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# Ecocultural Assessment in Families of Children With Developmental Delays: Construct and Concurrent Validities

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Home interviews were conducted with 102 families of children with developmental delays to assess ecocultural family resources and constraints, values, and goals as well as proactive adaptive efforts to deal with their circumstances. Interview topics included (a) economic factors; (b) child safety, health, and education; (c) domestic and childcare workloads; (d) familial support networks; and (e) sociocultural influences. Factor analyses performed on the ecocultural measures revealed 12 salient factors. Results indicated that some of the ecocultural factors were unique and statistically independent of the traditional measures of home environment (e.g., child-rearing attitudes, cognitive stimulation of the child, and general psychosocial climate). Significant relations were found between certain ecocultural factors and child's developmental status. Both ecocultural factors and traditional family measures accounted for significant variation in child outcomes.

Families of children with developmental delays face significant adaptive problems. Both the clinical and the research literature have addressed these problems under the rubric "stress," and the resulting efforts to assess family ecology have been criticized for being atheoretical (Burden & Thomas, 1986; Crnic, Friedrich, & Greenberg, 1983; Gallimore, Weisner, Kaufman, & Bernheimer, 1989; Turnbull & Winton, 1984) and pathology oriented (Crnic et al., 1983; Longo & Bond, 1984). In recent years, the field has benefitted from more robust and comprehensive conceptualizations (Bailey & Simeonsson, 1986; Bronfenbrenner, 1979; Crnic et al., 1983; Fewell, 1986; McCubbin & Patterson, 1983; Seligman & Darling, 1989; as well as Turnbull and Dunst and their respective colleagues). For example, Turnbull utilized family systems theory and family life cycle as the framework for studying families of children with disabilities (Barber, Turnbull, Behr, & Kerns, 1988; Turnbull, Summers, & Brotherson, 1986). Dunst and Trivette combined system theory with a social support model to examine the relations between various dimensions of support and individual and family development (Dunst & Trivette, 1988; Dunst, Trivette, Hamby, & Pollock, 1990; Trivette, Deal, & Dunst, 1986).

In another approach, Wikler (1986) used the ABCX model of family crisis proposed by McCubbin and Patterson (1983) to examine the impact of transitions on families of children with disabilities, and Bristol (1984) used the model to predict successful family adaptation to chil-

 

dren with autism. In the model, A is assigned to the stressor event, which interacts with B, the family's crisis-meeting resources, which, in turn, interacts with C, the way in which the family defines the event. X is used to signify the crisis, or the impact on the family of A, B, and C.

Useful as these perspectives have been, in our view they are not sufficient to capture the adaptive circumstances with which families are confronted. Families do not merely "have" an ecology around them, they also actively *create* their family ecology (Gallimore et al., 1989). Understanding the process of active construction of family ecology necessitates both an assessment of resources and constraints in families' lives as well as an assessment of how families have put these elements together in their everyday routines. The present study was designed to provide empirical evidence that our approach to family ecology—the ecocultural (*eco*logical–*cultural*) model—adds significantly to the prediction of child developmental outcomes and to our understanding of the connections between family activity and child development.

The ecocultural model, as applied to families of children with developmental delays, is a comprehensive approach composed of (a) a context that provides opportunities for, and constraints on, the families; (b) families' perspectives of their lives and circumstances, including their values and goals; and (c) families proactive efforts to accommodate the child with developmental delay. This theory has its origins in the psychocultural model proposed by Whiting and his colleagues (Whiting, 1976, 1980; Whiting & Edwards, 1988; Whiting & Whiting, 1975) and adapted by their students and associates (Munroe, Munroe, & Whiting, 1981; Super & Harkness, 1980, 1986; Weisner, 1984; Weisner & Gallimore, 1985). Based on cross-cultural research, Weisner (1984) proposed the following 12 domains of family ecology that have been shown to directly influence the lives of children and families:

1. Family Subsistence, the Work Cycle, and the Economic and Financial Base
2. Public Health, and Demographic Characteristics of Family and Community
3. Home and Neighborhood Safety
4. The Division of Labor by Sex, Age, and Other Characteristics, Including Domestic Task and Chore Workload
5. Childcare Tasks: Who Does Childcare and How It is Organized
6. Roles of Father and Others in Childcare
7. Composition of Children's Peer and Play Groups: Who Participates and Age and Sex of Groups
8. Structure and Quality of Marital Role Relationship
9. Networks, Supports, and Organizational Involvement for Women
10. Multiple Sources of Child Cultural Influence Available in Community
11. Sources of Parental Information Regarding Children and Family
12. Degree of Community Heterogeneity Influencing Family

Each domain includes (a) ecological resources and constraints faced by the family, (b) the family's goals and values, and (c) the family's efforts to actively construct its everyday routine within its ecological circumstances. Gallimore et al. (1989) and Weisner and Gallimore (1989) have described the development of ecocultural measures specifically for families of children with developmental delays. Gallimore, Weisner, Guthrie, Bernheimer, and Nihira (1993) investigated family responses to children with developmental delays within the ecocultural model. Bernheimer, Gallimore, and Weisner (1990) have described the interconnected and hierarchical nature of the ecocultural niche and addressed implications for family interventions.

