EVALUATION OF FAMILY FUNCTIONING: DEVELOPMENT AND VALIDATION OF A SCALE WHICH MEASURES FAMILY COMPETENCE IN MATTERS OF HEALTH (EFF)

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The Evaluation of Family Functioning Scale (EFF) is a measure of family functioning in relation to health matters. It was developed primarily to help the community nurse assess the families whom she serves. While the authors were inspired in large part by the Family Coping Index (Freeman & Lowe, 1962), the actual EFF was developed, validated and used in a research project (Thibaudeau, Reidy, D'Amours, & Frappier, 1983) with disadvantaged families in order to make a diagnosis of the functioning of the family, and to plan nursing care. It was used regularly over time to measure change globally and with respect to certain health care functions .

Definition of Terms

The word health, as it is used here, has a broad meaning. It refers to physical, psychological and social well-being, the absence of illness, the appropriate utilization of health and welfare resources, the salubrity of the environment, and the practice of health behaviours relating to the prevention of illness and accidents, solution of health problems, the meeting of basic health needs (rest, etc.). The concept of health also includes the capacity to cope with the constant exigencies and crises of life and the ability to move toward self-actualization in a useful social role.

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The authors wish to thank Health and Welfare Canada for financial aid received.

The family is defined as a group which consists of one or two parents, united by the bonds of marriage or a stable relationship, and of a child or children. These people live together, they are related to each other in familial roles and share the same culture. The family is a subsystem of society to which it contributes by its reproductive, social, educative and economic functions; the family must both rely on it for support and in turn contribute to it.

Family functioning refers, in the context of this evaluation, to the interaction and cohesion within the family, to the ability of the family group to satisfy the physical, psychological and social needs of its members, to their capacity to face the stress situations of life and to their participation in community life. Such functioning can also be seen in terms of competence to fill those roles assigned to them by society; it is equally concerned with the responsibility assumed by each family member for himself and for the family (according to his age and abilities).

The Theoretical Framework

The family is the object of study of many different disciplines which in turn observe, describe and analyse it according to their own light.

In his review of methods to evaluate the family, Strauss (1978) presents various types of theoretical frameworks, guides, inventories, interview schedules to measure the couple, the parent-child relationships, the family or other subsystem of the family. Many authors from various disciplines had developed interesting tools which were not concordant with our framework or were not sufficiently tested to be utilized in a research project (Boardman, Lyzanski, & Cottrell, 1975; Brown & Rutter, 1966; Epstein, Bishop, & Levin, 1978; Geismar, 1964; Moos, Insel, & Humphrey, 1974; Pless & Satterwhite, 1975).

Authors in nursing who write about family functioning generally employ two main approaches to family analysis: the structural-functional approach closely related to systems theory (Friedman, 1981; Minuchin, 1974), or the interactional approach often used in family therapy (Haley, 1971; Jackson, 1968; Satir, 1967). We have, however, adopted an eclectic approach and have constructed our instrument, with a theoretical base composed of various orientations, with the "Family Coping Index" (Freeman & Lowe, 1962) as a starting point. This index developed by Friedman in collaboration with the Richmond VNA, is based on the concept of need for nursing care. It can be used for periodic evaluation of the family in terms of the following nine categories of care or difficulties encountered by the family (a) physical independence; (b) therapeutic competence;

(c) emotional competence; (d) knowledge of health conditions; (e) application of principles of hygiene; (f) attitude toward health; (g) family life; (h) physical environment; (i) use of community services.

We were greatly inspired by this instrument, particularly by its structure. We have retained most of the categories; removing some and adding others, we have also modified to a great extent the content of the criteria proper to each category. Finally, our evaluation guide is essentially different from that of Freeman & Lowe.

The refinement of our scale was dependent on numerous authors such as David (1980); Kelman (1965); Lazarus (1980); Pratt (1976); Robinson (1971). The work of these authors contributed both at a general level of conceptualization, for example concerning family dynamics, or at a more specific level such as health behaviours, coping, way of life or attitudes toward health. We turned also to Lewis, Beavers, Gossett, & Phillips (1976) who underlined the characteristics of the normal healthy family: (a) communication between members; (b) parental unity; (c) flexibility of role; (d) the ability to function in the presence of psychological stress; (e) the fundamental role of the mother to be the first to suffer from family disorganization; and (f) physical illness as a criterion of functioning.

