Research Note 85-79

THE FAMILY SURVEY AS A DIAGNOSTIC INSTRUMENT

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The purpose of this paper is to document analyses done to make refinements in an instrument previously used for a May 1983 survey of 1,036 Army couples in the U.S. Army in Europe. The analyses were performed to determine strengths and weaknesses of the instrument, as well as to examine implications for use of data obtained from such an instrument. Sections of the instrument were assessed to determine whether the sections constituted actual scales. Results

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include reliability coefficients and relationships among the scales determined by factor analysis, intercorrelation, and step-wise regression. Results were examined in light of suggested refinements for the instrument, if it or sections of it are used in such research in the future. Recommendations include 1) future use of scales to analyze family bonding, strengths or weaknesses which have literature giving us the psychometric properties, and known relationships to other constructs, 2) revising items from the "Family Index of Coherence" to form a commitment to the Army scale, 3) using the literature on the psychological sense of community to develop scales for this variable, 4) using a known scale for job satisfaction, and 5) designing the next survey instrument so that multivariate scores can be more easily applied to groups of items or composite scores.

THE FAMILY SURVEY AS A DIAGNOSTIC INSTRUMENT

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Introduction

The survey instrument used in the 1983 ARI survey of Army Families in USAREUR was examined to determine if seven selected scales, as they appear in the survey format, actually possess the psychometric properties of scales. Scale at this point meant a group of items presented together under one heading in the survey instrument and using one response format for all items in the group. Two purposes guided this effort: 1) If scales could be demonstrated, the "value" of the survey will be enhanced, as composite scale scores can be used as diagnostic instruments in multivariate analyses; and, (2) scales identified can be selected or discarded for inclusion in subsequent surveys based on their psychometric properties, and on their relationship to other variables of interest in the research plans.

Analysis

Structure of the Scales

Seven scales were chosen after a review of the survey instrument, based on their face value to provide diagnostic information about Army families in general, the family in Europe, or satisfaction with the community. The scales are 1) Family Index of Coherence (FIC), 2) Social Support Index, 3) Community Life (examined as a possible community satisfaction scale), 4) Short-Term Family Separation (used as a measure of spouse independence), 5) Skills, 6) Expectations, and 7) Family Adaptability and Cohesion Evaluation Scale (FACES). Subsequently, an eighth scale, job satisfaction, was created from five items in the Community Life scale.

Each of these scales was subjected to an analysis of their reliability, estimated by Cronbach's coefficient alpha. Only the responses of the military members were used except when the FACES scale was considered. The FACES scale was not administered to the military member population, only to the non-military spouses. Items were deleted until the highest reliability coefficient was achieved.

Next, all the items which were retained for each scale were entered into a factor analysis. Only the responses of military members were analyzed. The FACES items (responses from the spouse population only) were not included in the factor analysis. The resulting factor loadings were examined to determine if the pre-selected scale groupings corresponded to the factor structure subsequently obtained.

Relationships Among the Scales

A second factor analysis was done using the composite scores as variables to examine whether the scale scores were generally tapping one or more than one constellation of factors or

constructs about Army families in Europe. An intercorrelation matrix was constructed using the composite scale scores as variables to further examine the extent of the relationships among the scales.

Diagnostic Ability of the Scales

Further surveys of Army families can be constructed in such a way that more inferences can be made about influences on Army families and about the relationships between various attitudes. Analyses were computed which serve as examples of areas for consideration in future studies, and which highlight changes in design needed in future survey instruments.

A second correlation matrix was constructed which included the composite scale scores and the variable "length of time in Europe during present tour," to look for areas of change over time in families in Europe.

Finally, regression analysis was used to further test the diagnostic ability of the scales. The scale scores, the profile items of "quantity of sponsorship," "belief in the NEO program," and community size were used as independent variables in a stepwise multiple regression analysis to construct an equation to predict community satisfaction (defined as the Community Life scale). Regression analyses were also computed using the additional scale scores, "quantity of sponsorship," and community size as independent variables to construct an equation to predict "intention to extend," (defined as Yes, No, and Maybe groups). The regression analyses on "intention to extend" were done for each rank grouping: Officer; NCO; and junior enlisted.