Our general purpose in this paper was to provide empirical data for the construct and concurrent validities of these ecocultural measures. Specifically, we have (a) described the quantitative development of these ecocultural factors, (b) examined the statistical relation between the eco-

cultural factors and traditional measures of proximal home environment, and (c) investigated the statistical relation between the ecocultural factors and the child's developmental status.

## Method

### *Sample*

The sample consisted of 103 children (59 boys) with various degrees of developmental delay of unknown etiology from 102 Euro-American families living in the greater Los Angeles area (there was one set of twins). At the beginning of the study, the children ranged in age from 32 to 55 months (mean = 41.8, standard deviation [*SD*] = 6.2), with Gesell Developmental Quotients (DQs) between 38 and 117 (mean = 72.3, *SD* = 15.98). All but 34 of the children had DQs below 80, and all 103 had been observed by clinicians to have significant delays in one or more areas (motor, speech, adaptive behavior, or cognition). Excluded from the sample were families whose child's delay was associated with chromosomal abnormalities, genetic conditions, or known prenatal drug or alcohol abuse.

*Developmental delay* is a term of relatively recent vintage and frequently lacks definitional specificity (Bernheimer & Keogh, 1986; Bernheimer et al., 1990). As such, it has been essentially a nonspecific clinical concept with less ominous tones for the future than *mental retardation*. The Division for Early Childhood (McLean, Smith, McCormic, Shakel, & McEvoy, 1991), however, recently made a policy statement recommending that eligibility criteria for preschool children include the noncategorical option of developmental delay. Although acknowledging that most states currently specify the delay as 1.5 to 2 *SD*s below the mean on a standardized developmental assessment, the Division for Early Childhood statement noted that test performance should not be the only criterion for eligibility. Professionals should be allowed the flexibility to make eligibility decisions based on "informed clinical judgment" (McLean et al., 1991, p. 4). In the current sample, as noted previously, informed clinical judgment was used to identify the children with DQs over 80 as having developmental delays. The majority of these children were delayed in language or motor skills.

Longitudinal data from UCLA studies of children with developmental delays, as just defined, provide support for the recommendation that developmental delay is an appropriate eligibility category for serving preschool children. Although some children with early delays "catch up," the majority continue to lag behind age norms on standardized tests of development and cognition, and the majority of these are placed in special education once they enter school (Bernheimer & Keogh, 1988). Indeed, 83% of the children in the current sample were placed in special education programs upon entry into elementary school (Bernheimer, Keogh, & Coots, 1993), and this percentage is expected to increase during later school years.

The 102 families in our study cohort consisted predominantly of middle-class married couples in their 30s; there was, however, a wide range of variation and heterogeneity surrounding this central tendency. For example, 11% were mothers living independently (due to divorce, separation, widowhood, or having never married) or in a variety of other residential and marital circumstances (e.g., living with parents). Altogether, 19.4% of the children were in a single-parent household (mother, father, grandmother, or other relative). About 25% of the mothers were employed full-time. The mean family socioeconomic level, assessed with the four factor index of social status (Hollingshead, 1975) was 44.7 ("middle-middle-class").

Seventy-three different agencies in the greater Los Angeles metropolitan area assisted in assembling the cohort. Two thirds of the cooperating agencies were public schools or private intervention programs. Only 5% of an original pool of 313

children who met our sampling criteria were excluded due to self-selection (e.g., the parents declined to participate, or the agency "decided" the parents would not be interested). This suggests that "selection bias" was present in the final cohort of 103 children and 102 families, but at an acceptable level of 5%.

Further details on the cohort and sampling procedure have been presented elsewhere (Gallimore et al., 1989; Gallimore et al., 1993; Weisner, 1993; Weisner, Beizer, & Stolze, 1991), and some material on our sample has been excerpted from these studies.

## Data-Collection Procedures

All sample families were visited by a trained interviewer who conducted semi-structured interviews with the parents; each interview lasted 2 to 3 hours. Interviewers were provided with specific questions and topics to be covered in each of the 12 theoretical domains constituting the ecocultural niche of the family (see p. 552). Direct questions were asked to obtain factual or concrete information regarding the child, the family, and their daily routine (e.g., number and type of child services, number of older siblings available for help, amount of diagnostic information received from professionals). Other items represented various descriptors of the ecocultural context of the family, such as family accommodations and family goals and values. For example, concordance in parents' beliefs regarding childcare, complexity of childcare work and schedule, structuring daily routine around the child, etc., were inferred from responses to open-ended questions, such as "What is your daily schedule like?" The respondents were encouraged to talk about "how is it going for you," or "for your child," in their own terms, using their own framework. Interviewers were trained to use probes to ensure clarity and comparability of data obtained from all families.

Each family also completed a questionnaire covering standard demographic information and socioeconomic status (SES) characteristics of the family. In addition to the transcription of the interview, field notes were compiled for all contacts with each family.

## Development of Ecocultural Factors

The quantification of the ecocultural context began with the coding of qualitative interview records and field notes. The identification of potential measures for relevant variables was guided by ecocultural theory, other family ecology research, and pilot work conducted during the development of the interview schedule itself.

*Coding of Interview Records and Field Notes.* The quantification process began with the development of a coding manual that covered a wide variety of measures describing the ecocultural context of the sample population. Depending on the type of measure, the coding required different response patterns (e.g., nominal scales; "yes/no" dichotomous scales; 3-point, 5-point, and 9-point Likert-type scales). Coders then reviewed all the interview and field note materials and scored each family using the coding manual. Two independent ratings were obtained on a random sample of 10% of the families to assess the reliability of the coding process. The overall percentage of agreement for all items was 81%. Items with less than 70% agreement were omitted from further analysis.

