PARITY-SPECIFIC AND TWO-SEX UTILITY MODELS OF REPRODUCTIVE INTENTIONS

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Abstract—This paper uses married couples' anticipated consequences of having a (another) child to predict their reproductive intentions. Parity-specific models identify different variables as predictors of reproductive behavior at different parities but do not yield interpretable patterns of difference by parity. Parity-specific models are not significantly stronger predictors of reproductive behavior. Generally, wife-only models are distinctly superior to husband-only models. Two-sex models are usually better predictors than one-sex models but not enough better to justify the additional cost.

Several recent papers have demonstrated the usefulness of using married couples' anticipated consequences of childbearing to predict their reproductive behavior. These generalized utility models are based on the assumption that couples act in ways which maximize anticipated benefits and minimize anticipated costs. The present paper explores two questions which remain unanswered by existing work: (a) Can such models predict reproductive intentions better with a parity-specific model than with a model which treats all parities together? (b) Are models which include the consequences anticipated by both wife and husband more powerful than models which use the consequences anticipated by only one sex?

THE UTILITY OF UTILITY MODELS

A number of reports in the literature, from a variety of disciplines, are based on a utility model. For example, Becker's 1960 article suggested an economic model of consumer behavior to study family size decisions. Namboodiri (1972) made several modifications of this model to meet criticisms of others, primarily sociologists. From a psychological point of view, Arnold and Fawcett (1975) looked at the costs and benefits of children perceived by couples and the effects of these perceptions on fertility behavior, while Hoffman and Hoffman (1973) and Terhune (1974) focused on identifying the values satisfied, or not satisfied, by children. Growing out of another psychological tradition, the work of those in the tradition of Fishbein attempted to predict fertility intentions from respondents' evaluations of expected outcomes and a normative measure. As Jaccard and Davidson (1976, pp. 330-331) point out, the attitudinal component of this last approach "... is nothing more than a subjective expected utility model as studied by psychologists for the past 25 years."

PARITY-SPECIFIC MODELS

In an early exposition, Mishler and Westoff (1955) proposed that fertility decisions should be viewed sequentially, since a family's circumstances are always changing and, in particular, are changed by each birth. [The sequential nature of fertility decision making is discussed at length by Namboodiri, (1972).] In the first round of the Family Growth in Metropolitan America (FGMA) study (Westoff et al., 1961), only women with two children were studied. This eliminated the possibility of comparing results with other parities. Arnold and Fawcett (1975), although they did not carry out their analysis by parity, report that a number of respondents told them that the process of having children had affected their feelings about children.

Researchers using the Fishbein model have generally included among their dependent variables the "next" fertility decision. Werner et al. (1975) achieved a parity-specific model by interviewing only women with two children. Davidson and Jaccard (1975), on the other hand, did include women with different numbers of children in their sample but did not look at their model by parity. The same is true of Townes et al. (1977) who used a subjective expected utility approach in a longitudinal study to predict the occurrence of pregnancy.

Although he did not initially assume a parity-specific model, Terhune (1974) found that the correlations between perceived costs and benefits of children and desired family size differed considerably among parity groups. At parities 0 and 1, anticipated rewards are important correlates of desired family size while at later parities anticipated costs predominate. He did not, however, deal directly with the question of adding a child to the family.

Using data from the 1965 National Fertility Survey (NFS), Namboodiri (1974) studied the ability of several demographic and socioeconomic factors to discriminate at different parities between women who expected to have a (another) child and

those who did not. He found that demographic factors discriminate better at lower parities than at higher parities and that the reverse is true for the socioeconomic factors. Our approach is similar to his except that we are examining the intentions to have another child in terms of the anticipated consequences of pregnancy or birth.

Parity-specific models may differ from combined models in two ways. First, they may reveal that different variables determine decisions at different parities suggesting that reproductive decisions are made on a parity-specific basis. Second, parity-specific models might explain more variance in reproductive behavior than all-parity models. The two possibilities are not necessarily linked; we will explore them separately.

