain concepts reflected across several FAD subscales.

Substantial correlation between the FACES II and the FAD was also reported by Fristad (1989), who compared the self-report and clinical rating scales from these instruments. The sample for this study consisted of 122 individuals from 41 families who were currently in treatment. Of most interest to the current review, results indicated that all correlations between scales on the self-report versions of the FACES II and the FAD were significant. Correlations between Adaptability and the seven FAD scales, for example, ranged from .64 to .84, with a median correlation of .74. Similarly, correlations between Cohesion and the FAD scales ranged from .57 to .80, with a median of .74. Again, as noted by Fristad, correlation between the FACES II and FAD subscales may have

been largely due to the multivariate nature of Adaptability and Cohesion.

Finally, in a study of the convergent and discriminant validity of the FACES III (Olson, et al., 1985), Edman, Cole and Howard (1990) presented correlations between self and significant-other versions of the FACES III, the FES, and a measure of family talkativeness. The sample for this study consisted of 121 nonclinical married couples. Results from this effort indicated that for the self-report instruments, FACES III Cohesion was substantially correlated ($r = .62$; $p < .05$) with a FES cohesion index, composed of FES Cohesion and Independence. FACES III Adaptability was correlated ($r = .44$; $p < .05$) with a FES adaptability index, composed of FES Organization and Control. Additionally, the Cohesion and Adaptability indices from both instruments were positively correlated with family talkativeness. Thus, subscales pertaining to family cohesiveness and flexibility from the FACES III and FES were substantially related.

In summary, the available research suggests that different family assessment instruments may measure a number of the same constructs. Limitations in the literature, however, prevent definitive conclusions regarding the degree of correspondence across given instruments. Much of the research in the area, for example, was not designed to

assess instrument correspondence. Instead, relevant studies have usually presented correlations between instrument subscales as a small part of reliability and validity assessment. Additionally, most studies have focused only on bivariate correlations between instrument subscales, and have not utilized more powerful factor analytic methods. Finally, there are no studies that examine correspondence across three of the more widely used instruments: the FACES III (Olson, et al., 1985), the FAM (Skinner, et. al., 1983), and the FES (Moos & Moos, 1981).

The current research was undertaken in order to address these limitations. The purpose of this research was to identify the major dimensions exhibited by the FACES III, FAM, and FES. As dimensions were identified, correspondence across the instruments was assessed.

The sample for the current research consisted of 138 family triads, containing a mother, father, and one adolescent. Exploratory factor analysis was used to obtain an estimate of the number of dimensions found across the instruments. In all, 19 subscales from the three instruments were factored. Separate analyses were conducted for mothers, fathers, and children, in order to determine the extent to which a common factor structure could be described for different family members.

Because of the exploratory nature of the study, the structure of the obtained factors could not be predicted with great precision. Some general hypotheses about the number of factors that would be obtained, however, could be made. Given the descriptive overlap across the three instruments, it was predicted that the 19 subscales would be substantially correlated. Because of these relationships, it was further predicted that relatively few factors (e.g., three or four) would be obtained. Additionally, it was hypothesized that the obtained factors would be similar to the major dimensions found in the literature on family and other interpersonal relations. Thus, obtained factors were expected to reflect broad dimensions pertaining to affect, communication, and control.

CHAPTER III

METHODS

Sample

The sample was obtained as part of a larger study of correspondence across family assessment methods (Jacob, 1989). This sample consisted of 138 family triads, composed of a mother, father, and one adolescent between the ages of 12 and 18. All participating family members had at least a 6th grade reading level, and English was the first and primary language spoken at home. All families were recruited via newspaper advertisements, and were paid \$25.00 for their participation.

Procedure

Advertisements that included a brief description of the study and a project phone number were placed in local newspapers. During the initial telephone contact, potential families were screened and the study procedure was described. If a family met all screening criteria and agreed to participate, arrangements were made to send packets containing the assessment instruments to their home to be completed. Families were informed that each respondent would complete two packets of questionnaires that

would be mailed on two separate occasions. During this contact, families were also told to not begin completing the instruments until after a staff member had called to go over instructions. These instructions were repeated in the packet cover letter.

The assessment instruments in the first packet were presented twice, once with instructions to "describe your family in general" (general format) and again with instructions to "describe your family during the past week" (specific format). The order of presentation of the general and specific formats was randomized across families. Thus, half of the families received packets with the general format first, followed by the specific format, and half of the families received packets with the specific format first, followed by the general format.

Several days after mailing the first packet, a staff member telephoned the family to discuss instructions with each participant. Family members were told that each person should complete his or her forms privately and independently, that all information would be strictly confidential, and that the family would be paid after both packets were returned. Copies of these instructions were included in the packet. When all instruments were completed, the packet mailed back to the project, using a postage-paid envelope.

After the family had completed and returned the first packet, the second packet was mailed to their home. The second packet contained the same assessment instruments as packet one, however, these instruments were presented only once, with written instructions to "describe your family during the past week" (specific format only). When all instruments were completed, the second packet was mailed back to the project, again using a postage-paid envelope.

Instruments

Each family member completed the following family assessment instruments: the FACES III (Olson, et al., 1985), the FAM (Skinner, et al., 1983), and the FES (Moos & Moos, 1981). Each respondent also completed the 168-item MMPI (Overall & Gomez-Mont, 1974), the General Health Questionnaire (GHQ) (Goldberg & Hillier, 1979), and the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1979). Brief demographic questions were completed by each parent. In the following sections, the constructs and psychometric properties of the FACES III, the FAM, and the the FES will be described.

A. Family Adaptability and Cohesion Scales III (FACES III)

FACES III, developed in 1985, is the most recent

version of a series of instruments developed by Olson and colleagues. FACES III is a 20-item instrument that assesses cohesion (10 items) and adaptability (10 items). Five concepts are related to the cohesion dimension: emotional bonding, supportiveness, family boundaries, time and friends, and interest in recreation. Four concepts are related to the adaptability dimension: leadership, control, discipline, and the combined concept of roles and rules. The FACES III is designed to be administered twice -- once for how respondents describe their family now (perceived) and again for how they would like their family to be (ideal). Discrepancy scores for each family member can be calculated, giving an indication each individual's satisfaction with the current family system. Responses are scored according to a five-point likert scale (Olson, et al., 1985).

The FACES III contains two subscales to assess model constructs of Adaptability and Cohesion. The constructs are defined as follows:

1. Cohesion -- the degree of emotional bonding that family members have toward one another.
2. Adaptability -- the ability of the marital or family system to change its power structure, role relationships, and relationship rules in response

to situational or developmental stress.

Continued revisions have strengthened the psychometric properties of the FACES III. Factor analysis limited to two factors indicated that cohesion items loaded primarily on Factor I (median loading = .48; range from .39 to .69), and adaptability items loaded primarily on Factor II (median loading = .37; range from .34 to .48). Item-scale correlations for Cohesion (median = .59; range = .51 to .74) and Adaptability (median = .47; range = .42 to .56) indicated fair content saturation for these items (Olson, et al., 1985).

Internal consistency reliability estimates for the FACES III are .77 for Cohesion and .62 for Adaptability. Test-retest reliabilities have not been reported. Although there was substantial correlation between cohesion and adaptability on FACES II ($r = .65$), this correlation was reduced to virtually zero on FACES III ($r = .03$). Lack of correlation has resulted in two clearly independent dimensions, allowing for a good distribution of scores on the 16 types of the circumplex model. Additionally, items on the FACES III were selected to minimize a social desirability response style; Adaptability is uncorrelated with social desirability ($r = .00$), whereas Cohesion is only moderately correlated with social desirability ($r = .35$).

Norms on normal families at different points in the family life cycle have been developed using a national sample of 2453 individuals (Olson, et al., 1985).

Empirical validation studies of the FACES III are currently underway (Olson, et al., 1985). Studies using the original FACES and the FACES II indicate that these instruments adequately discriminate between clinical and nonproblem families (e.g., Portner, 1981; Bell, 1982; Clarke, 1984; Carnes, 1985). In addition, Olson and Portner (1983) reported that levels of cohesion and adaptability (as assessed by FACES II) differed significantly across the life cycle for a large national sample of normal families. Moreover, balanced and extreme families in this sample were found to differ on theoretically relevant individual and family variables.

B. The Family Assessment Measure (FAM)

FAM III is the most recent version of a series of instruments developed by Steinhauer and colleagues (Skinner, et al., 1983; Steinhauer, et al., 1984). Developed according to a construct validation paradigm (Jackson, 1970; Skinner, 1981), the FAM III operationalizes the Process Model and indicates areas of family strengths and weaknesses.

FAM III contains 134 items that are intended to be

administered to all family members; mother, father, and children aged 10 and over. Items are organized around three response formats: a general scale (50 items focusing on family as a whole); a dyadic relationship scale (42 items focusing on the relationships between family dyads of interest); and a self-rating scale (42 items focusing on each individual's perception of his or her functioning in the family).