*Identification of Subdomains and Items.* Items were identified for each of the 12 domains as well as for subdomains within the domains, as postulated by ecocultural theory or indicated by field experience. A large pool of items was identified in this way. These items were then examined through a series of statistical procedures to determine their internal-consistency reliability and validity for a given subdomain.

Different criteria were used for different types of subdomains. For some subdomains, the items were examined on the basis of interitem correlations and the item–total correlation. In other cases, where

subdomain definitions could not be specified by the theory, factor analysis was used to determine the number and the nature of subdomains that represented the given domain. For some subdomains, each item was selected to represent different bits of information within a given subdomain. For example, the number of older siblings and the number of adults in the home together indicate the potential availability of household help, although these two numbers were not expected to be correlated. Such items were grouped together to form a subdomain on the basis of logical considerations rather than the psychometric criterion of internal-consistency reliability. The result of these efforts yielded a total of 46 subdomain scores representing Domains 1 through 9 and Domain 11. A single score, called Diversity of Cultural Influence, was developed by combining Domains 10 and 12.

*Factor Analysis of Subdomain Scores.* In order to achieve further data reduction and to identify primary ecocultural factors, we performed a series of factor analyses on these subdomains. Ecocultural theory postulates that the niche domains are interrelated and that certain domains, such as those related to health or safety issues and those related to subsistence, are pervasive in their influence on child behavior. Hence, the 11 domains were not expected to be independent. Given that factor analysis generates factors in horizontal, not hierarchical or nested, relations, the niche domains at approximately equal hierarchical levels have been analyzed in a series of separate factor analyses. Thus, separate factor analyses were applied to the subdomains representing the different ecocultural domains: Domain 1 (Family Subsistence, Work Cycle, and Economic Base); Domains 2 and 3 combined (Safety, Health, and Education of the Child); Domains 4 and 5 combined (Domestic and Childcare Workloads); Domains 6, 8, and 9 combined (Familial and Extra-Familial Support Networks); and Domains 7, 10, 11, and 12 combined (Sociocultural Influences for the Parents and Children). These five separate analyses were dictated by the hierarchical nature of the ecocultural theory. This approach also allowed us to maintain a subjects/variable ratio of at least 10:1 in all of the analyses. The maximum likelihood factor extraction and varimax rotation yielded a total of 12 statistically significant and interpretable factors, listed in Table 1. Thirteen subdomains were eliminated because they did not show significant loadings on any of these factors. Table 1 lists the ecocultural factors and the subdomains and their factor loadings. Only the subdomains with factor loadings of .25 or greater are listed in this table. Although there is no test of statistical significance for factor loadings, the general consensus among experts on factor analysis is that factor loadings greater than .25 to .30 are "substantial" (Guilford, 1954, p. 500). We emphasize that these factors are derived from five separate factor analyses representing different ecocultural domains postulated by ecocultural theory. For this reason, the factor structure may not be generalizable beyond the context of ecocultural theory.

## *Traditional Measures of Home Environment and Family Relations*

When this work began, we were not certain that ecocultural measures would succeed in describing the ecology of families of children with developmental delays, nor were we certain that, in the end, they would not merely replicate existing measures. Hence, we included traditional proximal home environment measures as well as ecocultural assessment. The traditional measures of home environment we employed represent three different theoretical approaches to the quantification of home environment: (a) the study of environmental process or reinforcement analysis of learning environment; (b) the study of general psychosocial climate of the home as perceived by the family members, a theme that can be traced to the need–

**Table 1**
**Ecocultural Factors and Measures**

| Factor analysis[a] | Econiche domain[b] | Ecocultural factor[c] | Subdomain | Factor loading |
|---|---|---|---|---|
| I | 1 | Socioeconomic status SESF | Income (INCOME) | .572 |
| | | | Occupational Status (O-STAT) | .943 |
| | | | SES (Hollingshead SES) | .933 |
| | | Careerist work orientation CAREER | Career Attitude (C-ATTITU) | .609 |
| | | | Employment Status (E-STAT) | .835 |
| | | | Work Attitude (W-ATTITU) | .854 |
| II | 2 & 3 | Multiple Service Usage SERVICE | Funding of Services (FUNDSERVE) | .505 |
| | | | Instrumental Response to Services[d] (INSTRESP) | .521 |
| | | | Multiple Service Involvement[d] (SERVINV) | .816 |
| | | Structuring of the Home Environment STRCTE | Families' Attempts to Structure Environment (ENVATMP) | .557 |
| | | | Safety/Convenience of Neighborhood | .516 |
| | | | Complexity of Transportation[d] (COMPTRAN) | .412 |
| III | 4 & 5 | Supplemental Help for Family FAMILYH | Interdependence/Sharing (SHARE) | .514 |
| | | | Family Helpscore (COUPLE) | .987 |
| | | Help Available Within Family COUPLEH | Childcare Help–Family (CHELPFA) | .907 |
| | | | Couple Helpscore (COUPLE) | .571 |
| | | Degree of Workload Related to DD Child WORKLD | Childcare Load–TC (CLOADTC) | .652 |
| | | | Childcare Load–Family (CLOADFA) | .663 |
| | | | Taskload & Complexity Score (TASK) | .697 |
| IV | 6, 8, & 9 | Connectedness of Family QCOUPLE | Concordance[d] (CONCORD) | .966 |
| | | | Father Involvement (FAINVOL) | .740 |
| | | | Father Involvement–Transportation (FTRANS) | .369 |
| | | Variety and Amount of Formal and Instrumental Help VAR-AMT | Functional Support[d] (SUPPORT) | .486 |
| | | | Formal Support Network (FSNET) | .975 |
| | | | Instrumental Involvement (INSTINV) | .524 |
| V | 7, 10, 11, & 12 | Integration of Child into Nondisabled Network SINTEGRA | Social Integration[d] (INTEGRA) | .965 |
| | | | Diversity of Cultural Influence (DIVERSE) | .478 |
| | | | Nonprofessional Source Re Diagnostic History (NSOURCE) | .337 |
| | | Integration of Child into Disabled Network DINTEGRA | Disabled Peer (DISABPER) | .572 |
| | | | Professional Sources (PSOURCE) | .893 |
| | | High Use of Information from Professionals INFORM | Amount of Information (AMTINF) | .826 |
| | | | Social Protection[d] (PROTECT) | .331 |