TWO-SEX MODELS

Are the consequences anticipated by both spouses better predictors of reproductive behavior than the consequences anticipated by either spouse alone? Even though it is often asserted in the study of fertility that one ought to study both wives and husbands, most studies are only of wives and the evidence on the advantages gained by studying both spouses is both sparse and mixed.

It seems reasonable to expect that the outcomes anticipated by both spouses might be better predictors of reproductive behavior of couples than those of either spouse alone. Data from our pilot study (Hofferth and Udry, 1975) showed that models which used expected consequences from both spouses were considerably more powerful predictors of contraceptive behavior than models which used the consequences expected by only the wife or the husband. In a recent article, Neal and Groat (1977) report on a study in which wives' and husbands' alienation scores were used to predict various aspects of reproductive behavior. Their findings were similar to those from our pilot study: in general, having the scores for both spouses improved predic-

tive ability over the scores for either spouse alone; husbands' scores often predicted as well as those of wives.

Nearly twenty years ago, Westoff did not see much to be gained by studying husbands, at least in the United States: "There is little evidence thus far that indicates any appreciable improvement in the prediction of fertility from the separate value orientations of the husband . . ." (1961, p. 33). Townes et al. (1977) compared the ability of wives', husbands' and wives'-and-husbands' subjective expected utility scores to predict the occurrence of a pregnancy. They report that the model using an average of wives' and husbands' scores predicted about as well as wives' scores alone but that husbands' scores alone did not predict a pregnancy as well. In spite of general agreement in principle that both spouses should be studied, the question is still open.

THE SAMPLE

The present study is based on data from the second wave of a panel study. In 1973, area samples of 100 white and 100 black ever-married women aged 15–44 were obtained from census tracts with race-specific median family incomes of under $6,000. The areas were in 16 counties (14 for blacks, due to the small black population in two of the counties) which had previously been defined as likely to show a demographic response to a subsidized family planning program. In addition to this low-income sample, a sample of 100 ever-married women aged 15–44 from middle-income census tracts was interviewed in five of the 16 counties.

The data for this report came from a survey of a subsample of these women and their husbands which was carried out in late 1976 and early 1977. The subsample consists of women under age 30 at the time of initial interview. Interviews were obtained for 572 couples, 406 women only, and 6 men only. The analysis for this report is based on data for white couples with 58 percent of the couples from low-income census tracts and 42 percent from the higher income tracts.

This represents substantial attrition from the original sample—only 62 percent of the original sample was reinterviewed. However, examination of 20 demographic and social background variables showed no significant differences on first-round variables between those who were reinterviewed and those who were not. Further, a correlation matrix of these 20 variables showed the same number of correlations significantly different between the two samples as one would predict by chance and no substantively important differences. Table 1 compares this sample to women in part of the 1973 National Family Growth Study sample who were white, married women living in SMSAs and under 30 at the time of the interview. The samples are similar with respect to parity and education of spouses. Our sample has slightly fewer high-income couples and a slightly higher proportion of wives in the 26–29 year age category. The sample may be taken as generally representative of white, married couples living in SMSAs, in which the wife was under 30 in 1973.

THE MODEL

For each dependent variable we ran multiple regression models separately by sex as well as a joint analysis using both female and male variables. This was done for all parities combined and for each parity separately. In each run, a forward entry multiple regression was performed with $F = 2.0$ and tolerance of .30 required to enter the model. The run was cut if the total F for the model increased after a decline. No more than ten variables were allowed to enter. No problems of multicollinearity were encountered in the analysis. Sterile couples as well as those in which the wife was pregnant were excluded from the analysis.