The FAM III contains seven subscales to assess model constructs, and two subscales to assess social desirability bias. Model constructs are defined as follows:

1. Task Accomplishment -- refers to "the successful accomplishment of a variety of basic, developmental, and crisis tasks" (Skinner, et al., 1983, p. 93).
2. Role Performance -- assesses functioning in three related areas: "(1) the allocation or assignment of specified activities to each family member; (2) agreement or willingness of family members to assume the assigned roles; and (3) the actual enactment or carrying out of prescribed behaviors" (p. 93).
3. Communication -- refers to the exchange of verbal

and nonverbal information. This dimension focuses on whether family members send clear, direct messages, and whether receivers are available and open to the information.

4. Affective Expression -- focuses on the content, intensity, and appropriateness of affect.
5. Affective Involvement -- assesses "the degree and quality of family members' interest in one another" (p. 93).
6. Control -- refers to "the process by which family members influence each other" (p. 93).
7. Values and Norms -- assesses "whether family rules are implicit or explicit, the latitude or scope allowed for family members to determine their own attitudes and behavior, and whether family norms are consistent with the broader cultural context" (p. 93).

The reliability of the FAM III has been assessed using a sample of 475 families from various health and social service settings. Internal consistency reliability estimates (coefficient alpha) were reported as .93 for the general scale, .95 for the dyadic relationship scale, and .89 for the self-rating scale. Intercorrelations among the subscales range from .39 to .70 on the general scale, .63 to

.82 on the dyadic relationship scale, and .25 to .63 on the self-rating scale (Skinner, et al., 1983).

The ability of the FAM III to discriminate between problem and nonproblem families has also been assessed using the sample described above. Multiple discriminant analyses were employed to identify linear combinations of subscales that differentiated problem from nonproblem families, and that differentiated family position (e.g., father, mother, child). These analyses indicated that problem families tended to report more dysfunction in the areas of Role Performance and Affective Involvement than nonproblem families. Problems in the areas of Control, Values and Norms, and Affective Expression served to differentiate children from adults, with children reporting more dysfunction (Skinner, et al., 1983). Additionally, Skinner (1987) has reported that the FAM III is currently being used in a variety of research studies that address its external validity.

C. The Family Environment Scale (FES)

The FES contains 90 items that are scored in a true-false format. Currently, there are three FES forms which can be used: the Real form (Form R), the Ideal form (Form I), and the Expectations form (Form E). Each form assesses family functioning in three primary domains:

Relationships, Personal Growth, and System Maintenance.

Each of these domains contains at least two subscales, for a total of ten constructs assessed. The ten constructs are defined as follows:

Relationship Dimension

1. Cohesion -- the degree of commitment, concern, and support family members demonstrate for each other.
2. Expressiveness -- the extent to which family members are encouraged to act openly and express their feelings directly.
3. Conflict -- the extent to which the open expression of anger, aggression and conflictual interactions are characteristic of the family.

Personal Growth Dimension

1. Independence -- the extent to which family members are encouraged to be assertive, self-sufficient, and make decisions on their own.
2. Achievement Orientation -- the extent to which activities such as school and work are cast into an achievement oriented or competitive framework.
3. Intellectual-Cultural Orientation -- the extent to which the family is concerned about political, social, intellectual, and cultural activities.
4. Active Recreational Orientation -- the extent of

family participation in sports or other recreational activities.

5. Moral-Religious Emphasis -- the extent to which the family actively discusses and emphasizes ethical and religious issues and values.

System Maintenance Dimension

1. Organization -- assesses the importance of order and clarity in structuring family activities, rules, and responsibilities.
2. Control measures the extent of hierarchical organization, the rigidity of rules and procedures, and the extent to which family members order each other around (Moos & Moos, 1981).

In general, the FES demonstrates good psychometric properties. Internal consistency reliability estimates (coefficient alpha) for the 10 subscales ranges from .64 to .78 (Moos & Moos, 1981). Bagarozzi (1984) reported test-retest reliabilities for 8-week, 4-month and 12-month intervals. Average correlations for the 10 subscales for each time period were .78, .74, and .73, respectively. Intercorrelation among the 10 subscales is low to moderate, with an average value of .20 (Moos & Moos, 1981).

Moos and Moos (1981) have provided a summary of research on the external validity of the FES. The construct

validity of the FES has been demonstrated by its ability to discriminate problem from nonproblem families in studies of alcoholics (Moos & Moos, 1981); distressed couples (Scoresby & Christensen, 1976); schizophrenics (Janes & Hesselbrock, 1976); and adolescent runaways (Steinbock, 1978). The predictive validity of the FES has been demonstrated in studies that examine family change during therapy, predicted treatment outcome, and associations between family environment and other individual and family variables (Skinner, 1987). Karoly and Rosenthal (1977) for example, reported that parents in treatment perceived increases in family cohesion and support, while a control group of parents perceived no changes in their families. Druckman (1979) reported that families who completed a treatment program for their delinquent children had higher pretest scores on the Intellectual-Cultural subscale than dropout families. Additionally, the FES has been used in Moos' and colleagues programmatic research evaluating the outcome of treatment for alcoholism (e.g., Finney, Moos & Newborn, 1980; Finney, Moos, Cronkite & Gamble, 1983; Moos, Finney & Gamble, 1982; Moos & Moos, 1984). Finney et al. (1980), for example, found that alcoholics in families with greater perceived cohesion functioned better both at six months and two years after treatment. Further, emphasis on Intellectual-Cultural, and Active Recreational areas were

associated with less alcohol consumption and less depression at follow-ups.

CHAPTER IV

RESULTS

Characteristics of the Sample

Demographic characteristics indicated that the sample was primarily white and middle-class. Ninety percent of the mothers were white, 6% were Hispanic, and 3% were Native American or Alaskan/Pacific Islander. Mothers were fairly well-educated; 5% had not completed high school, 34% were high school graduates, 41% had completed at least one year of college or had an associates degree, 17% were college graduates, and 3% had obtained a graduate or professional degree. Seventy-nine percent of the mothers were employed outside the home, and 20% were homemakers or students. The average age of the mothers was 40.26 years old.

Similar demographic characteristics were found for fathers; ninety-one percent of the fathers were white; 6% were Hispanic, 1.4% were Native American or Alaskan/Pacific Islander, and 1.4% were African-American. Fathers were also fairly well-educated; 9% had not completed high school, 27% were high school graduates, 34% had completed at least one year of college or had an associates degree, 18% were college graduates, and 13% had obtained a graduate or professional degree. Ninety-four percent of the fathers

were employed outside the home, and 5% were homemakers or students. The average age of the fathers was 42.46 years old.

Demographic information on the participating child was limited to sex and age. Results indicated that 79 (57%) of the children were female, and 59 (43%) were male. The average age for female and male children combined was 14.75 years old (range = 12-18, sd = 1.73). Daughters were slightly older than sons; the average age for daughters was 15.06 years old (range = 12-18, sd = 1.62), as compared to 14.34 years old for sons (range = 12-18, sd = 1.79).

Reports of total family income ranged from less than \$10,000 (1.4%), to more than \$100,000 (< 1%). The majority of the sample (36%) reported incomes in the \$30,000-49,999 range; 25% reported incomes in the \$20,000-29,999 range, and 19% reported incomes in the \$10,000-19,999 range. The majority of the families were in the middle (30%) and upper middle classes (37%), as measured by the Holingshead (1975) Four-Factor Index of Social Status (a weighted index of husband and wife education and occupation.)

Results of the Factor Analyses

Overview of Procedures

Analyses were conducted according to a two phase plan. First, exploratory factor analysis was used to determine the

factor structure of the three instruments for mothers, fathers, and children separately. The goals of this phase were to identify a smaller number of factors that accounted for maximum score variance in each sample, and to conduct a provisional assessment of the correspondence across the three instruments.

The second phase of the analyses involved comparisons of the obtained factor structures for mothers, fathers, and children. These comparisons were undertaken in order to provide a provisional assessment of the correspondence across different members' factor structures. Such assessment was expected to provide both conceptual and practical information. Highly similar factor structures, for example, would suggest that family members make similar differentiations between instrument subscales. In turn, similar differentiations would indicate that it is appropriate to administer a general version of an instrument to all members. In contrast, dissimilar factor structures would indicate that family members do not make similar differentiations, and that specific versions of instruments would need to be administered.

Prior to conducting the factor analyses, the total sample (N=414) was divided into five smaller samples: mothers (n=138); fathers (n=138); children (n=138); daughters (n=79); and sons (n=59). Analyses then proceeded

in an identical manner for each sample.

Subscale scores were computed for the three instruments, yielding a total of 19 variables; 2 from the FACES III, 7 from the FAM, and 10 from the FES. The variables were intercorrelated, and a Principal Components Analysis (PCA) was applied. PCA is the extraction of principal factors under the component model. In this model, factors are computed directly from the data by means of a linear transformation. In PCA, all variance is assumed to be relevant, common factor variance, and error is assumed to reflect only sampling error and not unique variance. As noted by Gorsuch (1983) and Nunnally (1978), PCA is appropriate in situations where the primary objective is data reduction and exploratory analysis. If testing of alternative theoretical structures is desired, then techniques such as Confirmatory Factor Analysis (CFA) can be applied. The current research did not use CFA because it was not possible to specify, a priori, different theoretical models to test. Results of the current research, however, can subsequently be tested with CFA.