[a]Five separate factor analyses were performed on a total of 45 subdomain sources. [b]Twelve econiche domains were postulated by the ecocultural theory of family accommodation (Weisner & Gallimore, 1989). [c]A total of 12 ecocultural factors were identified by means of 5 separate factor analyses. [d]Subdomains generated by prior factor analysis.

press theory of Murray (1938); and (c) decades of research on the association between child-rearing attitudes of parents and the development of children, which may be traced through works by Schaefer and Bell (1958), Kagan and Moss (1962), Yarrow, Campbell, and Burton (1968), Baumrind (1971), and others.

The traditional measures of home environment employed in this project included the Home Observation for the Measurement of Environment (Caldwell & Bradley, 1984), the Home Quality Rating Scale (Meyers, Mink, & Nihira, 1990), the Family Environment Scale (Moos, Insel, & Humphrey, 1974; Moos & Moos, 1986), the Family Adaptability and Cohesion Evaluation Scale (Olson, Partner, & Lavee, 1985), and the Marital Satisfaction subscale of the Enriching and Nurturing Relationship Issues, Communication and Happiness—Enrich (Olson et al., 1982).

The Home Observation for the Measurement of Environment, an observational inventory for families of preschool children, yields eight subscale scores: Learning Stimulation, Language Stimulation, Physical Environment, Warmth and Affection, Academic Stimulation, Modeling of Social Maturity, Variety of Experience, and

Acceptance. This measure has its roots in the behavioristic tradition of the study of environmental process and reinforcement analysis of the learning environment.

The Home Quality Rating Scale consists of 26 Likert-type rating scales designed to assess child-rearing attitudes and family adjustment to the child with developmental disabilities on the basis of an interviewer's observations and impressions. This scale includes various environmental qualities such as Harmony of the Home, Quality of Parenting, Concordance in Support of Childcare, Awareness of Disability, and Quality and Safety of the Physical Environment. The Home Quality Rating Scale has its roots in the tradition of research on child-rearing attitudes and values and their influence on the development of children.

The Family Environment Scale, a well-known measure of the psychosocial climate of the home, tends to overlap the two general dimensions of Family Adaptability Cohesion Evaluation Scale, namely, Cohesion and Adaptability. Therefore, only the three subscales of the Family Environment Scale that are not represented in the Family Adaptability Cohesion Evaluation Scale were included in this study (i.e., Achievement Orientation, Expressiveness, and Moral–Religious Emphasis).

### *Analytical Procedures*

The relation between the ecocultural factors and traditional measures of home environment was investigated through correlational analysis and factor analysis. The contribution of these two sets of variables was further examined in terms of their relation to the developmental status of the children as measured by the Gesell Developmental Quotient and the Communication and Daily Living Skills subscales of the Vineland Adaptive Behavior Scales. The results of hierarchical multiple regression analyses are reported in the section "Second-Order Factors and Child Characteristics." The relation between the ecocultural factors and the child's developmental status was examined by stepwise multiple regression analysis and is reported in the section "Ecocultural Factors and Child Developmental Status."

## Results

### *Descriptions of Ecocultural Factors*

Descriptions of the ecocultural factors rest upon the subdomains and their specific items. Note that the final 12 factors were defined strictly by factor analytic procedures, drawing upon a broad set of items suggested by ecocultural theory and the literature on families and children with disabilities. Factor scores for individual families were estimated by multiplying the standard scores for the original variables by the rotated factor score coefficients (Dixon, Brown, Engelman, Hill, & Jennrich, 1988).

*Socioeconomic Status* was defined by family income and parent's occupational status using the measure of SES developed by Hollingshead (1975). This factor can be interpreted as a traditional measure of SES.

*Career Work Orientation* (CAREER) was defined by subdomains that indicate a careerist orientation on the part of the parents. A high score indicates that the mother's or father's work is a desirable career or calling for them and not merely a means of getting income.

*Multiple Service Usage* (SERVICE) was defined by subdomains that indicate the availability and use of services for the child with developmental delays. A high score indicates multiple service involvements of the family.