Results

Internal Structure of the Scales

Each scale was examined for reliability by the computation of Cronbach's coefficient alpha. In the FIC scale and the Social Support scale, items were deleted until the highest possible coefficient for the set of items was obtained. Table 1 summarizes the items which were retained, and the relatively high coefficients obtained for the scales. The coefficients are comparable to the coefficients obtained in McCubbin and Patterson (1983).

In order to test whether the items loaded into factors which were comparable to the groupings (scales) already established for the items, a factor analysis was performed on all the individual items in all the scales for military members' responses only (excluding the FACES items which had been answered by the spouse population only). Results of the factor analysis are summarized in Tables 2a, 2b, 2c.

Table 1

Scale Reliability Summary

Scale	Cronbach Alpha Standardized	Items Deleted
Family Index of Coherence (FIC)	.82	16 items: 2,3,5,8,11,13, 17,18,20,21,22, 23,25,26,28,29
Social Support Index	.83	6 items: 1,7,11,16,19,25
Community Life	.91	none
Short-Term Family Separation	.86	none
Skills	.86	none
Expectations	.73	none
FACES	.91	none
Job Satisfaction	.83	not applicable

Table 2

Factor Pattern of Seven Scales (Military Members Only)

	Scale Items	Highest Factor Loading Per Item			
I.	Social Support	3	5	6	15
02	In emergency, community willing to help		.50		
03	Good feelings about time spent with fam			.75	
04	SM feel part of family			.75	
05	Community helps people in trouble		.48		
06	Friends value SM and SM's ability		.51		
08	People can depend on each other in com.		.63		
09	Family seldom listens to SM problems			.60	
10	Com friends are part of activites		.54		
12	Friends may take advantage of SM		.50		
13	Living in community gives secure feeling		.51		
14	Family shows love and affection to SM			.69	
15	Feeling in community to not be friends		.60		
17	Not good community to raise children		.41		
18	SM important to friends as they're to SM		.51		
20	Role in community is active and involved		.46		
21	Friends really care and love me		.53		
22	Family doesn't understand SM			.65	
23	SM feels useful in community		.55		
24	SM friends dishonest in comments			.45	
II.	Family Index Of Coherence (FIC)				
01	It fam-Army conflict, Army first	.48			
04	Family planning for assignments				.44
06	Confidence in getting help for problems	.55			
07	Family has say in future assignments				.55
09	Family unsure whether to stay in Army	.48			
10	Plan for educ and work impossible	.60			Factor
12	Career hurt if fam voices needs	.46			10
14	Fam unsure if SM at home or gone				.62
15	Schedule unsure due to freq TDY				.68
16	Army treats SM & fam justly	.65			
19	Fam committed to Army lifestyle	.58			
24	Army takes care of its families	.62			
27	Army helps us understand hardships	.62			
30	Being in Army Can't be good for family	.52			

Table 2 (cont)

Factor Pattern of Seven Scales (Military Members Only)

Scale Items	Highest Factor Loading Per Item						
III. Community Satisfaction	4	7	8	11	12	13	14
01 Your present housing				.77			
02 Your present neighborhood				.67			
03 PX	.79						
04 Commissary	.78						
05 Child care services			.57				
06 Medical/dental services	.61						
07 Cost of living	.41						
08 Travel around and see places	.46						
09 Eat out with family & friends	.48						
10 Quality of ACS program	.51						
11 Quality of recreation program	.64						
12 Chance for SP to find a job	.42						
13 Quality of child education			.80				
14 Children's happiness			.80				
15 Spouses happiness	.46						
16 SM satisfaction with job		.54					
17 Amount of time with children			.72				
23 Fear of SM going to war						.69	
24 Youth activities			.61				
25 Fear family caught in war						.71	
26 Use of NCO/Off club	.38						
27 Quality and number of friendships	.37						
28 Number of financial problems							.54
29 Amount of crime							.48
30 Quality of marital relationship	.40						
31 Quality of chaplains' programs					.85		
32 Quality of church services					.86		
IV. Job Satisfaction							
18 Chances for promotion		.54					
19 Quality of unit training		.73					
20 Quality of unit leadership		.78					
21 Quality of unit morale		.68					
22 Unit readiness		.74					