Following factor extraction, different solutions were generated by varying the number of factors to retain. Initially, factors were retained according to the "eigenvalues-greater-than-one" criterion. In subsequent analyses, different solutions were generated by specifying,

a priori, the number of factors to retain. Various methods of factor selection have been discussed in the literature, and there appears to be no single method that is recommended in all situations. The eigenvalues-greater-than-one criterion, however, is a widely used and reasonably well-supported method. Gorsuch (1983) reported that this criterion was generally stable in problems with less than 40 variables, and where the number of factors is expected to be between $v/5$ and $v/3$. Thus, this criterion was expected to perform well in the current investigation.

Retained factors were subsequently rotated so as to maximize interpretability. Both orthogonal and oblique rotations were examined. Oblique procedures allow for correlation among factors, and permit an examination of higher order factors which may increase the generalizability of the solution (Gorsuch, 1983).

Results for Mothers

Using the "eigenvalues-greater-than-one criterion," five factors were retained for mothers. Minimal correlation between the factors indicated that orthogonal rotation was appropriate. Examination of the orthogonally rotated solution indicated that the first three factors were defined by several subscales. (See Table 1) In contrast, the fourth and fifth factors were primarily defined by FES Achievement

Table 1. Initial Factor Structure for Mothers

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>h²</u>
FAM TA	.84	-.15	.00	.08	-.01	.73
FAM CTRL	.84	-.11	.03	-.06	-.04	.72
FAM VN	.82	-.05	.04	.04	.06	.68
AM COMM	.80	-.13	.10	.01	.11	.68
FAM AE	.77	-.23	-.07	.13	.09	.68
FAM RP	.74	-.17	-.12	-.36	-.10	.73
FAM AI	.74	-.02	.05	-.18	-.14	.60
FAC COH	-.61	.16	.20	.27	.35	.63
FES CONFL	.59	-.24	.34	-.06	-.09	.53
FES COH	-.51	.34	-.11	.48	.27	.69
FES INT	-.19	.78	-.06	.03	.07	.65
FES ACT	-.12	.75	-.07	.04	-.00	.58
FES IND	-.13	.32	-.72	-.02	-.07	.64
FES CTRL	-.02	.04	.69	.26	-.38	.69
FES MOR	-.11	.52	.59	-.12	.06	.65
FES ACH	.11	-.12	.12	.79	-.09	.67
FES ORG	-.41	.36	-.02	.54	-.25	.65
FAC ADAPT	.07	.02	-.06	-.10	.85	.74
FES EXP	-.36	.38	-.11	-.01	.42	.46
Variance	30.5%	11.4%	8.3%	7.9%	7.3%	

Orientation (.79) and FACES III Adaptability (.85), respectively. Additionally, other variables that had salient loadings on Factors Four and Five (e.g., FES Organization and Expressiveness) tended to split across factors. In contrast, Achievement Orientation and Adaptability loaded only on the fourth and fifth factors, respectively.

The initial results for mothers suggested that Achievement Orientation and Adaptability might be specific factors. The current research, however, was intended to explore common factors across instruments. Given this orientation, it was decided that Achievement Orientation and Adaptability should either be forced to load on the common factors, or, if uncorrelated with the remaining subscales, should be excluded from subsequent analyses.

In order to decide between these alternatives, a series of correlational analyses were undertaken. First, inspection of the nineteen variable intercorrelation matrix indicated low correlations between Achievement Orientation, Adaptability and the remaining subscales. The median correlation between Achievement Orientation and the other subscales was .10, with a range of .003 to .23. Similarly, the median correlation between Adaptability and the other subscales was .05, with a range of .004 to -.29.

Although there were no linear relationships between Achievement Orientation, Adaptability, and the remaining subscales, it was possible that curvilinear relationships were present (especially between the FACES III subscales and the remaining subscales). In order to explore this possibility, two analyses were undertaken. First, bivariate scatterplots of the relationships between all subscales were generated. Inspection of the scatterplots indicated that no curvilinear relationships were present between variables. Second, the FACES III Adaptability and Cohesion subscales were transformed such that any curvilinear function would become linear, and a new intercorrelation matrix was generated. Thus, if curvilinear relationships were initially present, Pearson Product-Moment coefficients would be expected to increase after transformation. Results of this analysis indicated that the majority of the correlations between the transformed FACES III subscales and the remaining subscales decreased. Among the correlations which increased, increases were very slight. For example, the correlation between the original Adaptability and FES Moral-Religious Emphasis was .004, and the correlation between the transformed Adaptability and FES Moral-Religious Emphasis was .01. On the basis of these analyses, it was concluded that Achievement and Adaptability were not substantially related to the other subscales in either a

linear or curvilinear manner.

Possible causes of the low correlations between Achievement Orientation, Adaptability, and the remaining subscales can be traced to two issues. First, although internal consistency reliability (coefficient alpha) was acceptable for Adaptability (.75), it was quite low for Achievement Orientation (.39). All things equal, unreliability is expected to attenuate correlation coefficients. Second, the content of the two subscales is unusual. For example, four of the ten Adaptability items appear to measure the relative power of children in the home (e.g., "Children have a say in their discipline;" "Parents and children discuss punishment together;" "The children make the decisions in our family;" "In solving problems, the children's suggestions are followed"). Perhaps Adaptability relates more to qualities of the parent-child dyad, rather than to qualities of the family as a whole. When examined, Achievement Orientation appears to tap the values of a Western industrialized society (e.g., "We feel it is important to be the best at whatever you do;" "Getting ahead in life is very important in our family;" "We believe in competition and may the best man win"), more than a family competitiveness dimension. If Achievement Orientation measures this broad societal value, its lack of correlation

with subscales more specific to family process is not surprising.

Based on the above results, the factor analysis was repeated without Achievement Orientation and Adaptability. Using the eigenvalues criterion, four factors were retained. Although the factor structure for the orthogonally rotated solution was fairly clear, some subscales did load on more than one factor. In an effort to provide a cleaner solution, an additional analysis was conducted in which three factors were retained. Lack of correlation between the three factors indicated that orthogonal rotation was appropriate.

The orthogonally rotated solution was clear and interpretable, with the three factors accounting for 57.6% of the variance. (See Table 2) Factor one was primarily defined by the FAM subscales; factor loadings ranged from .84 for Control, to .73 for Affective Expression. Factor two was primarily defined by several FES subscales, including Intellectual-Cultural Orientation (.76), Active-Recreational Orientation (.73), and Moral-religious Emphasis (.53). Finally, factor three was primarily defined by FES Control (.82) and Independence (-.69).

Table 2. Final Factor Structure for Mothers

	<u>I</u>	<u>II</u>	<u>III</u>	<u>h²</u>
FAM CTRL	.84	-.12	.05	.72
FAM TA	.81	-.14	.07	.68
FAM VN	.81	-.04	.07	.66
FAM COMM	.79	-.11	.09	.64
FAM RP	.77	-.26	-.13	.68
FAM AI	.75	-.07	.07	.57
FAM AE	.73	-.20	-.00	.57
FAC COH	-.64	.27	.17	.51
FES CONF	.59	-.25	.34	.53
FES COH	-.56	.46	-.06	.53
FES ORG	-.47	.41	.18	.42
FES INT	-.17	.76	-.12	.62
FES ACT	-.10	.73	-.08	.55
FES MOR	-.07	.53	.45	.49
FES EXP	-.34	.44	-.28	.39
FES CTRL	-.05	.06	.82	.68
FES IND	-.12	.26	-.69	.56
Variance	34.1%	13.7%	9.8%	

In summary, the initial factor analysis for mothers resulted in retention of five factors. Subsequent analyses indicated that the subscales that defined factors four and five (Achievement Orientation and Adaptability, respectively) were not correlated with the remaining seventeen subscales, and demonstrated poor to acceptable internal consistency. Based on these results, it was concluded that Achievement Orientation and Adaptability should be excluded from further analyses. Results of subsequent factor analyses indicated that a three-factor orthogonally rotated solution was most interpretable. In this solution, factor one was primarily defined by the FAM, and factors two and three were primarily defined by several FES subscales. Although a detailed interpretation of these factors will be presented in the discussion section, some comments may be made here. First, based on what is known about the FAM (e.g., Skinner, 1987), factor one appeared to reflect a dimension pertaining to affective relations. In contrast, factor two appeared to reflect a dimension related to family activities or interaction. Finally, factor three appeared to reflect a bi-polar dimension pertaining to control vs independence.

Results for Fathers

Results for fathers were highly similar to those reported for mothers. Using the eigenvalues-greater-than-one criterion, five factors were retained for fathers. Minimal correlation between the factors indicated that orthogonal rotation was appropriate. Examination of the orthogonally rotated solution indicated that the first two factors were defined by several subscales. In contrast, factors three to five were defined by a limited number of subscales. (See Table 3) Turning to the last two factors, factor four was primarily by FES Achievement Orientation (.74), with FES Moral-Religious Emphasis (.66), and factor five was primarily defined by FACES III Adaptability (.86), with FES Control (-.66).

