

Robert H. Weller, Florida State University

Measuring a woman's fertility performance is made much more complicated than a mere counting operation by the multidimensional nature of this performance. The present paper represents an examination of three dimensions of fertility performance and the manner in which they are interrelated as well as the extent to which they are associated with such demographic variables as current age, duration of marriage, and age at marriage. These three aspects of fertility behavior—which certainly do not exhaust the universe of its dimensions—are cumulative family size, expected completed family size, and desired family size.

The first represents the number of children a woman has borne by a specific point in time. The customary measure of cumulative family size is the number of children ever born. Although the determination of this number is a relatively straightforward matter, the use of cumulative family size presents a problem when the investigator wishes to analyze groups of women who have not completed their childbearing. It reflects differences in current age and may also contain the effects of differences in age at marriage, the duration of marriage, and differences in timing and spacing of births. Because of the desirability of having at least rough controls for these factors, the researcher who analyzes the differences in cumulative family size frequently finds the cell frequencies declining at an alarming rate as additional controls are introduced. Often the investigator must choose between controlling for extrademographic variables believed to be crucial in their independent explanatory power and controlling for demographic variables whose intervening influence is certain to be felt in the cumulative family size measure, e.g., duration of marriage, current age, and age at marriage.

One method of avoiding this particular pitfall when studying fertility behavior is to use expected completed family size. This involves several assumptions. One is that expected completed family size is a realistic estimate of the number of children a woman will have borne by the time she completes childbearing. Although this is often not the case with individual women, it is a fairly realistic assumption for aggregates of women (Westoff, Mishler and Kelly, 1957; Freedman, Whelpton and Campbell, 1959:218-219; Goldberg, Sharp and Freedman, 1959:376; and Whelpton, Campbell and Patterson, 1966:29).

Expected completed family size may be determined in several ways. One way is to determine the number of live births a woman already has experienced and add to this figure the number of additional children she expects to have. In the present study expected completed family size was determined through use of the question: "Altogether, how many children do you expect to have (from this present marriage)? Please count those you already have plus any others you

expect to have in the future." Those respondents who hesitated or who did not respond in numerical terms were given the additional instruction: "Well, just give me your best guess as to how many children you will have, in all."

The third dimension of fertility behavior considered in the present paper is desired family size. This probably is the most difficult dimension of fertility behavior to measure unambiguously, for in large part the response reflects the wording of the question used as well as any conditions implied or explicitly stated by the question. The question utilized in the present study is quasi-retrospective as well as hypothetical. The respondent was asked what her desired family size would be if she were just getting married. The question is retrospective in that presumably a woman's response reflects her own experiences (and those of her spouse) since she married (cf. Freedman, Coombs and Bumpass, 1965, for a demonstration of the extent to which family size desires change over the course of marriage in response to economic and social contingencies as well as in response to fertility experience and fecundity problems). The question is hypothetical in that it asks the respondent to imagine she were just getting married. Moreover, there is no way of determining what, if any, conditions and subsequent developments the respondent associates with this imagined union.

#### Source of Data

Data are taken from two representative samples of the population of the state of Rhode Island. The sampling procedure employed was a multi-stage, area probability sample of households. The data utilized in this study were obtained in the falls of 1968 and 1969 under the auspices of the Population Research Laboratory at Brown University, with a wide variety of information being collected with respect to general medical behavior, demographic behavior, and socioeconomic characteristics. A detailed discussion of the sample's design and the objectives and scope of the project may be found in Bouvier (1971) and Organic and Goldstein (1970).

The following analyses are limited to currently married females ages 20 through 49 who have been married only once, who have not been sterilized, and who know of no physiological reason they cannot have children. Even though they were obtained separately, the 1968 and 1969 samples have been combined and treated as one sample in order to increase the number of cases in the various cells. Organic and Goldstein (1970) have reported that the sampling technique utilized makes such a cumulation valid.