It may be seen, from this short review (Thibaudeau et al., 1983, for a more detailed presentation), that we have adopted an eclectic approach, adapting certain notions from various authors or schools of thought, in order to be able to place the accent on those health dimensions which are part of the family's daily life, and to permit the elaboration of a broad theoretical base.

The Family Functioning Scale (EFF)

The EFF like the original index developed by Freeman and Lowe (1962) was composed of nine dimensions relating to various aspects of family functioning, which was judged in terms of the competence of the family to care for its health at that moment of its existence. These dimensions are as follows:

Dimensions of Family Functioning

A. Knowledge of health and illness.
B. Ability to solve health problems and prevent complications.
C. Health habits.
D. Attitudes toward health and health services.
E. Ability to cope with stressful situations.

F. Family life patterns.
G. Action on the physical environment.
H. Knowledge and utilization of community health and welfare resources.
I. Participation in community life.

Each dimension was evaluated in the preliminary version of the EFF by a scale of 1 to 5. The number 1 corresponds to the lowest level, and 5 to the highest level of competence. The description of each of the five levels, provided to help the nurse locate the family correctly on the scale, is not considered exhaustive. These descriptions are presented only as a guide and the nurse, in using the scale, must weigh the various behaviours relative to each category. In completing the evaluation, the nurse also describes in operational and concrete terms under the column "comments," the behaviours of the family which permitted her to scale it at a given level within each dimension.

However, the nurses using the scale did not find the five point scale sufficiently precise. For this reason, they were permitted to "place" their families on the midpoints between each of the five defined levels. The final version of the scale was in this way expanded from five to nine points (see Appendix A) allowing the total possible score to range from 9 to 81 (midpoint 45). A higher score indicates a higher level of competence; a lower score a lower level of competence.

The following schema represents the final version of the scale.

1	2	3	4	5	6	7	8	9
(Level defined)		(Level defined)		(Level defined)		(Level defined		(Level defined)
Low level of competence				Medium level of competence				High level of competence

Steps in the Validation Process

To be useful as a research tool, a family evaluation scale must be valid and reliable. It must also possess these characteristics if it is to be used for clinical purposes, even though internal reliability relative to the exclusivity of the dimensions is perhaps less important. The study of St-Félix Beauger (1978) reports, in detail, the steps taken to assure such reliability and validity. This study was completed with a different sample of public health nurses before the actual research with the disadvantaged families was undertaken.

First, for purposes of content validity, nine nurse experts studied the EFF in terms of its content, structure, relevance and appropriateness for regular use in a community health service. Several modifications, in terms of content and wording, resulted from this in-depth study.

Next, to assess concurrent validity, 12 nurses from three CLSC's (Community Local Service Centres) and one Community Health Department chose from among the families they followed, one which functioned well and one which functioned badly. Each nurse first evaluated her families globally on a graphic scale of one to five points, and then justified the evaluation, in some detail; she then used the preliminary version of the EFF. Test-retest validity was assured by repeating both types of evaluation (graphic scale and EFF) one month later. Further, she also collected data from eight senior public health nurses of an urban health service. They evaluated 100 of the families they were following, and repeated this evaluation with 85 of these families at the end of one month.

The analyses of these data yielded the following results:

1. a high level of agreement (85%) between the two judges who judged the concomitance between the two scales (Graphic Scale and EFF) and the comments which justified the assigned score (validity);

2. a correlation of 0.86% (Pearson r) between the nurses' global assessment of the families and their score on the EFF (validity);

3. a correlation of 0.95% (Pearson r) between the two sets of scores on the EFF completed one month apart (test, re-test reliability);

4. the dimension "Ability to cope with stressful situations" consistently scored the lowest of all the dimensions;

5. analyses of the frequency distributions indicated that the nurses consistently experienced greatest difficulty in assessing clients on three dimensions: "Coping," "Family patterns" and "Action on the physical environment";

6. analyses of a complementary questionnaire completed by the nurses using the EFF indicated that they liked to use the tool and found it to be most helpful in structuring their observations and in planning their care.