The initial results suggested that Achievement Orientation and Adaptability might be specific factors. Given the current study's focus on general factors, however, Achievement Orientation and Adaptability could either be forced onto the more general factors, or, if uncorrelated with the remaining subscales, could be excluded from subsequent analyses. As with the procedures reported for mothers, a series of correlational analyses were undertaken in order to decide between these two alternatives.

Table 3. Initial Factor Structure for Fathers

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>h²</u>
FAM CTRL	.87	-.03	-.01	.01	-.03	.76
FAM AE	.83	-.20	-.10	-.04	-.04	.74
FAM AI	.83	-.24	.04	.03	.04	.75
FAM VN	.83	-.10	-.03	-.03	-.08	.71
FAM RP	.82	-.05	-.17	-.13	.05	.72
FAM COMM	.80	-.22	-.22	.01	-.07	.74
FAM TA	.77	-.27	-.14	-.07	-.04	.69
FAC COH	-.62	.37	-.25	.22	.22	.68
FES ORG	-.58	.08	.31	.42	-.03	.62
FES COH	-.57	.52	.28	.18	.08	.71
FES EXP	-.46	.37	.33	-.09	.17	.49
FES INT	-.21	.83	.11	.10	.08	.76
FES ACT	-.22	.76	.10	-.02	-.00	.64
FES IND	-.04	.15	.80	-.02	.14	.68
FES CONF	.49	-.18	-.59	-.14	.12	.65
FES ACH	-.04	-.12	-.11	.74	.11	.59
FES MOR	-.05	.33	.18	.66	-.09	.59
FAC ADAPT	-.09	.14	-.03	.20	.86	.81
FES CTRL	<u>.01</u>	<u>.07</u>	<u>-.39</u>	<u>.42</u>	<u>-.66</u>	.77
Variance	33.3%	11.9%	8.8%	8.0%	7.1%	

Inspection of the nineteen variable correlation matrix indicated low correlations between Achievement Orientation, Adaptability and the remaining subscales. The median correlation between Achievement Orientation and the other subscales was .05, with a range of .01 to .18. The median correlation between Adaptability and the other subscales was .14, with a range of -.04 to -.32. Looking specifically at the FES subscales that defined factor four, the correlation between Achievement Orientation and Moral-Religious Emphasis was .16. Turning to the subscales that defined factor five, the correlation between Adaptability and FES Control was -.32.

In order to explore the possibility of curvilinear relationships, bivariate scatterplots of the relationships between all subscales were generated, and the FACES III subscales were transformed such that any curvilinear function would become linear. These procedures indicated that no curvilinear relationships were present between variables. On the basis of these procedures, it was concluded that Achievement Orientation and Adaptability were not related to the remaining subscales in either a linear or curvilinear manner.

Causes of the low correlations between Achievement Orientation, Adaptability, and the remaining subscales can again be traced to unreliability and unusual content. As

with results for mothers, internal consistency (coefficient alpha) was acceptable for Adaptability (.78), but was low for Achievement Orientation (.45). Thus, unreliability may have attenuated the correlation coefficients. As noted previously, the content of Adaptability and Achievement Orientation may also have contributed to the lack of relationship between these and the remaining subscales.

Based on the above results, the factor analysis was repeated without Achievement Orientation and Adaptability. Using the "eigenvalues" criterion, four factors were retained. Minimal correlation between the factors indicated that orthogonal rotation was most appropriate. Although a clearer factor structure began to emerge with this analysis, several subscales loaded on more than one factor. In an effort to provide a cleaner solution, three factors were subsequently retained. Again, minimal correlation between the three factors indicated that orthogonal rotation was most appropriate.

The orthogonally rotated solution was clear and interpretable, with the three factors accounting for 62.6% of the variance. (See Table 4) When examined, the three factors appeared to be highly similar to those obtained for mothers. Factor one was primarily defined by the FAM subscales; factor loadings ranged from .87 for FAM Control,

to .77 for FAM Task Accomplishment. Factor two was primarily defined by FES Intellectual-Cultural Orientation (.76), Moral-religious Emphasis (.66), and Active-Recreational Orientation (.62). Finally, factor three was primarily defined by FES Control (.82) and Independence (-.65).

In summary, the initial factor analysis for fathers resulted in retention of five factors. Subsequent analyses indicated that the subscales that defined factors four and five (Achievement Orientation and Adaptability, respectively) were not correlated with the remaining subscales, and demonstrated poor to acceptable internal consistency. Based on these results, Achievement Orientation and Adaptability were excluded from further analyses. Subsequent analyses indicated that a three-factor orthogonally rotated solution was most interpretable. In this solution, factor one was primarily defined by the FAM, and factors two and three were primarily defined by several FES subscales. Similar to results for mothers, the three factors appeared to reflect dimensions pertaining to affect, family activities and control, respectively.

Table 4. Final Factor Structure for Fathers

	<u>I</u>	<u>II</u>	<u>III</u>	<u>h²</u>
FAM CTRL	.87	-.02	.04	.76
FAM AI	.83	-.17	-.01	.72
FAM AE	.83	-.22	.07	.74
FAM VN	.83	-.10	.07	.70
FAM RP	.81	-.17	.01	.69
FAM COMM	.79	-.26	.20	.73
FAM TA	.77	-.31	.08	.69
FAC COH	-.63	.31	.19	.53
FES ORG	-.57	.38	.05	.47
FES CONF	.47	-.45	.24	.48
FES EXP	-.45	.39	-.34	.47
FES INT	-.22	.76	-.08	.63
FES MOR	-.04	.66	.37	.57
FES ACT	-.22	.62	-.17	.46
FES COH	-.57	.60	-.16	.71
FES CTRL	.01	.13	.82	.69
FES IND	-.02	.39	-.65	.58
Variance	36.9%	16.5%	9.2%	

Results for Children

The results for children were highly similar to those reported for parents. Using the eigenvalues criterion, four factors were retained for children. Minimal correlation between the factors indicated that orthogonal rotation was appropriate. Examination of the initial solution indicated that although factors one, two and four were defined by several subscales, factor three was primarily defined by FACES III Adaptability (.86). (See Table 5)

The initial results suggested that Adaptability might be a specific factor. In contrast to results for parents, Achievement Orientation loaded on factor four with FES Control and Independence. Additionally, however, Achievement Orientation tended to load on more than one factor. Thus, this subscale's loading on factor four may have been due more to chance than a substantive relationship.

As with the procedures for parents, correlations between Adaptability, Achievement Orientation, and the remaining subscales were assessed. If Adaptability was reasonably correlated with the remaining subscales, it could be forced onto the more general factors; if uncorrelated, it could be excluded from subsequent analyses.

Table 5. Initial Factor Structure for Children

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>h²</u>
FAM RP	.83	-.03	.08	.11	.71
FAM VN	.83	-.18	-.15	.07	.75
FAM CTRL	.82	-.10	-.08	.23	.74
FAM COMM	.81	-.13	-.13	.12	.70
FAM TA	.80	-.11	-.17	-.08	.69
FAM AI	.75	-.35	-.10	.11	.71
FES CONF	.75	-.05	-.12	.10	.59
FAM AE	.75	-.22	-.10	.03	.62
FES COH	-.70	.49	.13	-.10	.76
FAC COH	-.69	.35	.35	.06	.72
FES ORG	-.64	.27	-.21	.14	.55
FES EXP	-.53	.17	.41	-.24	.54
FES INT	-.33	.72	-.08	-.12	.65
FES ACT	-.15	.72	.14	-.27	.63
FES MOR	-.14	.68	.10	.25	.55
FAC ADAPT	-.15	.11	.86	-.07	.78
FES IND	-.19	.29	.06	-.68	.59
FES CTRL	.11	.09	-.48	.67	.70
FES ACH	-.06	.43	.32	.52	.56
Variance	36.4%	13.2%	8.3%	8.1%	

Similarly, if Achievement Orientation was reasonably correlated with the remaining subscales, it could be retained on factor four.

Inspection of the nineteen variable correlation matrix indicated low correlations between Adaptability, Achievement Orientation, and the remaining subscales. The median correlation between Adaptability and the remaining subscales was .22, with a range of .05 to .43. The median correlation between Achievement Orientation and the remaining subscales was .16, with a range of $-.01$ to .33. Looking specifically at the FES subscales that defined factor four, the correlation between Achievement Orientation and Control was .11, and the correlation between Achievement Orientation and Independence was $-.02$.

In order to explore the possibility of curvilinear relationships, bivariate scatterplots of the relationships between all subscales were generated, and the FACES III subscales were transformed such that any curvilinear function would become linear. Results of these procedures indicated that no curvilinear relationships were present between subscales. Based on these procedures, it was concluded that Achievement Orientation and Adaptability were only minimally related to the remaining subscales.

Again, possible causes for the lack of relationship between Achievement Orientation, Adaptability, and the

remaining subscales can be traced to unreliability and unusual content. Internal consistency (coefficient alpha) was low for Achievement Orientation (.37), and moderate for Adaptability (.64). Thus, unreliability of the two subscales may have attenuated the correlations. As noted previously, the content of Achievement Orientation and Adaptability may also have contributed to the lack of relationship between these and the remaining subscales.