Independent Variables

The independent variables were selected to represent what we have identi-

Table 1.—Comparison of the Present Sample with Comparable Subsample of the 1973 National Study of Family Growth (Selected Characteristics of Currently Married, White Women 29 Years Old or Younger)

	Present Sample (N=649) (Percent)	NSFG Subsample (N=1576) (Percent)
Wife's Age		
16-20	10.6	14.5
21-25	41.4	44.4
26-29	47.9	41.0
Wife's Education		
<12	20.8	20.8
12	45.0	50.6
13+	34.1	28.6
Husband's Education		
<12	19.7	19.4
12	37.3	37.9
13+	43.4	42.7
Household Income		
<$8,000 per year	28.2	23.6
8,000-11,999	31.8	28.6
12,000-14,999	16.0	17.2
15,000+	24.0	30.6
Children Born Alive		
0	31.8	34.1
1	31.7	27.3
2	26.2	26.7
3	7.4	8.8
4+	2.9	3.1

fied as the most important domains of consequences of reproduction: (a) satisfactions or dissatisfactions directly attendant to caring for infants; (b) satisfactions related to the sex of the child; (c) consequences for the respondents' feeling about themselves; (d) financial costs incurred in giving birth and rearing children; (e) consequences for the marriage; (f) rewards and punishments attendant on changes in the behavior of friends and relatives. This is not meant to be an exhaustive list of domains and in fact deliberately omits all consequences which might come in the category of opportunity costs. We only maintain that these variables tap six domains in which consequences are both direct and easy to conceptualize. In the paragraphs below, the construction of the independent variables is described. Table 2 shows the means, standard deviations and ranges for the variables as measured in our sample.

1. *Changes in the respondent's feelings about her/himself* (FEEL). We asked respondents, "If you (your wife) became pregnant during the next few months, how would you feel about yourself?" A list of six items of the following form was presented: "Would you feel more or less proud of yourself?" The other adjectives were: mature, successful, embarrassed, critical and selfish. For each adjective a respondent could indicate that she/he would feel that way more (scored three), less (scored one) or neither more nor less (scored two). For purposes of creating an index, the scoring for those adjectives which indicate negative feelings was reversed. A high score indicates an increase in positive feelings or a decrease in negative feelings. This index is an average of the respondent's responses on the items.

2. *Sex of the children* (CSEX). This index was intended to measure the importance to the respondents of the sex of their

Table 2.—Mean, Standard Deviations, and Ranges for Variables Used in Regressions

Variables	Mean	S.D.	Range
FEELW	2.053	0.418	1 – 3
FEELH	2.088	0.365	1 – 3
CSEXW	2.037	0.787	1 – 4
CSEXH	2.112	0.767	1 – 4
ICAREW	4.111	0.463	2.20 – 5
ICAREH	3.769	0.553	1.40 – 5
COST3W	7.009	2.902	3 – 12
COST3H	6.289	2.652	3 – 12
SATISW	1.969	0.365	1 – 3
SATISH	2.086	0.322	1 – 3
TENW	2.228	0.224	1.44 – 3
TENH	2.169	0.227	1.44 – 3
CURSATW	6.342	1.938	1 – 9
CURSATH	6.523	1.907	0 – 9
CURTENW	2.477	1.638	0 – 9
CURTENH	2.617	1.708	0 – 9
BESTFW	0.349	0.822	–2 – +2
BESTFH	0.163	0.535	–1 – +2
BRSISW	0.354	0.819	–2 – +2
BRSISH	0.221	0.571	–1 – +2
MOTHRW	0.461	0.934	–2 – +2
MOTHRH	0.292	0.749	–2 – +2
FATHRW	0.328	0.807	–2 – +2
FATHRH	0.218	0.633	–1.667 – +2
MILW	0.322	0.849	–2 – +2
MILH	0.225	0.698	–2 – +2
FILW	0.190	0.689	–2 – +2
FILH	0.213	0.638	–2 – +2
CHILDW	0.340	0.835	–2 – +2
CHILDH	0.337	0.744	–2 – +2
HUSB	0.786	1.122	–2 – +2
WIFE	0.567	0.895	–2 – +2
INTW	1.422	0.453	1 – 2
INTH	1.417	0.456	1 – 2

children. A respondent's score on this index is the average of responses to two questions. The two questions are: "Many couples want at least one child of each sex. How important is it to you to have a (another) boy?" "How important is it to you to have a (another) girl?" Possible responses went from "very important" (scored four) through "not important at all" (scored one).

