On the Homogenization of Fertility Experiences

Robert W. Hodge
Naohiro Ogawa

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Robert W. Hodge
Professor
Department of Sociology
University of Southern California

Naohiro Ogawa
Professor
College of Economics
Nihon University
and
Deputy Director
Nihon University
Population Research Institute

C O N T E N T S

T A B L E S

A B S T R A C T

This paper examines, by drawing upon data collected in the 1963, 1971, and 1981-84 rounds of the Mainichi Family Planning Survey, intertemporal differences in fertility size goals and family size outcomes among currently married Japanese women. One of the primary conclusions derived from a series of the correlation analysis and the log linear analysis is that the increasing socioeconomic heterogeneity of the Japanese population has been associated with mounting homogeneity in family size goals and outcomes.

I. Introduction

Pre-transition societies are generally regarded as predominantly agrarian and relatively homogeneous ones with uniformly high levels of fertility. The emergence of fertility differentials in response to urbanization, industrialization, and other forms of social differentiation is at least one route into the demographic transition. At this juncture, we certainly know enough from comparative research to dispell the hypothesis that a fertility decline will follow or a nascent fertility differential emerge automatically and in lock step with any fixed degree of urbanization, industrialization, or elaboration in the division of labor within society (see, e.g., Freedman, 1979; Teitelbaum, 1984; Coale, et al. 1978). But while there appear to be significant stochastic elements in launching a demographic transition, we still hold to the notion that the end point of the demographic transition is a more heterogenous society in terms of its division of labor and available life styles, but nonetheless a society in which fertility experiences are perhaps no less homogeneous than in the pre-transition phase. In the post-transition society, fertility is low and homogeneous, while in the pre-transition phase it was high, but still homogeneous. In between, during the transition itself, one expects heterogeneity in fertility experiences.

II. Aggregate Movements in Fertility

In his well known treatise on Folkways, William Graham Sumner (1907) made a useful distinction between enacted and crescive institutions. The former are planned and consciously contrived with certain goals in mind, while the latter are the output of thousands of individual decisions which exhibit an orderly pattern or arrangement even though the final outcome was not conceived, let alone planned by any of those whose actions contribute to the end product. In the aftermath of the Second World War, Japan experienced a confluence of both enacted and crescive, macroeconomic and macrosociological changes which effectively impelled her on a course of demographic transition which proceeded with unparalleled rapidity. The major enacted changes include, in addition to economic planning, re-organization of the

school and university system to enhance educational opportunities and, especially, the passage of "eugenics" legislation which, by essentially legalizing abortion, gave Japanese women an effective new tool for moderating their family size. Less contrived and more nearly crescive rearrangements of the social fabric, all conducive to lower aggregate levels of fertility, included a rising age at first marriage, increases in female labor force participation, especially as paid employees, and the adoption of contraception, especially of rhythm which was popularized in women's magazines after its invention by a Japanese physician. One can also count changes in residence patterns, viz., the rise of neolocality among recently married couples, and the decline in arranged marriages as further crescive changes affecting the course of postwar Japanese fertility. We have discussed these macrolevel changes and, insofar as possible, the relationships between them in our other paper (Hodge and Ogawa, 1987).

The aggregate level forces operative over the brief course of Japan's demographic revolution are in many cases unusual and historically unique. Factors prominent in the Japanese case, but absent in large measure from the transition experiences of other countries would surely include the extensive use of abortions to terminate unwanted pregnancies and the adoption of rhythm and condoms--hardly the most reliable methods--as the main means of contraception. Perhaps no less unique to the Japanese case is the relatively modest direct impact of economic growth per se upon the total fertility rate. The consequences of Japan's economic miracle for her demographic miracle appear to have been largely worked out through such intervening social factors as female labor force opportunities and the so-called proximate determinants of fertility. By way of contrast, Hong Kong's demographic transition, which mirrors that of Japan with roughly a ten year lag, is characterized by a nearly perfect reflection of the crude birth rate in GNP per capita and in cumulative contraceptive adoptions. The latter two factors are so closely intertwined that it is virtually impossible to separate them, but it is reasonably clear that they effectively wash out the potential impacts of such correlated social and demographic factors as rising educational levels, expanding employment opportunities for women, and declines in infant mortality levels (Wat and Hodge, 1971; Freedman, 1979).

III. Micro-level Determinants of Fertility

The movement of aggregate levels of fertility reflects the behavior of thousands of individual couples. Fertility levels can change because successive cohorts behave in alternative ways, responding to different factors or reflecting compositional shifts in old ones like educational attainment. Fertility levels can also change because couples change their behavior patterns, as, for example, altering their family size horizons because of the onslaught of a depression or the unexpected appearance of an economic opportunity for either the husband or the wife. These are the basic sources of aggregate level demographic change; their mix can vary between not only different societies, but between alternative time periods within the same society. However, regardless of their mix, it is plain that if these two factors--cohort succession and individual change in family formation practices--are responsible for shifts in aggregate fertility, then the determinants of fertility are, of necessity, worked out at the individual level. This does not, of course, mean that collectivities and/or the societies of which they are a part have no influence on individual behavior. Indeed, to the contrary, they may play central roles in it by introducing obstacles which impede family formation or providing incentives to family expansion. Whole societies can foster or retard the growth of aggregate fertility by altering the context in which family decisions about fertility and family formation are made. Examples of such societal actions include provision of child care facilities, guaranteeing the jobs of women on maternity leave, and the legalization of abortion and contraceptive devices. Collectivities smaller than the whole society, like the extended family, can likewise stimulate or depress family sizes in subsequent generations by, for example, underwriting the costs of setting up a neo-local residence, providing child care for grandchildren, and arranging old-age security. Such societal and collective actions do not, however, in and of themselves determine individual fertility decisions, but rather provide a context and often a changing context in which such decisions are taken. These contextual factors may, of course, alter the relative influence of the various proximate determinants of fertility. This is the sense in which we contend that fertility behavior is