*Supplemental Help for Family* (FAMLYH) was defined by subdomains that suggest supplemental family help, such as use of a housekeeper, older siblings, and grandparents.

*Help Available Within Family* (COUPLEH) was defined by subdomains that indicate the availability of help for domestic activities, including help by the

spouse and siblings of the child with delays. A high score indicates that the husband, siblings, or other relatives assist the mother in family domestic activities impacted by the child with developmental delays.

*Structuring of the Home Environment* (STRCTRE) was defined by subdomains that indicate the family's attempts to structure their home environment for the child with developmental delays. Parents with a high score work to organize the home environment physically and structure family activities in order to assist the child.

*Family Workload Related to the Child With Developmental Delays* (WORKLD) was defined by subdomains that indicate the workload on the family required to care for the child with developmental delays. Workload includes the complexity of care required, the number of child problems requiring care, the physical effort required, and the coordination required. A high score on this factor indicates a higher overall workload effort by the family.

*Connectedness of Family* (QCOUPLE) was defined by subdomains that indicate parental concordance in childcare efforts and the father's support and participation in those efforts. A high score indicates a family judged to be connected and together, with high father participation in activities related to the child with delays.

*Integration of Child Into Nondisabled Network* (SINTEGRA) was defined by subdomains that indicate the effort to provide the child who has delays with normal experiences and parental efforts to seek information from nonprofessional sources. A high score suggests that parents have integrated the child into normalizing networks, in addition to or instead of those designed for children with disabilities. These parents tend to rely on nonprofessional sources of information in addition to professional sources.

*Integration of Child Into Disabled Network* (DINTEGRA) was defined by subdomains that indicate the effort to utilize special services for children with developmental delays and parental reliance on professional sources. A high score indicates that parents have integrated the child into networks specifically for children with disabilities and are getting information from professionals.

*Variety and Amount of Formal and Instrumental Help* (VAR–AMT) was defined by subdomains that indicate the use of a formal support network and instrumental help. A high score suggests that parents have support from a variety of professionals and programs as well as from church, spouse, or partner, and other childcare givers.

*Use of Information From Professionals* (INFORM) was defined by subdomains that indicate information-seeking regarding the child's diagnosis and prognosis and parental efforts to protect the child from negative social attention. A high score suggests that a family has concentrated on getting information regarding the child and his or her condition and that this information came primarily from professionals.

## Ecocultural Factors and Traditional Measures of Home Environment

Correlational analysis indicated moderate or low but statistically significant correlations (.20 to .50) between the traditional measures of home environment and several ecocultural factors. In order to identify specific sources of these covariances, we performed a factor analysis on the traditional measures of home environment and the 12 ecocultural factor scores. The correlation matrix was submitted to the maximum likelihood factor extraction, followed by the varimax rotation to Kaiser's criterion. The analysis delineated 10 interpretable second-order factors listed in Table 2. (These 10 second-order factors have been labeled by letters to distinguish them from the 12 ecocultural factors.) This factor analysis included the 12 ecocultural factor scores and 19 traditional measures of home environment. Because there were 102 fami-

**Table 2**
**Ecocultural Factors and Traditional Measures of Home Environment: Second-Order Factors**

| Factor | Loading[a] |
|---|---|
| Based on ecocultural factors only | |
| Factor A: Seeking Information and Services for Handicapped Child; Family Workload | |
| SERVICE—Multiple service usage (ECF) | .831 |
| DINTEGRA—Integration of children into disabled network (ECF) | .706 |
| INFORM—Use of information from professionals (ECF) | .701 |
| WORKLD—Degree of workload related to DD child (ECF) | .682 |
| Openness and awareness of disability (HQRS) | (.486) |
| Factor B: Active Assistance Within Family | |
| COUPLEH—Help available within family (ECF) | .964 |
| QCOUPLE—Connectedness of family (ECF) | (.366) |
| STRCTE—Structuring of the home environment (ECF) | (.360) |
| Factor C: Career Orientation of Parents | |
| CAREER—Careerist work orientation (ECF) | .631 |
| SESF—Socioeconomic status (ECF) | (.425) |
| VAR-AMT—Variety and amount of formal and instrumental help (ECF) | (.428) |
| Jointly-defined, combining both ecocultural factors and traditional measures | |
| Factor D: Family Cohesion and Marital Satisfaction | |
| Cohesion (FACES III) | .776 |
| Marital satisfaction (ENRICH) | .722 |
| QCOUPLE—Connectedness of family | .595 |
| Expressiveness (FES) | .546 |
| Acceptance (HOME) | (.357) |
| Concordance in support of childcare (HQRS) | (.324) |
| Factor E: Socioeconomic status | |
| Residential area (HQRS) | .801 |
| SESF—Socioeconomic status (ECF) | .647 |
| Physical environment (HOME) | .637 |
| Residential environment (HQRS) | .508 |
| STRCTE—Structuring of the home environment (ECF) | .402 |
| Factor F: Religious Affiliation and Instrumental Support | |
| Moral-religious emphasis (FES) | .962 |
| VAR-AMT—Variety and amount of formal and instrumental help (ECF) | .649 |
| Based on traditional home environment measures only (TRAD) | |
| Factor G: Cognitive-Educational Stimulation | |
| Academic stimulation (HOME) | .966 |
| Learning stimulation (HOME) | .676 |
| Language stimulation (HOME) | .547 |
| Variety of experience (HOME) | .475 |
| SINTEGRA—Integration of child into nondisabled network (ECF) | .388 |
| Factor H: Harmony of Parenting and Awareness of Disability | |
| Harmony and quality of parenting (HQRS) | .760 |
| Openness and awareness of disability (HQRS) | .708 |
| Concordance in childcare (HQRS) | .371 |
| Factor I: Affective Quality of Parent–Child Interaction | |
| Modeling of social maturity (HOME) | .862 |
| Warmth and affection (HOME) | .568 |
| Acceptance (HOME) | .451 |
| Factor J: Achievement Orientation | |
| Achievement orientation (FES) | .444 |
| INFORM—Use of information from professionals (ECF) | (.376) |