The study of St-Félix-Beauger (1978) also demonstrated that certain conditions are important for the appropriate utilization of the EFF by the nurse in community health. Of first importance is the understanding of family dynamics and structure and the ability to observe and to communicate effectively while helping clients clarify the meaning of

their behaviour. Further, the nurse must establish relationships between events and behaviours which are significant in order to interpret them in terms of the appropriate dimension of the EFF.

The description of the levels of the EFF (see Appendix B for example) was refined as a result of the analyses of the nurses' comments. However, the resulting final version used in the project with the disadvantaged families (Thibaudeau et al., 1983) differed little from the preliminary version.

Further analyses were carried out on data taken from our project with the disadvantaged families. First, an item analysis (as a measure of internal consistency) was carried out. The Cronbach alpha remained consistently high when the experimental and control groups were treated separately. (α: Gr Exp. = 0.8214, N = 45; α: Gr. Con. = 0.8605, N = 38, or combined α: 0.8593, N = 83). Further, the deletion of any one of the items (dimensions) did not result in any marked improvement in the level of α in any one of these three cases.

Next, a principal component analysis was carried out with 225 evaluations in order to examine the unidimensionality of the scale.

In a non rotated solution (using principal factor, no iterations), the first factor included all nine dimensions with factor loadings of 0.65 or more, and explained 62.7% of the variance. The remaining factors were not independent and explained only small additional proportions of the variation.

Dimension	Factor Loading
A	.79
B	.86
C	.83
D	.85
E	.80
F	.78
G	.79
H	.75
I	.65
% of variance	62.7

Factors are hypothetical constructs or variables that are assumed to underline a scale (or set of scales). Principal component analysis, like factor analysis, is a method used to determine the number and nature of these variables. The results just presented strongly suggest that there is a single construct underlying the nine dimensions of the EFF; that is to say it may be treated as a global measure of family competence in matters of health.

Relationship with other Measures and Variables

The relationships between the EFF and other variables, measured during the course of the project, were investigated. Three of these related to the mother's health or health ability; these correlated (Pearson r) significantly with either individual dimensions or total score of the EFF. The instruments used and variables measured were as follows:

INSTRUMENTS	VARIABLES MEASURED
Goldberg (GHQ)	Stress experienced by mother
Tension Scale	Tension experienced by mother (complement to GHQ, symptoms specific to this population)
Levenson's Locus of Control — Internal (I) — Powerful others (P) — Chance (C)	Belief in: — internal control of events — control by other — events occurring by chance
Hypothetical situations	Mother's ability to solve health problems
Social Functioning — Intensity of Social Network	— social interaction with relatives, friends, neighbours, etc.
— Intensity of social participation	— the frequency or degree of participation in social groups

The correlation coefficients and probabilities can be found in Table 1, where it may be seen that the total score of the EFF correlated negatively with Levenson's Chance Scale, and positively with the Hypothetical Situations and the Intensity of the Social Network.

Further, significant relationships (Pearson r) were also found between the dimensions of the EFF and the instruments used to evaluate some aspects of maternal or family health. Six of the nine dimensions correlated ($p \leqslant 0.05$) with the scale (Hypothetical Situations) which measured the mother's ability to solve health problems. These correlations ranged from 0.2065 for the dimension "Family life patterns," to 0.4006 for the dimension "Action on the physical environment." The other three dimensions "Ability to cope with stressful situations," "Knowledge and utilization of community resources," and "Social participation," were associated with the

Table 1

Pearson Correlation Coefficients (r), and Significance Levels, between the Dimensions and Total Score of the EFF and other Variables Related to the Health of Family Members.