#### Results

The three measures of family size are presented in Table 1. With the exception of a difference in location between cumulative family size and the other two aspects of fertility behavior, the overall picture is that of

similarity between the three distributions.

In Table 2 it can be seen that only cumulative family size is even weakly related to the current age of the woman. This relationship is not linear, but reverses its slope somewhat after age 35-39. This suggests that cohort changes have been occurring in the cumulative family size of Rhode Island married females that are not fully evident in the cross-sectional data at our disposal.

A similar situation is present when duration of marriage is considered. As duration of marriage increases, cumulative family size also increases. However, neither expected nor desired family size is related to the length of time the female has been married. A third demographic variable that can affect family size is age at marriage. It can be seen in Table 2 that the older the age at marriage the lower the number of children ever born. However, expected family size does not decrease with age at marriage, nor does the number of children desired. An exception to this occurs among those females who were age 26 or older when they married. These women desire, and expect to have, substantially less children than the other females.

The relationship between expected completed family size and the number of children ever born is shown in Table 3. There is some misreporting, with about 2 percent of the respondents expecting a smaller family size than they already have. About 55 percent of the women report identical scores on the two measures, and about 43 percent of the women expect to have more children than they already have. Except in the case of childless women, expected and cumulative family size increase together.

When expected and cumulative family size are compared, the outcome is strongly associated with the female's current age (Table 4). The older the women the greater the probability that the expected and cumulative family size measures coincide. This is also true of duration of marriage. This gives additional evidence to the notion of expected completed family size as a valid substitute for the number of children a female will have borne before completing childbearing. Age at marriage appears unrelated to the outcome of the comparison between expected completed and cumulative family size. Although the probability of agreement between expected and cumulative family size increases with parity, the outcome of the comparison is not clearly related to either expected or desired family size.

It can be seen in Table 5 that desired and cumulative family size tend to increase as the other increases. How much of this tendency is due to the influence of past fertility behavior upon family size desires and/or vice versa are not known. Only a longitudinal research design would be appropriate to deal adequately with issues like that. However, over one half of the women report a desired family size larger than their number of children ever born. About one seventh of the women already have a cumulative family size that is larger than the desired family size measure. This suggests that desired and cumulative family size may be relatively independent. When desired and cumulative family size are compared, the outcome of the comparison

is not consistently related to any of the six demographic variables utilized in this study (Table 6). However, the older the female the greater the probability she will have a cumulative family size larger than desired family size and the smaller the probability of desiring more than the number already born. The same types of relationship exist with respect to duration of marriage and the number of children ever born.

When the desired and expected family size measures are compared, about 58 percent of the women expect to have the same number of children they would desire to have if they were just getting married. Slightly more than one sixth expect a greater number, and the remaining 23 percent expect less. These last two categories of fertility behavior are of great heuristic value because they are indicators of the extent to which females do not have the number of children they desire.

The first category (those expecting to have more children than desired) has been classified elsewhere as "excess fertility" (Ryder and Westoff, 1971; and Weller and Chi, 1972). The category of women expecting less children than they would desire has been termed "deficit fertility" (Weller and Chi, 1972). The proportions observed in Table 7 are fairly close to those obtained in the second GAF study (Whelpton, Campbell and Patterson, 1966:52-53) and the 1965 National Fertility Study (Ryder and Westoff, 1971: 74).

The demographic variable most related to the outcome of the comparison between expected and desired family size is cumulative family size. As the number of children ever born increases, the probability of excess fertility increases (Table 8). The probability of deficit fertility decreases with parity, although not as regularly as excess fertility increases. The probability of excess fertility is negatively related to age at marriage, but bears little relationship to duration of marriage. An exception to the latter statement is that women married less than 5 years are clearly differentiated from the other women. Given the cross-sectional design of the study, it is not known to what extent these women's behavior will gradually resemble the behavior of the other women who have had greater exposure to the marital experience. The number of children desired and the total expected completed family size seemingly are not associated with the outcome of the comparison between desired and expected completed family size.