Based on the above results, the factor analysis was repeated without Achievement Orientation and Adaptability. Using the "eigenvalues" criterion, three factors were retained. Minimal correlation between the three factors indicated that orthogonal rotation was appropriate.

The orthogonally rotated solution was clear and interpretable, with the three factors accounting for 64.5% of the variance. (See Table 6) The obtained factor structure was highly similar to that obtained for parents. Factor one was primarily defined the FAM subscales; factor loadings ranged from .82 for FAM Role Performance, to .73 for FAM Affective Involvement. Factor two was primarily defined by FES Active-Recreational Orientation (.74), Moral-religious Emphasis (.72) and Intellectual-Cultural Orientation (.69). Finally, factor three was primarily defined by FES Control (.84) and Independence (-.68).

Table 6. Final Factor Structure for Children

	<u>I</u>	<u>II</u>	<u>III</u>	<u>h²</u>
FAM RP	.82	-.05	.07	.68
FAM VN	.82	-.21	.17	.75
FAM CTRL	.81	-.11	.28	.75
FAM COMM	.80	-.14	.20	.70
FAM TA	.80	-.14	.05	.66
FES CONF	.74	-.09	.17	.58
FAM AE	.74	-.25	.12	.62
FAM AI	.73	-.38	.17	.71
FAC COH	-.69	.44	-.08	.68
FES COH	-.68	.53	-.15	.77
FES ORG	-.64	.27	.22	.53
FES EXP	-.52	.24	-.42	.50
FES ACT	-.11	.74	-.28	.64
FES MOR	-.12	.72	.16	.56
FES INT	-.30	.69	-.10	.58
FES CTRL	.10	.11	.84	.73
FES IND	-.15	.21	-.68	.53
Variance	39.3%	14.8%	10.4%	

In summary, the initial factor analysis for children resulted in retention of four factors. Subsequent analyses indicated that Adaptability and Achievement Orientation were not correlated with the remaining subscales, and demonstrated poor to moderate internal consistency. Based on these results, Adaptability and Achievement Orientation were excluded from further analyses. Results of subsequent analyses indicated that a three factor orthogonally rotated solution was most interpretable. Highly similar to the structure obtained for parents, factor one was defined by the FAM, and factors two and three were defined by several FES subscales. Thus, factor one appeared to reflect a dimension pertaining affect, factor two reflected a dimension pertaining to family activities, and factor three reflected a bi-polar dimension pertaining to control vs independence.

Results for Daughters Versus Sons

Although the factor structures for mothers, fathers, and children were highly similar, it was possible that different factor structures could be obtained for daughters versus sons. In order to examine this possibility, the sample of 138 children was further divided into daughters (n=79) and sons (n=59), and the factor analysis was repeated for girls and boys separately.

Using the "eigenvalues" criterion, four factors were retained for daughters. Examination of the orthogonal solution indicated that although the first three factors were defined by several subscales, factor four was primarily defined by FACES III Adaptability. Subsequent correlational analyses (identical to the procedures reported for parents and children), indicated that Adaptability was not related to the remaining subscales in either a linear or curvilinear manner, and demonstrated relatively low internal consistency. On the basis of these results, Adaptability was excluded from further analyses.

Subsequent factor analysis resulted in retention of three factors. Examination of the orthogonally rotated solution indicated that the three factors accounted for 65.8% of the variance. (See Table 7). Factor one was primarily defined by the FAM subscales; loadings ranged from .84 for FAM Role Performance, to .73 for FAM Affective Involvement. Factor two was primarily defined by FES Control (.81), and FES Independence (-.74). Finally, factor three was primarily defined by FES Moral-Religious Emphasis (.84), Achievement Orientation (.72), and Intellectual-Cultural Orientation (.58). Thus, as with results for parents and children, the obtained factor structure for daughters appeared to reflect dimensions pertaining to affect, control vs independence, and family activities.

Table 7. Final Factor Structure for Daughters

	<u>I</u>	<u>II</u>	<u>III</u>	<u>h²</u>
FAM RP	.84	.04	.05	.71
FAM COMM	.83	.20	-.09	.74
FAM CTRL	.80	.33	-.10	.76
FAM TA	.79	.17	-.11	.67
FAM VN	.79	.23	-.25	.74
FAM AE	.73	.29	-.21	.66
FAM AI	.73	.24	-.39	.74
FAC COH	-.72	-.22	.40	.73
FES COH	-.71	-.31	.43	.79
FES CONF	.67	.35	-.09	.58
FES ORG	-.65	.07	.22	.48
FES CTRL	.16	.81	.13	.70
FES IND	-.22	-.74	-.03	.60
FES ACT	-.13	-.62	.51	.66
FES EXP	-.42	-.51	.26	.50
FES MOR	-.09	-.001	.84	.71
FES ACH	-.16	.14	.72	.56
FES INT	-.33	-.28	.58	.52
Variance	37.0%	14.4%	14.4%	

Using the "eigenvalues" criterion, six factors were retained for sons. Examination of the orthogonally rotated solution indicated that although the first three factors were defined by several subscales, factors four to six were primarily defined by FACES Adaptability, FES Achievement Orientation, and FES Independence, respectively. The usual series of correlational and reliability analyses indicated that Adaptability, Achievement Orientation, and Independence were not related to the remaining subscales in either a linear or curvilinear manner, and demonstrated relatively poor internal consistency. On the basis of these results, the three subscales were excluded from further analysis.

Subsequent factor analysis resulted in retention of three factors. Examination of the orthogonal solution indicated that the three factors accounted for 65.8% of the variance. (See Table 8) Factor one was primarily defined by the FAM subscales (range of loadings = .83 to .72). Factor two was primarily defined by FES Active-Recreational Orientation (.81), Intellectual-Cultural Orientation (.76), and Moral-Religious Emphasis (.51). Finally, factor three was primarily defined by FES control (.90) and Moral-Religious Emphasis (.39).

Table 8. Final Factor Structure for Sons

	<u>I</u>	<u>II</u>	<u>III</u>	<u>h²</u>
FAM CONF	.83	-.12	.17	.73
FAM VN	.82	-.28	.07	.76
FES CONF	.81	.03	-.13	.67
FAM RP	.81	-.22	.06	.71
FAM COMM	.79	-.25	.10	.70
FAM TA	.76	-.13	-.33	.70
FAM AI	.73	-.44	.16	.75
FAM AE	.72	-.13	-.25	.60
FES EXP	-.69	.09	-.17	.51
FAC COH	-.66	.33	.21	.59
FES COH	-.64	.55	.08	.72
FES ORG	-.60	.20	.35	.52
FES ACT	-.06	.81	.10	.67
FES INT	-.25	.76	-.06	.64
FES MOR	-.14	.51	.39	.43
FES CTRL	<u>.10</u>	<u>.06</u>	<u>.90</u>	.82
Variance	41.9%	14.9%	9.0%	

Thus, the final factor structure for sons appeared to reflect dimensions pertaining to affect, family activities, and control vs independence. In contrast to results for the previous samples, the control factor was not as robust for sons, as it was defined almost exclusively by FES Control.

In summary, the obtained factor structures for daughters and sons were similar but not identical. The most salient differences between daughters and sons occurred for FES Achievement Orientation and Independence. For daughters, Achievement Orientation helped define the family activities factor. For sons, the exclusion of Independence resulted in a less robust control factor. Despite these differences, however, affect, family activities and control factors emerged for both daughters and sons.

Based on the above results, it was concluded that daughters and sons could be appropriately combined in one sample. Because of relatively small sample sizes, however, this conclusion must be regarded as somewhat tentative. Although some authors have suggested that factor analysis is stable with small subjects to variables ratios (provided the sample size exceeds 50) (Arrindell & van Der Ende, 1985), other authors suggest that large ratios (e.g., 10 to 1) are needed for stable factor configurations (e.g., Guilford, 1954; Gorsuch, 1983; Cattell, 1978; Nunnally, 1978). The

initial subjects to variables ratios for daughters and sons were low; four to one, and three to one, respectively. Thus, the factor structures for these samples should be regarded as more provisional than those obtained for parents and children. With this caution in mind, however, the obtained factor structures for daughters and sons did appear similar to each other, and similar to the structures obtained for parents and children. Based on this similarity, combining daughters and sons into one sample appeared to be appropriate.

Comparison of Factor Structures Across Samples

To compare the factor structures for mothers, fathers, and children, a listing of subscales with salient loadings on each factor for each family member was constructed. (Salient loadings were defined as .40 and above; see Table 9). As seen, the final factor structures for mothers, fathers, and children were highly similar; not only did the same subscales load on each factor, but the magnitude of the loadings were similar across members.