Scales		Dimensions									Total score EFF
		A Knowledge	B Ability	C Habits	D Attitudes	E Coping	F Life pattern	G Environment	H H.serv.	I Part. social	
Goldberg (N = 82)						-0.1833[a]		0.2140 *			
Tension (N = 82)				0.2390 *				0.2376 *			
Levenson: (N = 82)	I							0.1206 *			
	P	-0.1303 *							0.1844		
	C	-0.2693***	-0.1927 **	-0.1561 **	-0.1250 *	-0.2060 **	-0.1981 **	-0.1901 **		-0.1689 **	-0.2218 **
Hyp. sit. (N = 82)		0.3908***	0.3434***	0.2985 **	0.2681 **	0.1870[a]	0.2065 *	0.4006***	0.1839	0.2020	0.4064***
Soc. funct. (N = 82)											
Soc.network				0.2462 *					0.3797***	0.4263***	0.2939***
Soc. part.										0.2189 *	

a $p \leq 0.10$
* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$

Hypothetical Situations but only with a p 0.10. In clinical terms, what does this mean? The various aspects of a family's functioning in relation to health matters are related to and, to some extent, can be predicted by the mother's ability to solve health problems.

Levenson's Locus of Control (Internal and Powerful Others) were each significantly ($p \leqslant 0.05$) and positively correlated with only one of the dimensions of the EFF, (Internal with "Effect on the physical environment," and Powerful Others with "Knowledge of health and illness"). However, the Chance Scale was negatively related ($p \leqslant 0.05$) to all but the dimension "Knowledge and utilization of community resources."

The instruments used to measure social interaction and tension also show positive correlation with several of these dimensions. It is interesting to note, however, there is a negative ($p = 0.093$) correlation between the Goldberg Scale (GHQ) which measures stress of the mother and the family's "Ability to cope with stress."

While significant relationships were not found between the global score of the EFF and the tests used to evaluate the health of school and pre-school children in this project, some (weak) significant relationships were found between several of the dimensions and certain of these tests. Both Glidewell's scale (Mother's evaluation of health problems in the school child) and the Health behaviour of children scale (Mother's evaluation of health problems in the pre-school child) correlated negatively with the family's scores on "Patterns of family life." The former r was equal to -0.2292, $p = 0.078$, the latter r was -0.1879, $p = 0.095$.

A second pair of (weak) significant correlations occurred between the dimension "Knowledge and utilization of community resources" and both the Butler Scale (teacher evaluation of child's health — as a positive concept), and the Observation of the behaviour of the 2-5 year old child (nurse's evaluation of problems). The former correlation was 0.2456, $p = 0.056$, the latter -0.2098, $p = 0.062$.

Further, family competence as measured by the EFF was found to be related to the education level of the mother. It seems to discriminate between families with mothers who have only primary ($N = 40$) as compared to secondary ($N = 44$) level education (Prim. $\bar{x} = 29.35$; second. $\bar{x} = 34.6$; sig. diff. between the two $\bar{x}$, $p = 0.01$). It also discriminates between families who have been on welfare for less than two years ($N = 31$), and those who have been on welfare for two years or more ($N = 35$) at the time of the evaluation (less than two years, $\bar{x} = 35.66$; two years or more, $\bar{x} = 29.9$; sig. diff. between the

two $\bar{x}$, $p = 0.4$). Type of family (one parent/two parents), age of the parents, source of revenue, general condition of the home are not significantly associated with the level of EFF. It would seem then that the family which functions well in health matters tends to have a mother with a higher level of education but at the same time the family's competence has a tendency to deteriorate the longer the family is on welfare.

Functioning of Disadvantaged Families

As mentioned earlier, the EFF was developed for use in a research project with disadvantaged families. This was a project with a quasi-experimental design (45 experimental, 38 comparative families). The experimental families were cared for, in their homes, by nurses prepared to apply a model specifically designed for the project.

It was found that before the nursing intervention began (Time 1), the comparative group ($\bar{x} = 30.5$) scored significantly ($p \leqslant 0.05$) higher than the experimental group ($\bar{x} = 24.9$). By the end of the period of nursing intervention (Time 2), the relationship was reversed in that the score of the latter group was then higher. This increase in the mean score, during the experimental period, was significant (Time 2, experimental group $\bar{x} = 42.4$, comparative group $\bar{x} = 30.3$). The comparative group of families changed little over time.

While we do not pretend to have established standards, it should be noted that the mean of neither group, at both T_1 and T_2, even approaches the midpoint (45) of the scale. None of the experimental families at T_1, three at T_2, and two of the control families at both T_1 and T_2 had mean scores at or above the midpoint of the EFF (which may be seen by definition as a medium or acceptable level of family functioning). However, in a pretest, a group of middle class families with relatively fewer health and social problems did have a mean score above the midpoint. (The version of the scale used in this pretest was scored in terms of 5 points with a midpoint of 27; the mean score for the group was 30.6).