3. *Infant care* (ICARE). We presented the respondents with a list of ten items related to taking care of babies: talking to the baby, giving the baby a lot of atten-

tion, feeding the baby, changing the baby's diapers, washing the baby, taking the baby visiting, getting less sleep because of the baby, being responsible for the baby, listening to the baby crying, holding and cuddling the baby. We asked respondents to rate each of the items on a five-point scale from "like a lot" (scored five) to "dislike a lot" (scored one). We created an index from the respondents' answers to the ten items. A respondent's score on the index was the average of her/his responses.

4. *Cost of Children* (COST3). This variable was constructed from three items in which respondents indicated the extent to which various financial costs associated with pregnancy and child rearing would influence their decisions to have a (another) child. We asked respondents: (1) "These days it's becoming pretty expensive to raise children. What do you think are going to be the most costly things about raising your children?" (2) "If you and your husband (wife) were to have a (another) child, about how much would you expect to pay for prenatal care and delivery?" (3) "If you and your husband (wife) were to have a (another) child, about how much do you think it would cost to raise that child from birth to age eighteen?" For each of these items, respondents were asked how much that factor would influence their childbearing decisions. Responses ranged from "very much" (scored four) to "not at all" (scored one). Responses to the questions concerning the importance of the factors were summed to construct the index.

5. *Changes in the marriage.* We used two variables to measure changes that respondents might expect to occur in their marriages as a result of a (another) child (see Orden and Bradburn, 1968, for the items used). One deals with positive aspects such as being affectionate (SAT). For each of nine items, respondents were asked whether they would expect to do them more often (scored three), less often (scored one), or about the same (scored two) if they had a baby in the next year.

The second variable deals with tensions (TEN). For each of nine areas of potential tension, respondents were asked whether they would be more troublesome (scored three), less troublesome (scored one), or about the same (scored two) if they had a baby in the next year. A respondent's score on each of these indexes is the average of her/his responses to the nine items. A high score on the satisfaction index indicates expected increases in positive aspects of the marriage and a high score on the tensions index indicates expected increases in tensions.

Since these two indexes are change measures, we included current measures of the same items in our models as controls (CURSAT and CURTEN). The same items used for the change items were used for the present variables. However, when referring to the present, respondents were asked for the satisfaction items whether they had done those things with their spouses in the past few weeks. For the tension items they were asked whether each was a problem in their marriages. Respondents' scores on these indexes are the sum of their responses to each of the individual nine items.

6. *Respondents' feelings about changes in the behavior of others*: best friend (BESTF), brother or sister (BRSIS), mother (MOTHR), father (FATHR), mother-in-law (MIL), father-in-law (FIL), respondents' children (CHILD), spouse (HUSB/WIFE). For each of several individuals in a person's social circle, we asked three questions designed to find out about changes in behavior that the respondent might expect in the event of a pregnancy: spending more or less time with the respondent, increasing approval or criticism, and being more or less demanding. The questions were phrased as follows: "If you (your wife) were to become pregnant during the next few months, do you think any of the people listed on this card would be more or less demanding of you because you were (she was) pregnant?" If the respondent indicated that s/he expected such a change,

s/he was asked how s/he would feel about it: whether s/he would be pleased or bothered by it. Very pleased was scored +2 and very bothered was scored −2. We constructed one variable for each person in the respondent's social circle based on the respondent's reaction to the anticipated behavior change. This was done by averaging the scores for each friend or relation on the three questions asking for the respondent's reaction to anticipated changes in the person's behavior.

The Dependent Variable

The dependent variables in the model are the intentions of the wife and husband to have a (another) child (INT). Wife and husband were asked independently, "Do you and your husband (wife) intend to have a (another) child?" Table 3 shows the distribution by parity of responses to this question. Responses were scored: yes

= 1, don't know = 1.5, and no = 2. This three-point scale of intentions might be presumed to produce weaker results than had we used an intentions scale which allowed for more intention values.