*Note.* ECF: Ecocultural Factor, HQRS: Home Quality Rating Scale, HOME: Home Observation for Measurement of Environment, FES: Family Environment Scale, FACES III: Family Adaptability and Cohesion Evaluation Scale III, ENRICH: Enriching and Nurturing Relationship Issues, Communication and Happiness.
[a]Parentheses indicate secondary loadings.

lies in the sample, there was a subject-to-variable ratio of 3.3:1. Although this is not a favorable subject-to-variable ratio for common exploratory factor analyses, it was considered to be within the acceptable range for factor analysis employed as a method for data reduction and for structuring the data in preparation for subsequent hierarchical multiple regression analyses. The factor analysis was not intended to establish construct validities of the second-order factors. For this reason, these second-order factors may not be generalizable beyond the context of this study.

Second-order factors A, B, and C were primarily defined by the ecocultural factors only. They appear to represent three salient dimensions: (a) seeking information and services for the child with delays and the family workload (Factor A); (b) active family assistance, including assistance in domestic work and childcare by the father, siblings, and others (Factor B); and (c) career orientation of parents (Factor C). Emergence of these three second-order factors suggests that the ecocultural factors describe families in ways that are different from the traditional measures of home environment included in the present study.

Three other factors were defined *jointly* by the ecocultural factors and the traditional measures. They were Factor D, Family Cohesion and Marital Satisfaction; Factor E, SES; and Factor F, Religious Affiliation and Instrumental Support for the Family. These three factors were evidently the primary sources of covariations among the traditional family environmental measures and the ecocultural measures.

The remaining four factors, G, H, I and J, were defined primarily by the traditional measures of home environment. Factor G represents cognitive stimulation and the learning opportunities at home, a salient second-order factor in the Home Observation for the Measurement of Environment inventory. Factor H represents harmony and quality of parenting and awareness of the child's disability, a second-order factor measured by the Home Quality Rating Scale. Factor I represents the affective quality of parent–child interaction, measured by the Home Observation for the Measurement of Environment inventory. Factor J represents another well-known dimension, achievement orientation, measured by the Family Environment Scale. The fact that these four second-order factors were defined primarily by the traditional measures of home environment again suggests the uniqueness of the ecocultural factors and their statistical independence from the traditional measures of home environment.

## *Second-Order Factors and Child Characteristics*

Having found some second-order factors defined by ecocultural measures only, some defined by traditional home environment measures only, and some defined by a combination of both, we next examined the relations between each of these sets of factors and the children's developmental status by means of a series of hierarchical multiple regression analyses. In these analyses, the factor scores for the 10 second-order factors were entered into the regression equation in a hierarchical manner. The dependent variables were the Gesell DQ, the Vineland Communication Skills scale, and the Vineland Daily Living Skills scale. The Gesell DQ was employed as a child outcome measure because (a) it was considered the most appropriate measure (as compared to the Stanford-Binet Intelligence Scale or the Wechsler Intelligence Scale for Children-Revised (WISC–R) of developmental level for our sample (i.e., children with ages ranging from 32 to 55 months and with significant developmental delay), and (b) in a previous longitudinal study of young children with developmental delay (Project REACH: Bernheimer & Keogh, 1988), the Gesell was found to predict the developmental delay of these children at school age. The two Vineland subscales—Communication Skills and Daily Living Skills—were also used as child outcome measures because (a) the development of language and communication skills is a critical issue for families of a child with developmental delay (therefore, two different perspectives of language development—the Gesell and the Vineland—were used to provide a comprehensive assessment of the child), and (b) the Daily Living Skills scale is a measure of an important area of child development not adequately represented in the Gesell. The two other Vineland subscales—Motor Skills Domain and Socialization Domain—were considered to be adequately represented by the Gesell.

In the initial set of hierarchical mul-

tiple regression analyses, the ecocultural factors were entered into the equation first, the traditional factors second, and the combined factors last to predict each child's outcome scores. In Figure 1, *Ecocultural Factors* refers to the first three factors listed in Table 2: Factor A—Seeking Information and Services for Handicapped, Factor B—Accommodation Focus and Family Resources, and Factor C—Career Orientation of Couple. *Combined Factors* refers to the next three factors in Table 2, representing both ecocultural and traditional family measures. These three factors are Factor D—Family Cohesion and Marital Satisfaction, Factor E—Socioeconomic Status, and Factor F—Religious Affiliation and Instrumental Support. *Traditional Factors* in Figure 1 refers to the last four factors listed in Table 2: Factor G—Cognitive–Educational Stimulation, Factor H—Harmony and Quality of Parenting, Factor I—Affective Quality of Parent–Child Interaction, and Factor J—Achievement Orientation. Figure 1 shows that the relative contribution of the ecocultural factors is greater in predicting Gesell DQ and Vineland Daily Living Skills than in predicting Vineland Communication Skills.