The theoretical midpoint on each of the nine dimensions falls at 5. The closest either group comes to this midpoint is with scores of 4.03, 4.13 T_2 respectively on the dimensions, "Action on the physical environment," and "Knowledge and utilization of community resources." The dimension on which both groups of families scored the lowest, at both T_1 and T_2 was that of "Ability to cope with stressful situations."

Each dimension represents an aspect of family competence. While it may be concluded that the competence of the families of the experimental group did increase over the course of the application of the model, did this increase in ability vary from one dimension to another? The answer to this question may be found by examining the scores by dimension for the experimental group (the differences for the comparative group tend consistently to be too small). It may be seen, for example, that the dimensions which relate to the level of "Action on the physical environment" and their level of "Knowledge and utilization of community health and welfare resources," have the highest scores (as compared to the other seven dimensions) at both T_1 and T_2. On the other hand, the two types of competence which improved most over time were two of the lowest at T_1, "Ability to cope with stressful situations" and "Knowledge of health and illness."

It would seem then that the general tendency between T_1 and T_2 is a reversal of the relative positions of the experimental and comparative groups resulting from a significant increase in the $\bar{x}$ scores of the former and the stability or slight diminution over time in scores of the latter.

Discussion

In constructing the EFF scale, we began with the "Family Coping Index" and then went on to develop an appropriate conceptual framework. In using this eclectic approach, we were able to produce an instrument which reflected our clinical approach and which was both useful for the professional nurse and sufficiently reliable in order to measure change. Essentially, we wished to measure change in terms of nine types of behaviour. However, the results of our statistical analysis, the alpha coefficient and principal component analyses allowed us to treat the scale as unidimensional. Further, positive correlations betwen the scale, the ability of the mother to resolve health problems, and both the global scale and eight of the dimensions of the EFF to some extent support the concurrent validity of the tool.

We have, therefore, considered the EFF as a global measure of family competence, in which competence is defined as the ability of the family to satisfy the physical, psychological and social needs of its members, to face stressful situations and to participate in community life.

Other analyses were also carried out with the data from disadvantaged families who were experiencing difficulty in meeting the exigencies of daily life. While we found that the scale did discriminate between different types of families, we obtained low scores on all

dimensions of the scale. It would seem that the extreme poverty of these families overshadows the rest of their lives. In other words, all the scores of these families tend to be located at one end of the normal curve. Would we notice greater variation from one dimension to another in "normal" families or in families in more comfortable circumstances? It would be interesting to study groups of families of a more diversified nature, whether families from a different socio-economic milieu or more bi-parental families. At the same time, however, questions such as these, as well as results already obtained through multivariate analyses based on a multiple regression model have led us to believe that the next, immediate step in the development of the EFF is to refine a predictive model using the data we already have on hand.

One of the limitations of the EFF is related to its level of precision. It would perhaps, be useful to elaborate sub-scales for each dimension. However, in increasing the complexity of a scale, one also increases the difficulty in using it. The limitations of this scale, it seems, are more closely related to the conditions under which it is used, than to the scale itself.

Appropriate utilization depends in large measure on the ability of the nurse to observe a family, to understand the interaction between its members, to communicate directly and effectively with the family in a way which will clarify her perception of the situation. In other words, the nurse must be able to comprehend the dynamics and structure of the family. She must also be able to determine which behaviours belong to which dimension of the scale if the condition of exclusivity between dimensions is to be assured.

One of the limitations, in terms of the development of the scale, is related to the difficulty of having the same family evaluated by two health workers, whether two nurses or a nurse and a social worker, who know the family and who have observed the interaction between family members during the same period of time. When one considers the lack of personnel in community health, it seems, perhaps, of little use to contemplate further such measures of reliability.

In conclusion it would seem that, with some limitations, the EFF is internally reliable and possesses a certain degree of concurrent and discriminatory validity. It has been shown to be useful both as a clinical and a research tool.

REFERENCES

The Reference List for the English version is the same as that of the French version. See page 38.