Table 2 (cont)

Factor Pattern Of Seven Scales (Military Members Only)

Scale Items	Highest Factor Loading Per Item				
V. Expectations	1	2	7	9	10
01 Quality housing for family				.51	
02 Quality schools for kids				.52	
03 Time for fam togetherness					.56
04 A job I really like			.45		
05 Better chance for advancement			.41		
06 Chance to travel in Europe				.55	
07 Family chance to enjoy Europe				.53	
08 Quality Med/Dental services				.54	
09 Financial security & stability				.58	
VI. Skills					
01 Speak German or Italian language	.74				
02 Drive a car in USAREUR or SETAF	.46				
03 Use public transportation	.71				
04 Use the local telephone system	.73				
05 Order food from local restaurant	.76				
06 Understand local customs and laws	.73				
07 Use the local postal system	.76				
08 Use the train system in Europe	.75				
09 Shop on the economy	.67				
VII. Spouse Independence					
01 Sp handles/displines child		.58			
02 Sp gets jobs done at home		.70			
03 Sp uses Army & Civ stores		.64			
04 Sp offers support to child		.59			
05 Sp handles family finances		.71			
06 Sp keeps busy and does things		.71			
07 Sp makes decisions for the family		.75			
08 Sp maintains a positive attitude		.66			
09 Sp handles emergencies		.71			

The factor analysis with varimax rotation yielded 15 orthogonal factors which accounted for 63% of the total variance. The factor structure is summarized below in terms of the scales.

The Social Support scale is comprised of two factors with no items from any other scale loading on these factors. The factors represent items about support from the community (factor 5) and items about support from the family (factor 6).

The Short-term Family Separation (Spouse Independence) scale formed a 9-item factor (factor 2). The 9 skills items also formed a factor (factor 1).

The Expectations scale formed somewhat of a scattered factor pattern. The three factors represent: 1) an item about time for family togetherness (factor 10), 2) two items which factored with the job satisfaction items (factor 7), 3) and a 6-item general expectations scale (factor 9).

Ten of the 14 items in the FIC scale formed a factor (factor 3). Two of the items loaded with one other item from the Expectations scale (factor 10). The three items deal with time for the family to be together. Two of the FIC items comprised another factor (factor 15). The items were about planning future assignments.

The Community Life scale was the least "cohesive scale," loading on 7 various factors. One Community Life item loaded on the factor composed of the five-item job satisfaction scale (factor 7). (Although it was not done in the present analysis, that item should be grouped with the job satisfaction scale for any future tests of these scales.) A second Community Life factor was formed for items related to children (factor 8). The main factor within the scale was formed by 13 of the 27 items (factor 4). It appears to be a general community satisfaction or quality of life factor. The remaining eight items loaded into four different factors. Each factor contained two items: one factor on housing and neighborhood (factor 11); one on fear of war (factor 13); one on church programs (factor 12); and one on amount of crime and financial problems (factor 14).

Relationships Among the Scales

A second factor analysis with varimax rotation which used the composite scale scores as variables produced two factors in the scales. Sixty-seven percent of the total variance was accounted for by the two factors. Factor 1 consisted of FIC, Social Support, Short-term Family Separation (Spouse Independence), Skills, and Expectations. Factor 2 consisted of the job satisfaction items and Community Life. The FACES scale did not load above a criterion of .30 on either factor, and appears to be discrete from the above scales. Factor 1 could indicate that some global quality of Army Family functioning in USAREUR is being measured. These factors are summarized in Table 3.