### Conclusions

The extent to which different scores on cumulative, desired, and expected completed family size are obtained for the same women suggests that these are relatively independent dimensions of fertility behavior--at least at the time of the interview. Of course this is less true of expected completed and cumulative family size than of the two other possible relationships. With several notable exceptions, the associations between the measure of each of these dimensions of fertility behavior and the demographic variables of current age, age at marriage, and duration of marriage are not as strong as one would expect on a priori basis. This is particularly the case with the expected completed family size and desired

family size. This suggests that perhaps it is not really necessary to control for all of these factors when analyzing the effects of extra-demographic variables upon fertility behavior.

At the same time, this investigator publicly wonders if the same results (and non-results) would have been obtained if the data had been collected and studied longitudinally rather than cross-sectionally. To understand the real relationship between these factors, it may be necessary to select a representative sample of women at age  $n$  and periodically collect measures of the relevant variables from these women as they progress through the life cycle. This has been tried on a small scale, but not with an entire

cohort of women who are representative of the population of women. Of course it would also be necessary to design the study in such a way that an interaction between the process of obtaining repeated scores and the fertility measures themselves would be minimized and measurable.

A second conclusion that may be drawn is that fertility behavior is multi-dimensional rather than unidimensional. Hence it may be oversimplistic to write or speak about the relationship between variable  $X$  and fertility. Rather, it may prove more accurate to specify which specific aspects of fertility behavior are under consideration.

Table 1  
Moments of Measures of Fertility Dimensions

	Children Ever Born	Expected Family Size	Desired Family Size
Mean <sup>a</sup>	2.5	3.3	3.3
Median	2.0	3.0	3.0
Standard Deviation	1.6	1.4	1.4
Skewness <sup>b</sup>	.9	.6	.6
Kurtosis <sup>c</sup>	2.9	3.0	3.1
Number of Cases	396 <sup>d</sup>	396 <sup>d</sup>	392

- a. For computational ease, all cases in the category 6+ have been assigned the value 6.5. There were 11 or less for each of the variables.
- b. The measures of skewness utilized is Pearson's (modified) coefficient of skewness. For discussion of this measure, see Yeomans (1968): 114-118.
- c. The amount of kurtosis in a series is measured by the fourth moment around its mean divided by the fourth power of the standard deviation, i.e.,  $\frac{\sum (X_i - \bar{X})^4}{NS^4}$

Any value greater than 3 indicates a leptokurtic distribution, while one of less than 3 shows platykurtosis. (Yeomans, 1968: 118-119).

- d. Includes 4 women for whom desired family size is not known.

Table 2. Family Size and Selected Demographic Characteristics

	Children Ever Born	Expected Family Size	Desired Family Size
Age of Wife			
20-24	1.0	3.3	3.3
25-29	2.0	3.1	3.0
30-34	2.4	3.3	3.4
35-39	3.5	3.5	3.5
40-44	3.1	3.1	3.5
45-49	2.9	2.9	2.8
No. of Cases*	393	396	387
Duration of Marriage			
0-2	0.4	3.3	3.4
3-4	1.4	3.0	3.2
5-9	2.2	3.2	3.0
10-14	3.3	3.4	3.3
15+	3.3	3.3	3.3
No. of Cases	392	391	386
Age at Marriage (Wife)			
≤ 17	3.3	3.4	3.2
18-19	2.5	3.2	3.1
20-21	2.4	3.4	3.3
22-23	2.3	3.2	3.3
24-25	2.6	3.3	3.3
≥ 26	1.5	2.0	2.8
No. of Cases	391	391	385

\*In this and subsequent tables, those women who are not classified on one or more of the variables have been excluded. The number of such women can be obtained by subtracting the number of cases from 396, the base number of women in the study group.