RÉSUMÉ

L'évaluation du fonctionnement de la famille en matière de santé (E.F.F.)

L'échelle d'Évaluation du fonctionnement de la famille en matière de santé (E.F.F.) a été construite dans le but d'aider les infirmières en santé communautaire à structurer leurs observations des familles qu'elles soignent et à les guider dans leur évaluation des comportements familiaux. Bien que les auteurs se soient inspirés du "Family Coping Index" (Freeman & Lowe, 1962), l'échelle E.F.F. a été construite, validée et utilisée dans le cadre d'un projet de recherche (Thibaudeau, Reidy, D'Amours, et Frappier, 1983) auprès de familles défavorisées, pour diagnostiquer le fonctionnement de la famille en matière de santé et planifier les soins de l'infirmière. Elle a aussi été utilisée pour mesurer périodiquement le changement global et le changement de certains aspects spécifiques du fonctionnement de la famille en matière de santé. L'échelle comporte neuf dimensions chacune étant divisée en neuf unités de mesure. Le processus de validation est décrit (validité, concomitance, fidélité test-retest, consistance interne, et analyse des composantes principales, etc.), et les limites de l'échelle sont discutées.

BOSTON UNIVERSITY SCHOOL OF NURSING

SECOND ANNUAL NURSING SCIENCE COLLOQUIUM:
STRATEGIES FOR THEORY DEVELOPMENT II

March 21-22, 1985, Boston University, Boston, MA

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Appendix A

Evaluation of Family Functioning Code Sheet

Name of family _____ Date _____

Nurse _____ Agency _____

	Areas of functioning	Comments
A.	Health-illness knowledge 1 2 3 4 5 6 7 8 9	
B.	Ability to solve health problems and to prevent complications 1 2 3 4 5 6 7 8 9	
C.	Health habits 1 2 3 4 5 6 7 8 9	
D.	Attitudes toward health and health services 1 2 3 4 5 6 7 8 9	
E.	Ability to cope with stressful situations 1 2 3 4 5 6 7 8 9	
F.	Family life patterns 1 2 3 4 5 6 7 8 9	
G.	Action on the physical environment 1 2 3 4 5 6 7 8 9	
H.	Knowledge and use of community resources 1 2 3 4 5 6 7 8 9	
I.	Participation in community life 1 2 3 4 5 6 7 8 9	

Appendix B

Dimension B: Ability to Solve Health Problems and to Prevent Complications

This ability manifests itself in two fashions: (a) by the identification of a condition and of the gravity of this condition following observation, and by making a decision which will resolve the problem or improve the condition; (b) by acting to resolve the problem, protect those in the surroundings and prevent complications. These acts can be of a specific nature, such as giving medication for an infection, the isolation of a child to prevent the spread of the infection, helping a child who had reading difficulties, or of a general nature such as general hygiene and comfort measures.

LEVEL 1. The family is clearly incapable of evaluating the gravity of a situation and of giving appropriate care. It manifests negligent or *laissez-faire* behaviour in its observation and care of family members, or else it constantly has recourse to an emergency service for trivialities.

LEVEL 3. The family can identify an acute or evident condition (i.e. respiratory problems) but cannot carry out appropriate action other than having recourse to a health professional. It knows how to take the temperature with a thermometer but it does not know how to interpret the "degrees". Or else, it knows how to carry out a number of specific actions but neglects measures of a general order. It tends, above all, to neglect problems of a psycho-social nature.

LEVEL 5. The family responds partially to the needs of its members, or cares for some and neglects others. It observes and acts appropriately for the condition which it encounters often. It can carry out treatments but tend to neglect the prevention of complications.

LEVEL 7. The family recognizes most common conditions and can intervene appropriately. It does not appeal to health services unless necessary. It protects other members of the family against contagion. It pays some attention to problems of a psychological nature. It can appropriately give certain specific types of care and can also, to some extent, carry out a more general plan of care.

LEVEL 9. The family makes pertinent observations and correctly evaluates the gravity of the situation. It acts appropriately from a point of view of both specific and general care. It can call upon health agencies for assistance when needed. All the members participate in solving health problems according to their age and their abilities. They pay a great deal of attention to problems of a psychological nature.