Table 3

Factor Pattern of Scale Scores

Scale	Highest Factor Loading	
	Factor 1	Factor 2
Job Satisfaction		.89
FIC	-.83	
Social Support	.85	
Community Satisfaction		.88
Spouse Independence	.85	
Skills	.80	
Expectations	.70	
FACES	.13	

An intercorrelation matrix was constructed using the scale scores as variables. Table 4 summarizes the high degree of relationships among the scales. All the scales are correlated with the others ($p < .01$), except the FACES scale which has no relationship with the others except for a low correlations ($p < .05$) with Social Support, probably because of the factor of family support in the Social Support scale. An examination of the positive and negative correlations among the other scales could lead to hypotheses about the population for further study.

Diagnostic Ability of the Scales

A second correlation matrix was constructed to examine whether the scales had any relationship to the length of time a family has been in Europe. These scales generally do not discriminate among families based on that variable. The only correlations found were a moderate correlation ($r = .22$; $p < .01$) between time and the Skills scale, and a low correlation between time and Expectations ($r = .16$; $p < .05$).

The diagnostic ability of the scales was further examined by a stepwise multiple regression analysis to construct an equation to predict the dependent variable community satisfaction (defined as the Community Life scale). The variables "quantity of sponsorship," "belief in NEO," and community size were also used with the scales as independent variables. Table 5 summarizes the results of this analysis. All the variables entered into the equation significantly. A total of 49% of the variance in community satisfaction responses was accounted for. Job satisfaction accounted for 44% of the variance. Expectations accounted for the next highest amount of variance, 5%. As the job satisfaction scale was created from items in the Community Life group on the survey, there is contamination in the interpretation of this finding. The Community Life scale was formed from the remaining items which did not pertain to job satisfaction. The two scales are factorially independent. However, the suggestion is that some relationship may exist between community satisfaction and job satisfaction for the military member population. A more complete measure of job satisfaction should be used in future research to determine if job satisfaction has a real relationship to community satisfaction and to other constructs of interest.

A final test of the scales was made by using "intention to extend" as a dependent variable. Intention to extend was broken into three categories: "Yes," "No," and "Maybe." The independent variables were all of the scales, "quantity of sponsorship," and "community size." These variables were used to form an equation by stepwise multiple regression analysis. The analyses were done by rank.

A total of 17% of the variance in the response to the item "intention to extend" for ranks E1 to E5 was accounted for by

Table 4

Intercorrelation of Composite Scale Scores
(Military Members Only)

	Job Satisfaction	FIC	Social Support	Community Satisfaction	Spouse Independence	Skills	Expectations
Job Satisfaction	———						
FIC	-.32**	———					
Social Support	.41**	-.71**	———				
Community Satisfaction	.70**	-.35**	.44**	———			
Spouse Independence	.41**	-.65**	.71**	.41**	———		
Skills	.38**	-.58**	.65**	.40**	.70**	———	
Expectations	.48**	-.55**	.67**	.55**	.66**	.60**	———
FACES	.06	-.04	.15*	.08	.12	.07	.10

* $p < .05$
** $p < .01$

Table 5

Summary of Results of Stepwise Multiple Regression Analysis for the Prediction of Community Life Scores (Military Members Only)

Variables	R	R^2	R^2 change
Job Satisfaction	.66	.44	.44
Expectations	.70	.49	.05
Community Size	.70	.49	.00
Quantity of Sponsorship	.70	.49	.00
Social Support	.70	.49	.00
Spouse Independence	.70	.49	.00
Belief in NEO	.70	.49	.00
FIC	.70	.49	.00
Skills	.70	.49	.00
FACES	.70	.49	.00

these variables. Table 6 summarizes these findings. The FIC scale accounted for 10%, and Spouse Independence accounted for the next largest amount of the variance, 4%.

Table 7 summarizes the same analysis for ranks E6 to E9. A total of 11% of the variance could be accounted for. Again, the FIC scale and the Spouse Independence scale accounted for most of the variance in response, along with community size.