The second step in the comparison was to delete subscales that loaded saliently on more than one factor, for any family member. Thus, a subscale was deleted if it split across factors for either mothers, or fathers, or children. Based on this procedure, five subscales were deleted: FACES

Table 9. Final Factor Structure Before Deletion of Double-Loaded Subscales

	I				II				III		
	M	F	C		M	F	C		M	F	C
FAM CTRL	.84	.87	.81	FES INT	.76	.76	.69	FES CTRL	.82	.82	.84
FAM TA	.81	.77	.80	FES ACT	.73	.62	.74	FES IND	-.69	-.65	-.68
FAM VN	.81	.83	.82	FES MOR	.53	.66	.72	-----	-----	-----	-----
FAM COM	.79	.79	.80	FES COH	.46	.60	.53	FES MOR	.45	.37	.16
FAM RP	.77	.81	.82	FES EXP	.44	.39	.24	FES EXP	-.28	-.34	-.42
FAM AI	.75	.83	.73	-----	-----	-----	-----	-----	-----	-----	-----
FAM AE	.73	.83	.74	FES ORG	.41	.38	.27				
FAC COH	-.64	-.63	-.69	FES CONF	-.25	-.45	-.09				
FES CONF	.59	.47	.74	FES IND	.26	.39	.21				
FES COH	-.56	-.57	-.68	FAC COH	.27	.31	.44				
FES ORG	-.47	-.57	-.64								
FES EXP	-.34	-.45	-.52								

III Cohesion, and FES Conflict, Cohesion, Organization, and Expressiveness. As seen, these subscales loaded primarily on Factor One, but also tended to split across the factors for at least one member. As subscales were deleted, a compromise was reached for fathers and mothers. Table 9 indicates that FES Independence loaded on factors two and three for fathers. A decision was made to drop Independence from factor two and retain it on factor three. This decision was based upon two considerations: the loading for Independence was higher for fathers on factor three (-.65) than factor two (.39), and Independence did not split across factors for either mothers or children. Similarly, FES Moral-Religious Emphasis loaded on factors two and three for mothers. Here, a decision was made to drop Moral-Religious Emphasis from factor three and retain it on factor two. Again, this decision was based on two considerations: the loading for Moral-Religious Emphasis was higher for mothers on factor two (.53), than factor three (.45), and Moral-Religious Emphasis did not split across factors for either fathers or children.

The factor structures after deletion of the five subscales are illustrated in Table 10. Again, it may be noted that the structures across members were highly similar. Factor One was defined by the seven FAM subscales, and appeared to reflect a dimension pertaining to affect.

Factor Two was defined by FES Intellectual-Cultural Orientation, Active-Recreational Orientation, and Moral-Religious Emphasis, and appeared to reflect a dimension pertaining to family activities. Finally, Factor Three was defined by FES Control and Independence, and appeared to reflect a bi-polar dimension pertaining to control vs independence.

Table 10. Final Factor Structure After Deletion of Double-Loaded Subscales

	I				II				III		
	M	F	C		M	F	C		M	F	C
FAM CTRL	.84	.87	.81	FES INT	.76	.76	.69	FES CTRL	.82	.82	.84
FAM TA	.81	.77	.80	FES ACT	.73	.62	.74	FES IND	-.69	-.65	-.68
FAM VN	.81	.83	.82	FES MOR	.53	.66	.72				
FAM COM	.79	.79	.80								
FAM RP	.77	.81	.82								
FAM AI	.75	.83	.73								
FAM AE	.73	.83	.74								

CHAPTER V

DISCUSSION

The current research involved exploratory factor analysis of the FACES III, FAM, and FES. The purpose of the research was to identify the major dimensions exhibited by the three instruments. As dimensions were identified, correspondence across the instruments was assessed. A related goal was to determine the extent to which a common factor structure could be identified for separate samples of mothers, fathers, and children.

A convenience sample of 138 families from a large southwestern city was obtained. Families consisted of a mother, father, and one adolescent between 12-18 years old. Each respondent completed a packet of self-report family assessment instruments, which included the FACES III, FAM, and FES. Principal components analysis was used to obtain an estimate of the number of dimensions exhibited across the instruments. Separate analyses were conducted for each family member, and a preliminary assessment of the correspondence across members was conducted.

The most interpretable factor structure for all family members contained three orthogonal factors. Composition of the factors across members, although not identical, was highly similar. Factor One was primarily defined by the seven FAM subscales, although a few subscales from the FACES

III and FES (e.g., Cohesion, Conflict, and Expressiveness) also loaded on this factor. Factor Two was primarily defined by FES Active-Recreational Orientation, Intellectual-Cultural Orientation, and Moral-Religious Emphasis. Finally, Factor Three was primarily defined by FES Independence and Control.

In the following discussion, the three factors are interpreted. The factors are related to selected theoretical literature, and current findings are compared with previous research. Current limitations are also discussed, and suggestions for future research are advanced.

Based upon subscale loadings, Factor One appeared to reflect an affective dimension. Subscales that loaded on Factor One from the FACES III and FES, for example, appear to focus on affect and affect expression. Further, as noted by Skinner (1987), substantial intercorrelation among the FAM subscales suggests that it measures a single dimension. Given the affect-laden quality of the FAM items, it is likely that this single dimension reflects an individual's evaluation of other family members along dimensions of like-dislike or hostility-affection.

Based upon subscale loadings, Factor Two appeared to reflect a family activities or family interaction dimension.

Several items from the subscales, 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"). Items also 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"). Thus, the three subscales on Factor Two (all from the "personal growth" domain of the FES model) share an emphasis on group activities and family interaction, including conversation.

Finally, Factor Three appeared to reflect a control dimension. Although Independence and Control come from different domains in the Family Environment Model, examination of their content indicates they may measure opposite ends of a control continuum. For example, the Independence item, "In our family we are strongly encouraged to be independent," can be contrasted with the Control item, "There is a strong emphasis on following rules in our family." Similarly, the Independence item, "We think things out for ourselves in our family," can be contrasted with the Control item, "There is one family member who makes most of the decisions." Again, the Independence item, "We come and

go as we want to in our family," can be contrasted with the Control item, "There are set ways of doing things at home."

In summary, current results indicated that the FACES III, FAM, and FES were not multidimensional, as suggested by the developers of these instruments. Rather, subscales across the instruments could be organized along three dimensions: Affect, Activities, and Control. Additionally, current findings indicated that there was little correspondence across the instruments; although each instrument contributed to the affect factor, the remaining factors were defined solely by the FES. This modest correspondence appeared to be due to the limited dimensionality of the FAM and FACES III. Hypothesized relationships between the FAM and FES, for example, failed to obtain because the FAM was so strongly unidimensional.

When compared to the major dimensions found in the interpersonal relations literature, the obtained factors appear highly meaningful. Theories of interpersonal behavior, for example, have often emphasized processes related to affect and control. Leary (1957) described a personality system in which a variety of interpersonal behaviors were organized along two axes, labeled Hostility-Affection and Dominance-Submission. Similarly, Benjamin (1979) described a model of social behavior in which

transactions were organized along two axes, labeled Affiliation (friendly versus unfriendly) and Interdependence (independence versus enmeshment). Another two-factor model was developed by Parsons and Bales (1955), who described expressive (socioemotional) and instrumental (problem-solving) roles as the primary dimensions of family and other small group processes. Thus, although empirical findings do not support the dimensions suggested by the FACES III, FAM, and FES, these instruments do appear to measure important dimensions of interpersonal relations.

The current results are generally consistent with previous research focused on instrument dimensionality. Correlational studies of the FAM, for example, suggest that it measures a single affective dimension (Skinner, 1987). Similarly, recent factor analytic studies of the FES (e.g., Fowler, 1981, 1982; Oliver, May & Handal, 1988) suggest that this instrument may also measure fewer dimensions than purported. Fowler (1981, 1982), for example, conducted a maximum likelihood factor analysis of the FES subscales, using data provided in the preliminary FES manual (Moos, Insel & Humphrey, 1974). Results of this effort indicated that the FES contained two factors, labeled Cohesion vs. Conflict and Organization-Control.

Another maximum likelihood analysis of the FES

subscales was conducted by Oliver et al. (1988), who used data provided in the revised FES manual (Moos & Moos, 1981). Separate analyses were conducted for adult and adolescent normative samples. Results of this effort yielded three factors. For the adult sample, the factors were labeled Conflict vs. Cohesion, Control vs. Expressiveness, and Activities. Factors for the adolescents were labeled Activities, Organization-Achievement, and Conflict.

Although the current factors for the FES are not identical to those described in previous research, they are highly similar. In both the current and previous research, for example, the FES yielded two to three factors, reflecting affect, psychological and behavioral closeness, and control. At a more general level, such factors may be grouped under the three domains of the Family Environment Model. Affect and closeness, for example, reflect the "Relationships" domain, and Control, Organization and perhaps, Independence, reflect the "System Maintenance" domain. Activities appear to reflect the "Personal Growth" domain, although this domain may relate more to family interaction or "family growth" than to individual development. Thus, although the FES does not appear to contain 10 independent dimensions, it may reflect the three domains specified by the model.

Reasons for the limited dimensionality of the FAM and FES may be traced to error in the underlying theories, problems with self-report methodology, or both. Turning first to theoretical issues, it is possible that the models for the two instruments are overly complex. In reality, family relations may be best described with a limited number of broad dimensions. The previous discussion highlighted the relevance of two-factor models of interpersonal relations. Perhaps family relations, while unique in many respects, are best portrayed in broad strokes as well.