It is well known that the proportion of predicted variances in multiple regression analyses is directly influenced by the order of entry of the predictor variables into the equation, especially when the predictors are correlated with each other. In order to test the stability of the proportions of predicted variance depicted in Figure 1, we repeated the hierarchical regression analyses by counterbalancing the order of entry of the ecocultural and traditional factors. Thus, in the second analysis, the traditional factors were entered first, the ecocultural factors second, and the combined factors last. The result was almost identical with the first analysis for all three child outcome measures, indicating the virtually independent contributions of all three factors in predicting these child outcome measures.

The heights of the bars in Figure 1 indicate the total predicted variances. Although only 25 to 30% of the total variances in children's developmental status was predicted by all of the environmental variables, about 30 to 60% of the predicted variance, depending on the outcome measures, was accounted for by the ecocultural factors. Furthermore, the percentage of

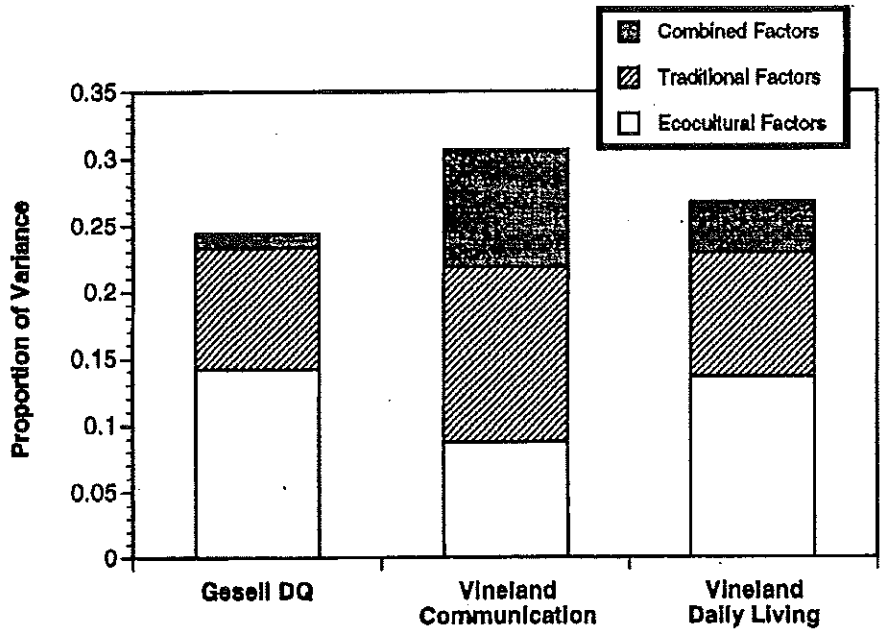


*Figure 1.* Hierarchical regression analysis predicting child's developmental status.

predicted variance remained stable over the two alternate orders of entry into the hierarchical regression analysis. The stability of the predicted variance indicates that there is little redundancy between the ecocultural factors and the traditional measures of home environment.

## *Ecocultural Factors and Child's Developmental Status*

The results indicate that the three second-order ecocultural factors each make a unique contribution in predicting all three child outcome measures. These three second-order factors represent 6 of the 12 ecocultural factors: Career Work Orientation, Multiple Service Usage, Help Available Within Family, Family Workload Related to the Child With Developmental Delays, Integration of the Child into Disabled Network, and Use of Information From Professionals. Four other factors that, in combination with the traditional measures, contributed to the prediction of child outcome measures were SES, Structuring of the Home Environment, Connectedness of Family, and Variety and Amount of Formal and Instrumental Help.

Having established the uniqueness of the ecocultural factors, we returned to the 12 ecocultural factors (see p. 552) in order to further examine the relation of the developmental status of the children with developmental delays to each of the ecocultural factors that have been derived from the ecocultural model of family ecology (Weisner, 1984). Gesell DQs, along with Vineland Communication Skills and Daily Living Skills subscores, were used as the dependent variables in a series of stepwise multiple regression analyses. These analyses focused on the relative importance of the 12 ecocultural factors as predictors of variance in the child's developmental status. As shown in Table 3, the child's developmental status was significantly related to five of the ecocultural factors, $p < .01$. The significant factors identified by the analyses were Integration of Child Into Nondisabled Network (Factor 9), Multiple Services Usage (Factor 3), Integration of Child Into Disabled Networks (Factor 10), Degree of Workload Related to Child With Delays (Factor 7), and Supplemental Help for Family (Factor 4). (Rather than 12 ecocultural factors, 9 were used as independent variables in this analysis because the data for the remaining 3 factors—Use and Availability of Help Within Family, Quality of Father and Family Involvement, and Amount and Variety of Formal and Instrumental Support for Family—were not available from single-parent families. Inclusion of these three factors would have reduced the number of subjects in this analysis from about 100 to 80 or fewer. Nevertheless, an analysis using all 12 ecocultural factors with a reduced number of subjects indicated that these 3 factors did not contribute significantly to the predicted variance of the child's developmental status as compared to the 5 that did; moreover, the pattern of findings remained substantially the same. Consequently, we do not believe that the inclusion of these 3 factors would have changed the