The same analysis for Officers produced a very different profile. A total of only 8% of the variance could be accounted for by these variables. However, the most significant variable was Expectations, accounting for 3% of the variance, with FIC second, accounting for 2%. Spouse Independence did not enter the equation for Officers. Table 8 summarizes this analysis.

Summary

The analyses above were computed for the dual purposes of 1) determining if selected subsections of the family survey instrument labelled as scales actually represented scales for which composite scores could be computed and used in multivariate analysis, and 2) to substantiate suggestions for the inclusion, deletion or substitution of new material in future research instruments.

The scales considered will be commented on individually in reference to their reliability, scale structure, predicted relationship to variables of interest in future research plans, and their long-range potential for indicating areas of intervention to improve the quality of life for Army Families in Europe.

Social Support

Nineteen items of the Social Support scale were grouped together for the current analysis. The resulting scale appears to be reliable and is composed of two discrete factors: Support from the community and support from the family. The scale loaded into a factor with the FIC scale, the Spouse Independence scale, Skills and Expectations scales when composite scores were used as variables. As suggested above, these may constitute unique measures of Army family life.

The concept of social support is very important in any analysis of coping strategies, and some measure of social support should be retained. We have no guarantee, however, that the scale is valid, that is, measuring what it says it measures. One option is to replace this scale with a family diagnostic instrument the qualities of which are known. A suggestion is the Family Relationship Index (FRI) (see Billings & Moos, 1982) which has high reliability (Alpha = .89), is correlated with other measures of social support, and is predictably related to individual levels of depression and psychosomatic symptoms. "The

Table 6

Summary of Results of Stepwise Multiple Regression Analysis for the Prediction of Intention to Extend (Yes, No Maybe) for the Ranks E1 to E5

Variables	R	R^2	R^2 change
FIC	.32	.10	.10
Spouse Independence	.36	.14	.04
Community Size	.39	.15	.01
Community Satisfaction	.39	.15	.00
Job Satisfaction	.40	.16	.01
Social Support	.40	.16	.00
Quantity of Sponsorship	.40	.16	.00
Skills	.40	.16	.00
FACES	.41	.17	.01
Expectations	.41	.17	.00

Table 7

Summary of Stepwise Multiple Regression Analysis for the Prediction of Intention to Extend (Yes, No, Maybe) for the Ranks E6 to E9

Variables	R	R^2	R^2 change
FIC	.24	.06	.06
Spouse Independence	.28	.08	.02
Community Size	.31	.10	.02
Job Satisfaction	.32	.10	.00
Social Support	.32	.11	.01
Community Satisfaction	.33	.11	.00
Quantity of Sponsorship	.33	.11	.00
Skills	.33	.11	.00
Expectations	.33	.11	.00
FACES	.33	.11	.00

Table 8

Summary of Results of Stepwise Multiple Regression Analysis for the Prediction to Intention to Extend (Yes, No, Maybe) for Officers

Variables	R	R^2	R^2 change
Expectations	.17	.03	.03
FIC	.22	.05	.02
Community Satisfaction	.25	.06	.01
Social Support	.27	.07	.01
Skills	.28	.08	.01
Community Size	.28	.08	.00
Job Satisfaction	.29	.08	.00
FACES	.29	.08	.00

FRI has been used to show that family resources can moderate the relationships between stressful life events and criteria of individual functioning," (p. 221). The study by Billings and Moos showed how this measure was used to evaluate the support of the family in improving the individual's ability to tolerate work stress. The FRI contains a subscale of family coherence.

An additional scale to measure community support could be derived from one of the social support factors in the original scale.

Family Index of Coherence (FIC)

This scale proved to contain a discrete factor for 10 of the 14 items used in this analysis. The scale appears to be reliable. It was the best predictor of intention to extend for enlisted members in the present analysis. Rather than measuring "family coherence," however, the 10 items seem to measure commitment to the Army based on their content. The FIC could be used in future research as measure of commitment to the Army.