**Table 3**  
**Expected Family Size by Children Ever Born**

Children Ever Born	Expected Family Size							No. of	
	0	1	2	3	4	5	6-9	Cases	$\bar{X}$
0	0	1	15	12	13	5	1	47	3.0
1	0	15	19	15	8	0	1	58	2.3
2	4	0	60	22	17	2	1	106	2.6
3	1	0	3	62	17	3	0	86	3.2
4	1	0	0	1	38	5	3	48	4.2
5	0	0	0	0	2	20	1	23	5.0
6-9	0	0	0	0	0	1	15	16	6.4
No. of Cases*	6	16	97	112	95	36	22	384	
$\bar{X}$	2.5	0.9	1.5	2.2	2.7	3.9	5.3		

%Expected < CEB = 1.8

%Expected = CEB = 55.6

%Expected > CEB = 42.6

\*For ease of presentation, those women reporting a number greater than 9 on one of the fertility measures have been excluded from Tables 3,5,7.

**Table 5**  
**Desired Family Size and Children Ever Born**

Children Ever Born	Desired Family Size							No. of	
	0	1	2	3	4	5	6-9	Cases	$\bar{X}$
0	0	0	17	14	15	4	2	52	3.2
1	4	1	18	22	9	1	2	57	2.8
2	1	1	43	14	36	2	3	100	3.0
3	1	2	13	37	26	2	3	84	3.2
4	2	0	10	1	28	0	4	45	3.6
5	0	0	3	5	3	8	3	22	4.2
6-9	0	1	3	0	4	2	6	16	4.5
No. of Cases	8	5	107	93	121	19	23	376	
$\bar{X}$	2.1	3.1	2.0	2.0	2.6	3.4	3.8		

%Desired < CEB = 14.9

%Desired = CEB = 32.7

%Desired > CEB = 52.4

**Table 6**  
**Comparison Between Desired Family Size and Children  
Ever Born by Selected Demographic Characteristics.**

	Desired % < CEB	Desired % = CEB	Desired % > CEB	Total	No. of Cases *
<b>A. Age of Wife</b>					
20-24	2.5	8.9	88.6	100.0	79
25-29	11.4	30.7	57.9	100.0	88
30-34	14.8	45.9	39.3	100.0	61
35-39	34.0	32.0	34.0	100.0	53
40-44	18.3	42.3	39.4	100.0	71
45-49	28.1	43.8	28.1	100.0	32
No. of Cases					
<b>B. Duration of Marriage</b>					
0-2	0.0	3.8	96.2	100.0	53
3-4	2.0	10.0	88.0	100.0	50
5-9	10.3	38.5	51.2	100.0	78
10-14	26.8	40.8	32.4	100.0	71
15+	24.5	43.8	31.7	100.0	139
No. of Cases					
<b>C. Wife's Age at Marriage</b>					
≤ 17	26.5	41.1	32.4	100.0	34
18-19	15.9	37.8	46.3	100.0	82
20-21	17.4	28.8	53.8	100.0	132
22-23	10.4	28.6	61.0	100.0	77
24-25	14.3	45.2	40.5	100.0	42
≥ 26	8.7	13.0	78.3	100.0	23
No. of Cases					390

Table 6 (Cont.)

	D < CEB	D = CEB	D > CEB	Total	No. of Cases
D. Children Ever Born					
0	0.0	0.0	100.0	100.0	52
1	6.9	1.7	91.4	100.0	58
2	2.0	43.1	54.9	100.0	102
3	18.8	43.5	37.6	100.0	85
4	28.3	60.8	10.9	100.0	46
5	54.5	36.4	9.1	100.0	22
6-9	68.7	31.3	0.0	100.0	16
No. of Cases					381
E. Expected Family Size					
0					6
1	25.0	6.3	68.7	100.0	16
2	3.1	36.5	60.4	100.0	96
3	9.8	36.6	53.6	100.0	112
4	16.0	31.9	52.1	100.0	94
5	42.8	22.9	34.3	100.0	35
6-9	45.4	36.4	18.2		22
No. of Cases					381
F. Desired Family Size					
0				100.0	8
1				100.0	5
2	27.1	40.2	32.7	100.0	107
3	6.5	40.9	52.7	100.0	93
4	6.6	23.0	70.5	100.0	122
5	10.5	42.1	47.4	100.0	19
6-9	16.0	20.0	64.0	100.0	25
No. of Cases					379