In our analysis, we have examined the effect of wife and husband expected utilities from a birth on their *individual* reproductive intentions. Two-sex models implicitly assume that each sex's intentions may be affected by the utilities expected by the spouse. This in turn assumes that benefits or costs expected by the spouse are transformed through marital interaction into benefits and costs to the self (although not necessarily the same costs and benefits).

RESULTS

Parity-specific models

Table 4 shows the R^2's for the regressions predicting intentions to have a (an-

Table 3.—Responses to: "Do You and Your Husband (Wife) Intend to Have a (Another) Child," by Sex and Parity

| | Parity | | |
Response	0	1	2+
Women			
Yes	71%	66%	25%
Don't Know	16	12	20
No	13	22	55
Total Percent	100	100	100
Number	(69)	(104)	(143)
Men			
Yes	77	66	25
Don't Know	10	14	18
No	13	20	57
Total Percent	100	100	100
Number	(69)	(104)	(143)

Table 4.—Variance in Childbearing Intentions Explained (R^2)[a] by Models Based on Data from Both Spouses, from Wives Only, and from Husbands Only

	Wife	Husband	Number of Cases
All Parities			(316)
Wife & husband	.40	.40	
Only wife	.35	.30	
Only husband	.19	.26	
Parity 0			(69)
Wife & husband	.36	.37	
Only wife	.31	.32	
Only husband	.18	.25	
Parity 1			(104)
Wife & husband	.49	.44	
Only wife	.43	.37	
Only husband	.12	.24	
Parity 2+			(143)
Wife & husband	.39	.33	
Only wife	.32	.26	
Only husband	.15	.22	

a—All R^2's are significant at the .05 level or beyond.

other) child. In terms of the amount of variance explained, parity-specific models are not a clear improvement over models with all parities combined. Nevertheless, as previously noted, it is possible that the configuration of anticipated consequences which make significant contributions differs by parity. In order to explore this possibility, Table 5 shows the unstandardized regression coefficients which entered the equations. We inspected these coefficients across parity groups. Where there were interesting patterns, we tested for significant interactions.

We note first, however, some consistency across parity groups. The anticipated financial costs of children are the most consistent of the consequences in having a significant effect on our measures of reproductive behavior. Some pre-vious research has suggested that money considerations are not as important in fertility decision making as one might expect. For example, the anticipated effect of a child on the material well-being of the family does not appear to be a factor which consistently discriminates couples who experience a pregnancy during a one-year interval from those who do not in the study reported on by Townes et al. (1977). However, Arnold and Fawcett (1975) found that respondents' perceptions of the economic burden of children were significant predictors of the number of additional children desired and current use of contraception. We find that the expected financial costs are the only anticipated consequences of childbearing and rearing which appear consistently across parities. The contribution is

Table 5.—Unstandardized Regression Coefficients from Models with Both Female and Male Anticipated Consequences of a (Another) Birth and by Parity

Independent[a] Variables	Wife Parity			Husband Parity		
	0	1	2+	0	1	2+
Wife's Variables						
Feelings About Self		-.13	-.24*			-.27*
Sex of Children	-.07	-.07	-.13*	-.08		-.07
Cost of Children	.02	.05*	.04*	.05*	.04*	.03*
Expected Satisfaction with Marriage	-.14	.24*				
Expected Tensions in Marriage	.39*	.22				
Current Satisfaction in Marriage		-.03	-.03*			
Infant Care		-.23*				
Best Friend	.10		-.08*			
Father			.07			
Children			.08*			
Husband	-.09*	-.14*			-.14*	
Husband's Variables						
Feelings About Self			.27*			
Sex of Children			-.15*		-.15*	-.17*
Cost of Children		-.03*				
Expected Satisfaction with Marriage		-.14			-.18*	
Current Tension in Marriage				-.05*		
Infant Care				-.17*		
Brother or Sister	-.14*					-.09

a-Variables offered but never entered: wife's current tension in marriage, wife's brother or sister, wife's mother, wife's mother-in-law, wife's father-in-law, husband's expected tensions in marriage, husband's best friend, husband's mother, husband's father, husband's mother-in-law, husband's children, husband's father-in-law, wife. Entry criteria: F = 2.0 and tolerance = .30.