Community Life (Satisfaction)

This scale formed several factors even with five job satisfaction items being removed. It appears to be a reliable scale. Because the items seem to measure attitudes about the quality of community services which are unique to Army communities, portions of the scale should be retained. The job satisfaction items should be removed from the scale: Items 18-22 and item 16.

Because of the emphasis by the Army Family Action plan on the Psychological Sense of Community, and Quality of Life, more items on these issues should be added and the constructs separated psychometrically. The literature on these topics which have received a great deal of attention in the past 10-15 years since the "birth" of community psychology, should be examined for reliable scales, whose psychometric properties have already been investigated.

Job Satisfaction

The five-item job satisfaction scale formed a unique factor, and is reliable. It also predicts 43% of the variance in the responses to the Community Life scale. This finding is contaminated by the fact that the job satisfaction items were drawn from the Community Life group of items. The remainder of the items were used to form a factorially separate Community Life scale. However, it is possible that the construct of job satisfaction could be highly related to community satisfaction in the military member population. These five job satisfaction items should be retained with item 16 from the Community Life scale due to their content which is specific to active duty military careers. However, given the rich literature on job

satisfaction and its relationship to job performance, absenteeism, turnover, etc., it is advisable to include a broader measure of job satisfaction in future surveys. A short measure of job satisfaction which could be included is the 20-item Minnesota scale the psychometric properties of which are well documented (Weiss, Dawis, Lofquist, & England, 1967).

Spouse Independence (Short-term Family Separation)

The scale formed a discrete factor, appears to be reliable, and taps an aspect of family life which is somewhat unique to military life, especially in foreign settings. It was also a significant predictor of intention to extend for the enlisted population in the current study. Retain this as is.

Skills

This scale is also unique in containing items specific to this population. It formed a discrete factor and a high reliability coefficient was obtained. Correlation analysis also showed that reported skills were greater for those with more time in country, across ranks, perhaps refuting the idea that the population under study tends to remain isolated and uninformed about their host country. It should be retained as is.

Expectations

The scale, while reliable, did not form a discrete factor. There was a correlation between Expectation responses and how long the military member had been in Europe, and there is a significant difference in Expectations among ranks (as found by Sanders[1]). Expectations was the best predictor of intention to extend for officers, of all the variables considered in this analysis. It also contributed to the prediction of intention to extend for enlisted members, and to the prediction of Community Life responses.

Given the rich literature and theoretical models available on expectations and their relationship to subsequent attitudes and behavior, (see for example the theories reviewed in Fishbein, 1975), it seems appropriate to expand the number of items on expectations, breaking it into subareas of interest (e.g., job, housing, culture shock, etc.). Specific areas where expectations were not met have already been identified from the first survey, and differences were found among ranks (Ozkaptan and Sanders, 1984). An expanded analysis of met and unmet expectations offers an avenue for future intervention.

[1]Sanders, W., ARI, FU, USAREUR. Personal communication, January 1984.

FACES

This scale, while highly reliable, did not relate to the other scales except for a low correlation with Social Support. It may be related to other research questions not considered in this effort, but it did not demonstrate any utility in the present analyses.

In conclusion, there may be other reliable scales in the survey instrument which should be retained in addition to those recommended here. And, there are other research questions where the scales confirmed in this effort can be tested as diagnostic instruments. The "diagnosis" of family functioning, quality of life, and psychological sense of community should be further investigated in terms of additional items or scales which can discriminate these constructs in this population. The measures of family functioning and social support in the current survey are first steps in this investigation, but are in need of refinement. The Community Life scale with some items deleted offers a possible Quality of Life measure. The Expectations scale appears to be a good diagnostic instrument, although some items should probably be deleted (3, 4, and 5). A short job satisfaction scale should be added. Finally, the Skills and Short-term Family Separation (Spouse Independence) scales should be retained. A factor of the FIC scale should be retained as a measure of commitment to the Army.

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