Table 7 Expected Family Size and Desired Family Size									
Number of Children Expected	0	1	2	3	4	5	6-9	No. of Cases	$\bar{X}$
0	0	0	4	1	1	0	0	6	2.5
1	4	1	6	3	1	1	0	16	1.9
2	1	0	64	9	24	0	1	99	2.6
3	1	2	15	70	22	1	4	115	3.1
4	2	1	13	6	66	1	4	93	3.0
5	0	0	6	5	5	13	5	34	4.3
6-9	0	1	3	0	5	2	10	21	4.7
No. of Cases	8	5	111	94	124	18	24	384	
X	2.1	3.5	2.3	3.0	3.6	4.8	5.1		
% Desired < Expected					18.7				
% Desired = Expected					58.4				
% Desired > Expected					22.9				

Table 8 Comparison Between Expected Family Size and Desired Family Size By Selected Demographic Variables					
A. Age of Wife	% Desired < Expected	% Desired = Expected	% Desired > Expected	Total	No. of Cases
20-24	6.2	83.9	9.9	100.0	81
25-29	20.2	58.5	21.3	100.0	89
30-34	22.6	59.7	17.7	100.0	62
35-39	37.0	31.5	31.5	100.0	54
40-44	16.7	45.8	37.5	100.0	72
45-49	26.5	44.1	29.4	100.0	34
No. of Cases					392
B. Duration of Marriage					
0-2 years	5.7	84.9	9.4	100.0	53
3-4	2.0	72.0	26.0	100.0	50
5-9	24.4	60.2	15.4	100.0	78
10-14	29.6	46.5	23.9	100.0	71
15+	24.5	43.8	31.7	100.0	139
No. of Cases					391

<b>C. Wife's Age at Marriage</b>					
≤ 17	32.4	47.0	20.6	100.0	34
18-19	17.1	68.3	14.6	100.0	82
20-21	23.5	55.3	21.2	100.0	132
22-23	18.2	50.6	31.2	100.0	77
24-25	16.7	61.9	21.4	100.0	42
≥ 26	4.4	47.8	47.8	100.0	23
<b>No. of Cases</b>					<b>390</b>
<b>D. Children Ever Born</b>					
0	1.9	76.9	21.2	100.0	52
1	8.5	55.9	35.6	100.0	59
2	9.5	61.9	28.6	100.0	105
3	21.6	54.5	23.9	100.0	88
4	36.2	51.0	12.8	100.0	47
5	50.0	36.4	13.6	100.0	23
6-9	75.0	25.0	0.0	100.0	16
<b>Total Number of Cases</b>					<b>389</b>
<b>E. Expected Family Size</b>					
0					6
1	25.0	6.3	68.8	100.0	16
2	1.0	64.0	35.0	100.0	100
3	15.7	60.8	23.5	100.0	115
4	23.2	69.4	7.4	100.0	95
5	45.7	40.0	14.3	100.0	35
6-9	63.7	31.8	4.5	100.0	22
<b>Total number of cases</b>					<b>389</b>
<b>F. Desired Family Size</b>					
0				100.0	8
1				100.0	5
2	33.3	57.7	9.0	100.0	111
3	11.7	74.5	13.8	100.0	94
4	8.8	52.8	8.4	100.0	125
5	15.8	68.4	15.8	100.0	19
6-9	16.0	32.0	52.0	100.0	25
<b>Total Number of Cases</b>					<b>387</b>

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Due to limitations of space imposed by the publisher, Table 4 has been omitted. Copies may be obtained by writing to the author, Department of Sociology, Florida State University, Tallahassee, Florida 32306.