*Significant at the .05 level or beyond.

not significant at every parity but the interaction with parity is not statistically significant.

Another factor which frequently shows a significant effect on fertility planning is the importance to the respondents of the sex of an additional child. The distribution across parities is reasonable. Concern about the sex of an additional child makes a significant contribution with increasing frequency as parity increases. Once again we looked to a test of interaction with parity to determine whether

our observations were statistically significant. The interaction (where differences were in the predicted direction) was significant only for the husbands' concern about the sex of an additional child and parity for the *husbands'* intentions.

The way that the wife would expect to feel about herself if she became pregnant in the next few months shows the same patterns as concern about the sex of an additional child. As parity increases so does the appearance of the way the wife expects she would feel about herself as a

significant predictor. One might think, as Hoffman and Hoffman (1973) indicate, that such a factor would be more important at parity 0 since for women it is the arrival of the first child that is supposed to establish adult status. But our data suggest, and indeed Hoffman and Hoffman's own discussion does not contradict the possibility, that anticipation of feelings such as pride and success is a better predictor of fertility behavior at later parities than at earlier parities. The interaction of this variable with parity was significant only in the model with *wives'* intentions.

Thus, although we observed patterns of differences in the predictive ability of several independent variables by parity, our statistical tests did not always confirm these. Nevertheless, when we tested the models for *overall* differences by parity (excluding the intercept), we found that the models are significantly different by parity.

Two-sex models

Are two-sex models an improvement over one-sex models? Table 4 shows the comparison of R^2's from models containing both wife and husband predictors with R^2's from models containing predictors of one sex alone. First, we note that there is a slight tendency for models with the husband's predictors to predict his intentions better than they predict wife's intentions and for models with wife's predictors to predict her intentions better than they predict husband's intentions. Second, wife predictors alone are in every case better than husband predictors alone, sometimes substantially better. This is the case even when it is the husband's intentions which are being predicted. Third, the two-sex models are in every case better than either one-sex model. However, the two-sex models are often only a marginal improvement over the models in which there are wife predictors alone (see Bumpass and Westoff, 1970). While the two-sex models usually contain different contributing variables from each sex (Table 5), the contribution of the hus-

band's independent variables to explaining variance in reproductive intentions is mostly redundant to the variance explained by the wife's independent variables. It is hard to escape the conclusion that wives' utility considerations dominate the reproductive intentions of both sexes at every parity. In this sense it may be said that wives are more "influential" in reproductive decision making.

SUMMARY AND CONCLUSIONS

We found all-parity models as good as parity-specific models and cannot conclude that parity-specific models increase the ability to predict reproductive intentions. We examined the models to see whether particular predictors were better at some parities than at others. While there appeared to be some differences by parity in the importance of several of the predictors, when we tested for interaction we found that few of the interaction terms were significant. Tests for the overall difference in the models by parity were significant. This is very weak support for the proposition that decisions are made by couples one birth at a time. No interpretable patterns of difference by parity were found which help to illuminate the parity-at-a-time process.

With respect to the value of two-sex models, we found that models which used the consequences anticipated by both spouses were only a minor improvement over models based on wife's responses alone. Wife-alone models are generally substantially stronger than husband-alone models in the prediction of reproductive intentions. In this sense, wives are more "influential" in reproductive decision making. Whether two-sex models predicting intentions are enough of an improvement over the wife-alone models to justify the ggreatly increased cost of collecting husband data depends on how much one is willing to invest in a modest improvement. The improvement we obtained from husband data was probably not worth the cost. If only one sex is to be studied, the clear choice as far as repro-

ductive intentions are concerned is also the commonsense choice—study women.

One should keep in mind that we have reported on reproductive intentions, not on pregnancies or births. The fact that two-sex models are not much better than wife-alone models in predicting intentions says nothing about the role of two-sex models in predicting actual events such as pregnancies. Preliminary analysis (Fried and Udry, 1979) suggests a brighter future for two-sex models.

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