Turning to methodological issues, it is possible that family relations are complex, but that self-report instruments cannot capture this complexity. Thus, respondents may be unable to differentiate between closely related, yet distinct dimensions (see Jacob & Tennenbaum, 1988). If this is the case, other methods (e.g. observational techniques) might be better able to capture subtle differences between related areas. In order to examine this possibility, however, multitrait-multimethod data are necessary (e.g., Campbell & Fiske, 1959).

Before moving to a discussion of the FACES III, specific methodological shortcomings of the FES should be noted. In brief, it has been argued that the emergence of the 10 FES dimensions may have been a statistical artifact of Moos' original sample (see Robertson & Hyde, 1982; Roosa

& Beals, 1990; Waldron, Sabatelli & Anderson, 1990). The FES was developed in the following manner: subscales were constructed a priori, an item pool was administered, and items with unacceptable inter-item correlations were eliminated. Inter-item correlations were again computed, providing empirical evidence for subscale composition. Because items with unacceptable correlations had been eliminated, however, the second set of correlations necessarily improved. At this stage, subscale composition should have been confirmed in an independent sample. Because this was not done, the subscales may not be stable and generalizable; i.e., the instrument may have a different dimensionality when used in other samples. Given current findings, this possibility seems likely. It should again be noted, however, that the current factors for the FES appeared to reflect the three broad domains of the Family Environment model. In addition, these domains are reflected in the factors obtained by Fowler et al (1981, 1982) and Oliver et al (1988). Perhaps at a two or three factor level, the FES is generalizable. If true, researchers should be cautious about using FES subscales out of context. If certain areas of the FES are deemed relevant, an alternative strategy might be to develop factor scores corresponding to the model domains. Such a strategy has the benefit of reducing measurement error while maintaining the

underlying theoretical model.

Unlike the FAM and FES, the FACES was not intended to be multidimensional. As reported, Cohesion helped define the affect dimension, whereas Adaptability appeared to be a specific factor. On the one hand, this finding is consistent with Olson's assertion that Adaptability measures a unique dimension pertaining to family "flexibility." On the other hand, given the description of Adaptability, one would expect it to correlate at least moderately well with subscales purporting to measure control and independence.

Current findings are also contrary to previous empirical studies involving the FACES II. Other authors (e.g., Fristad, 1989; Miller, et al., 1985) have reported that FACES II Adaptability was substantially correlated with several subscales from other instruments, even subscales without theoretical links to flexibility. These relationships were interpreted as stemming from the heterogeneous nature of Adaptability. FACES III Adaptability also appears to be quite heterogeneous. Why, then, was it not related to the remaining subscales in the current study?

One possible explanation may be found in the revision of the FACES II to the FACES III (see Olson, et al., 1985). This revision was primarily intended to reduce the

correlation between Cohesion and Adaptability. Although this objective was achieved, it is possible that some Adaptability items which related to control and independence were eliminated. On the other hand, it is possible that Adaptability is now a more pure measure of flexibility. Given the empirically driven manner in which the revision was undertaken, however, the former possibility seems more likely.

In summary, current results for the FACES III were inconsistent with previous studies of the FACES II. Although Cohesion was correlated with other subscales purporting to measure psychological and behavioral closeness, Adaptability appeared to be a specific factor. Given limitations of the current study, it is unclear whether the lack of relationship between Adaptability and the remaining subscales occurred because Adaptability is poorly defined, or because it is well defined but unique. In order to examine these possibilities, Adaptability would need to be compared with another scale purporting to measure flexibility. Thus, the only conclusion that may be drawn from the current study is that Adaptability was not related to subscales purporting to measure control or independence.

Before presenting conclusions and recommendations, limitations of the current study must be addressed. The

most important limitation is the lack of multitrait-multimethod data (see Campbell & Fiske, 1959). Without such data, it is impossible to determine whether the limited dimensionality of the FAM and FES stems from incorrect theory, problems with self-report methodology, or both. Future research would do well to assess theoretical constructs across different types of methods, including self-report, observational and quasi-observational procedures (see Jacob & Tennenbaum, 1988).

A second limitation concerns the use of exploratory factor analysis. The current research provides only a preliminary assessment of the relationships within and across the three instruments. Before the obtained factor structures can be accepted with confidence, they must be tested with procedures such as confirmatory factor analysis. A series of confirmatory analyses are currently underway using LISREL VII (Joreskog & Sorbom, 1989). These analyses will be used to test alternative theoretical models, and will provide a statistical test of the similarity of factor structures across respondents.

A third limitation is that the sample of children was heterogeneous as to sex and age. Although the factor structures for daughters and sons did not appear substantially different, these results must be regarded as tentative due to small sample size. In addition, it is

possible that obtained results would have differed as a function of child age. Younger children, for example, may exhibit less differentiated factor structures than older children. Again, because of small sample size, meaningful age comparisons could not be undertaken in the current study.

A final limitation concerns the lack of two independent measures of family flexibility or adaptability. As noted, without two measures, it is impossible to determine whether FACES III Adaptability is unique or simply poorly defined.

Despite the above limitations, the current research makes several important contributions to the family assessment literature. First, the study focused on three widely used family assessment instruments. Given the frequency with which these instruments are used, it is imperative that their empirical properties be examined. Second, the current research used factor analytic methods, rather than simply examining bivariate correlations between variables. Third, separate analyses were conducted for different family members, avoiding problems associated with nonindependent data, and permitting preliminary assessment of the correspondence across different members' factor structures.

In conclusion, current results suggest that the FACES III, FAM, and FES contain fewer dimensions than proposed. Subscales from the instruments could be organized along three broad dimensions of interpersonal process, labeled Affect, Activities, and Control. Because of the limited dimensionality of the FACES III and especially, the FAM, correspondence across the three instruments was limited. Of the instruments, the FES demonstrated the greatest range, contributing to all three factors. Additionally, the three factors appeared to reflect the three domains in the Family Environment model, namely, Relationships, Personal Growth, and System Maintenance.

The current study raises additional questions for the conceptualization and measurement of family functioning. Although multidimensional models appear to be quite popular, the adequacy of such models remains questionable. It may be that families, like other interpersonal relationships, are best described with a limited number of primary dimensions. Certainly, two and three factor models have been used and accepted in the family field from the 1930's to the present (e.g., Angell, 1936; Beavers, 1976; Beavers & Voeller, 1983; Hill, 1949; Parsons and Bales, 1955, Olson, et al 1979, 1983). Perhaps more attention should be applied to the refinement of such models, and to the application of more

generic models of interpersonal process to the family (see Benjamin, 1979; Leary, 1957).

Alternatively, multidimensional models of family process may be important additions to the literature. If this is the case, more attention needs to be paid to the operationalization of such models. In particular, self-report instruments based on multidimensional models need careful evaluation. Although the literature is not extensive, results are beginning to accumulate which suggest that there are major discrepancies between multidimensional models and the characteristics of their associated instruments. Related to this point, other methods of multidimensional assessment (e.g., observational, quasi-observational methods) need to be used and evaluated.

Overall, future research will need to balance the interrelated demands of theory and method. Multidimensional models, while conceptually appealing, may be limited to certain types of methodology. Conversely, primary factor models, while easier to operationalize, need to be closely linked to theory. Moreover, the differences between a primary factor model specific to family relations (such as the Circumplex), and primary factor models of more generic

interpersonal relations need to be articulated. Given such efforts, the conceptualization and measurement of family functioning should increase in both richness and veracity.

REFERENCES

- Achenbach, T., & Edelbrock, C. (1979). The child behavior profile: II. Boys aged 12-16 and girls aged 6-11 and 12-16. Journal of Consulting and Clinical Psychology, 47, 223-233.
- Angell, R. (1936). The family encounters the depression. New York: Charles Scribner's Sons.
- Arrindell, W.A., & van der Ende, J. (1985). An empirical test of the observations-to-variables ratio in factor and components analysis. Applied Psychological Measurement, 9(2), 165-178.
- Bagarozzi, D.A. (1984). Family measurement techniques. The American Journal of Family Therapy, 12(4), 59-62.
- Beavers, W.R. (1979). A theoretical basis for family evaluation. In J.M. Lewis, W.R. Beavers, J.T. Gossett, and V.A. Phillips (Eds.), No single thread: Psychological health in family systems. New York: Brunner/Mazel.
- Beavers, W.R., & Voeller, M.N. (1983). Family models: Comparing and contrasting the Olson Circumplex Model with the Beavers Systems Model. Family Process, 22, 271-273.
- Bell, R.Q. (1982). Parent/adolescent relationships in families with runaways: Interaction types and the circumplex model. Unpublished doctoral dissertation, Family Social Science, University of Minnesota.
- Benjamin, L.S. (1974). Structural analysis of social behavior. Psychological Review, 81, 392-425.
- Benjamin, L.S. (1977). Structural analysis of a family in therapy. Journal of Consulting and Clinical Psychology, 45, 391-406.
- Bilbro, T.L., & Dreyer, A.S. (1981). A methodological study of a measure of family cohesion. Family process, 20, 419-427.
- Bowen, M. (1961). The family as the unit of study and treatment (Workshop, 1959): 1. Family psychotherapy. American Journal of Orthopsychiatry, 31, 40-60.