**Table 3**
**Ecocultural Factors and Developmental Scores ($N$ = 90)**

| Child's development | $R$ | Beta coefficient | Ecocultural factor |
|---|---|---|---|
| Gesell DQ | .47 | .50 | Integration Into Nondisabled Networks (SINTEGRA) |
| | | −.46 | Multiple Services—Use and Availability (SERVICE) |
| | | −.28 | Integration Into Disabled Networks (DINTEGRA) |
| Vineland Communication[a] | .47 | .39 | Integration Into Nondisabled Networks (SINTEGRA) |
| | | .28 | Help for Family—Use and Availability (FAMILYH) |
| | | −.19 | Family Workload Re DD Child (WORKLD) |
| Vineland Daily Living[a] | .52 | −.26 | Integration Into Disabled Networks (DINTEGRA) |
| | | .33 | Integration Into Nondisabled Networks (SINTEGRA) |
| | | −.25 | Family Workload Re DD Child (WORKLD) |

[a]Age equivalent.

results of this analysis.) These results may be interpreted as indicating the concurrent validity of the ecocultural factors for differentiating families of children with delays in different ecocultural circumstances.

## Discussion

The factor analysis of the ecocultural factors and the traditional measures of home environment yielded three separate categories of second-order factors: the ecocultural factors, the traditional measures, and combinations of both. The fact that the ecocultural factors and the traditional measures emerged as different second-order factors indicates that the ecocultural factors are measuring salient aspects of family different from those assessed by traditional measures of home environment.

The three second-order ecocultural factors seem to represent (a) the family's attempt to seek information and services for the child with developmental delay, (b) the amount of help available within the family, and (c) the career and work orientation of the parents. Four salient and well-known dimensions of traditional measures (cognitive and educational stimulation, affective–emotional quality of parent–child interaction, harmony and quality of parenting, and achievement orientation) were found to be independent of the newly developed ecocultural factors. These results clearly indicate the convergent and discriminant validities of the new ecocultural measures.

The remaining three second-order factors (Family Cohesion and Marital Satisfaction, SES, and Religious Affiliation) were defined jointly by ecocultural factors and traditional measures. As indicated previously, we employed the second order factor analysis as a means for data reduction in preparation for subsequent multiple regression analysis. Therefore, caution should be exercised in generalizing the nature of these second-order factors beyond the context of this study.

The second analysis was conducted to answer the following question: What are the relative contributions of the ecocultural factors and the traditional measures in predicting a child's developmental status? We found that the ecocultural factors predicted significant portions of the variance in the child's developmental status and that the ecocultural factors measured aspects of families that are not measured by the traditional home environment measures relevant to child development.

The last analysis was conducted to determine the contributions of individual ecocultural factors in predicting the child's developmental status. Five of the 12 ecocultural factors were significantly related to the child's developmental status, which was positively related to the integration of a child with delay into nondisabled networks. Conversely, the child's developmental status was negatively related to multiple use of services, as well as to the integration of the child into disabled networks. The concurrent relation found between the types of service networks and the child's developmental status is likely to reflect the fact that the children with more severe impairments are more apt to use and be integrated into special services rather than that the special services make the children more impaired. The results also indicate that the availability of help for the family from outside sources is related to higher developmental status of the child. Although it is possible that the availability of help and the mother being employed may contribute to the child's higher developmental level, it is also possible that others are more likely to help, and mothers are more likely to be employed, in families in which the children have higher levels of functioning.

The ecocultural factors that predicted child's developmental status have much in common with related research demonstrating the importance of social support. For example, Dunst and Trivette (1990) have developed a conceptual model depicting the direct and indirect influences of social support on parent, family, parent—

child, and child functioning. Additional evidence for the relation of social support to child behavior and development has been provided by Affleck, Tennen, Allen, and Gershman (1986), Crnic, Greenberg, and Slough (1986), and Dunst, Trivette, and Cross (1986).

In general, there is an association between child developmental status measures, on the one hand, and, on the other, ecocultural indexes of impact on everyday family activities, kinds of networks and services, and workload. The ecocultural measures appear to describe ways in which families reorganize their everyday lives due to their child with developmental delay. The 12 factors include each of the three ecocultural dimensions proposed by ecocultural theory (resources and constraints, values and goals, and accommodation activities). These measures add a perspective to our understanding of family ecology and accommodation to delay that are not captured by other kinds of family assessments.

Similar sets of ecocultural factors were selected by the stepwise regression procedures for three different measures of child development, indicating the stability of the ecocultural measures in their abilities to account for child outcomes. At the same time, somewhat different orders of entry into the regression equations were chosen for the three different assessment measures of child development, indicating the sensitivity of ecocultural factors to the differential needs of, and stresses on, families of children with different types of developmental delay.

Results of the present study demonstrate that the ecocultural factors measure family dimensions that are different from, and complementary to, those assessed by traditional measures of home environment. The ecocultural factors appear to be sensitive to the needs of children with developmental delays as well as to the caregiving demands of their families. These dimensions provide a comprehensive view of the children's ecocultural context, combining parents' material resources and constraints, their values and beliefs about their circumstances, and their actual accommodations. Such dimensions will be a meaningful addition to the discourse between professionals, researchers, and parents of children with developmental disabilities.

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