- Campbell, D.T., & Fiske, D.W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. Psychological Bulletin, 56, 81-105.
- Cattell, R.B. (1978). The scientific use of factor analysis. New York: Plenum press.
- Carnes, P. (1985). Counseling sexual abusers. Minneapolis, MN: CompCare Publications.
- Clarke, J. (1984). The family types of schizophrenics, neurotics, and "normals." Unpublished doctoral dissertation, Family Social Science, University of Minnesota.
- Druckman, J. (1979). A family oriented policy and treatment program for juvenile status offenders. Journal of Marriage and the Family, 41, 627-636.
- Edman, S.O., Cole, D.A., & Howard, G.S. (1990). Convergent and discriminant validity of the FACES III: Family adaptability and cohesion. Family Process, 29, 95-103.
- Endler, N.S., & Magnusson, D. (1983). Toward an interactional psychology of personality. Psychological Bulletin, 83, 956-974.
- Epstein, N.B., Bishop, D.S., & Levin, S. (1978). The McMaster model of family functioning. Journal of Marriage and Family Counseling, 4, 19-31.
- Epstein, N.B., Baldwin, L.M., & Bishop, D.S. (1983). The McMaster family assessment device. Journal of Marital and Family Therapy, 9(2), 171-180.
- Finney, J.W., Moos, R.H., & Newborn, C.R. (1980). Posttreatment experiences and treatment outcome of alcoholic patients six months and two years after hospitalization. Journal of Consulting and Clinical Psychology, 48, 17-29.
- Finney, J.W., Moos, R.H., Cronkite, R.C., & Gamble, W. (1983). A conceptual model for the functioning of married persons with impaired partners: Spouses of alcoholic patients. Journal of Marriage and the Family, 45, 23-34.

- Fowler, P.C. (1981). Maximum likelihood factor structure of the Family Environment Scale. Journal of Clinical Psychology, 37, 160-164.
- Fowler, P.C. (1982). Factor structure of the Family Environment Scale: Effects of social desirability. Journal of Clinical Psychology, 38, 285-292.
- Fristad, M.A. (1989). A comparison of the McMaster and Circumplex family assessment instruments. Journal of Marital and Family Therapy. 15 (3), 259-269.
- Goldberg, D.P., & Hillier, V.F. (1979). A scaled version of the General Health Questionnaire. Psychological Medicine, 9, 139-145.
- Gorsuch, R.L. (1983). Factor analysis. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Group for the Advancement of Psychiatry. Treatment of families in conflict. New York: Science House.
- Guilford, J.P. (1954). Psychometric methods. New York: McGraw-Hill.
- Hess, R.D., & Handel, G. (1959). Family worlds: A psychological approach to family life. Chicago: University of Chicago Press.
- Hill, R. (1949). Families under stress. Westport, Connecticut: Greenwood press.
- Hollingshead, A.B. (1975). Four factor index of social status. Unpublished manuscript, Yale University, New Haven, Connecticut.
- Jackson, D.N. (1970). A sequential system for personality scale development. In C.D. Spielberger (Ed.), Current topics in clinical and community psychology (Vol 2). New York: Academic Press.
- Jacob, T. (1989). Family assessment in alcohol research. Grant application submitted to NIAAA.
- Jacob, T., & Tennenbaum, D.L. (1988). Family assessment: Rationale, methods, and future directions. New York: Plenum Press.

- Janes, C., & Hesselbrock, V. (1976, August). Perceived family environment and school adjustment of children of alcoholics. Paper presented at the American Psychological Association's Annual Convention, Washington, D.C.
- Joreskog, K.G., & Sorbom, D. (1988). Lisrel 7: A guide to the program and applications. Chicago: SPSS Inc.
- Karoly, P., & Rosenthal, M. (1977). Training parents in behavior modification: Effects on perceptions of family interaction and deviant child behavior. Behavior Therapy, 8, 406-410.
- Kiernan, D., & Tallman, I. (1972). Spousal adaptability: An assessment of marriage competence. Journal of Marriage and the Family, 34, 247-256.
- Leary, T. (1957). Interpersonal diagnosis of personality. New York: Ronald Press.
- Lee, C. (1988). Theories of family adaptability: Toward a synthesis of Olson's Circumplex and the beavers Systems Models. Family Process, 27, 73-85.
- Miller, I.W., Epstein, N.B., Bishop, D.S., & Keitner, G.I. (1985). The McMaster family assessment device: Reliability and validity. Journal of Marital and Family Therapy, 11(4), 345-356.
- Minuchin, S. (1974). Families and family therapy. Cambridge: Harvard University Press.
- Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. Psychological Review, 80, 252-283.
- Moos, R., Finney, J., & Gamble, W. (1982). The process of recovery from alcoholism: II. Comparing spouses of alcoholic patients and matched community controls. Journal of Studies on Alcohol, 43, 888-909.
- Moos, R., Insel, P., & Humphrey, B. (1974). Combined preliminary manual: Family, work, and group environment scales. Palo Alto, California: Consulting Psychologists Press.
- Moos, R., & Moos, B.S. (1976). A typology of family social environments. Family Process, 15, 357-372.

- Moos, R., & Moos, B.S. (1981). Family Environment Scale Manual. Palo Alto, CA: Consulting Psychologists Press.
- Moos, R., & Moos, B.S. (1984). The process of recovery from alcoholism: III. Comparing functioning in families of alcoholics and matched control families. Journal of Studies on Alcohol, 45, 111-118.
- Nunnally, J.C. (1978). Psychometric theory. (2nd ed.). New York: McGraw-Hill.
- Oliver, J.M., May, M.J., & Handal, P.J. (1988). The factor structure of the Family Environment Scale: Factors derived from subscales. Journal of Clinical Psychology, 44(5), 723-727.
- Olson, D.H., & McCubbin, H.I. (1983). Families: what makes them work. Beverly Hills, CA: Sage Publications.
- Olson, D.H., & Portner, J. (1983). Family adaptability and cohesion evaluation scales. In E.E. Filsinger (Ed.), Marriage and family assessment. Beverly Hills, CA: Sage.
- Olson, D. H., Portner, J., & Lavee, Y. (1985). FACES III. St. Paul MN: Family Social Science, University of Minnesota.
- Olson, D.H., Sprenkle, D.H., & Russell, C.S. (1979). Circumplex model of marital and family systems I: Cohesion and adaptability dimensions, family types, and clinical applications. Family Process, 18, 3-28.
- Olson, D.H., Russell, C.S., & Sprenkle, D.H. (1983). Circumplex model VI: Theoretical update. Family Process, 22, 69-83.
- Overall, J.E., & Gomez-Mont, F. (1974). The MMPI-168 for psychiatric screening. Educational and Psychological Measurement, 34, 315-319.
- Parsons, T., & Bales, R.F. (1955). Family, socialization, and interaction process. Glencoe, Illinois: The Free Press.
- Portner, J. (1981). Parent/adolescent relationships: Interaction types and the circumplex model. Unpublished doctoral dissertation, Family Social Science, University of Minnesota.

- Robertson, D.U., & Hyde, J.S. (1982). The factorial validity of the family environment scale. Educational and Psychological Measurement, 42, 1233-1241.
- Roosa, M.W., & Beals, J. (1990). Measurement issues in family assessment: The case of the Family Environment Scale.
- Scoresby, A., & Christensen, B. (1976). Differences in interaction and environmental conditions of clinic and non-clinic families: Implications for counselors. Journal of Marriage and Family Counseling, 2, 63-71.
- Skinner, H.A. (1981). Toward the integration of classification theory and methods. Journal of Abnormal Psychology, 90, 68-87.
- Skinner, H.A. (1987). Self-report instruments for family assessment. In T. Jacob (Ed.), Family interaction and psychopathology: Theories, methods, and findings. New York: Plenum Press.
- Skinner, H.A., Steinhauer, P.D., & Santa-Barbara, J. (1983). The Family Assessment Measure. Canadian Journal of Community Mental Health, 2, 91-105.
- Steinbock, L. (1978). Nest-leaving: Family systems of runaway adolescents. (Doctoral dissertation, California School of Professional Psychology). Dissertation Abstracts International, 38, 4544B.
- Steinhauer, P.D. (1987). The family as a small group. In T. Jacob (Ed.), Family interaction and psychopathology: Theories, methods, and findings. New York: Plenum Press.
- Steinhauer, P.D., Santa-Barbara, J., & Skinner, H.A. (1984). The process model of family functioning. Canadian Journal of Psychiatry, 29, 77-88.
- Waldron, R.J., Sabatelli, R.M., & Anderson, S.A. (1990). An examination of the factor structure of the Family Environment Scale. The American Journal of Family Therapy, 18(3), 257-272.
- Wynne, L.C., Ryckoff, I.M., Day, J., & Hirsch, S.I. (1958). Pseudo-mutuality in the family relations of schizophrenics. Psychiatry, 21, 205-220.