worked out at the level of individual couples, rather than as a feature of socioeconomic structures per se. Put otherwise, fertility is the output of micro-processes which are both reflected at and have consequences for macro-level phenomena.

In keeping with the foregoing perspective, much demographic work has examined various micro-level determinants and models of fertility and such related phenomena as abortion and contraceptive use. This is the strategy we have followed in our earlier work (Ogawa and Hodge, 1983; Hodge, Ogawa and Kobayashi, 1986) which has drawn extensively on a cross-sectional survey of currently married Japanese women of childbearing age conducted in the spring of 1981. At the time these micro-level data were assembled, Japan had already been in the post-transition phase of her demographic history for at least two decades. In this post-transition period, we can detect only vestiges of the individual level determinants of fertility which one might surmise exhibited somewhat more substantial connections to family formation patterns in earlier phases of Japan's vital regime.

What emerges from the examination of micro-level determinants of fertility behavior in contemporary Japan is an overriding sense of just how homogeneous family formation patterns have become in a society which is otherwise still set on a course of economic expansion, social differentiation, and enhanced social complexity. We cannot, of course, argue that there are no educational or urban-rural differentials in fertility or that such traditional facets of the paternalistic family system as arranged marriages and patrilocality of residence at marriage have no impact upon fertility and family formation. Indeed, we can show that these and such other micro-level determinants of fertility such as pre-marital work experiences among women and age at current marriage (which are overwhelmingly first marriages) do, indeed, exert an influence over processes of family formation. However, what is more noteworthy about these impacts than their statistical significance and the correspondence between the direction of their impacts with the expected ones is their miniscule size. Japan has not yet reached the point where one's location in the socioeconomic structure has no bearing whatsoever upon fertility and family formation, but she is amazingly close to a society in which birth processes are uniform from one segment of the population to another.

The evident homogeneity in fertility and family formation processes across all major social and economic groups in contemporary Japan harbors the potential for the rationalization of family formation processes to fit the child consumption preferences of individual couples. Those preferences are, as it turns out, only somewhat more heterogeneous than between group variations in cumulative fertility and family formation processes. For the most part, married Japanese women of childbearing age believe that the ideal number of children for a Japanese couple is two or three. In addition, they desire two or three children and expect to have them, at least as judged by the sum of the number they already have and the number of additional ones they want. So, Japanese women follow social conventions by desiring what they regard as ideal and expecting that they will fulfill those desires. Finally, their actual behavior closely mirrors these ideals, desires, and expectations, because Japanese women prove to be efficient users of less than the most reliable methods of contraception to secure actual family sizes consonant with their desires and expectations.

IV. Japanese Fertility after Camelot

What currently characterizes the pattern of Japanese fertility, with its relatively weak ties to the location of couples in the Japanese social order, has itself been a product of the post-transition period. The micro-level analyses presented herein have been based on a single cross-sectional survey of knowledge about and attitudes toward fertility and family planning practices. This survey is, however, only one of a series of inquiries conducted since 1950. At the time we began the work, we chose to analyze only the most recent of these surveys for a variety of reasons. First, and most importantly, we wanted to identify, insofar as possible, the social and economic forces operating upon current fertility behavior in Japan. Second, at the time we began these analyses, the 1981 survey was by far the richest in the series, though two more recent surveys which we have only begun to analyze in the light of the findings reported herein are equivalent in scope and detail. Although we ultimately plan to analyze the full set of 18 surveys, largely in ways

suggested by the results reported herein, we can introduce some preliminary results from comparisons of two of the earlier surveys with the pooled results of two of the most recent ones to document various changes which have been worked out even within the confines of the post-transition phase of Japan's demographic history.

A number of difficulties are encountered in working with the earlier Mainichi surveys. For the initial surveys, the individual records have been lost, so one can only work with such crosstabulations as were published or preserved in the files of the Mainichi Newspapers. Here we make use of the first of the Mainichi surveys which we can tabulate at will, viz., the one conducted in 1963. To obtain a contemporary reference point about two decades later, we pooled the 1981 and 1984 surveys. Finally, we chose the 1971 survey, which we can also tabulate without constraints, as an intermediate reference point. The sample designs for the 1963, 1971, and 1984 Mainichi studies are virtually identical to that already described elsewhere (Population Problems Research Council, 1978).

The means and standard deviations of desired number of children are reported for all three periods in Table 1, which also exhibits the results observed when the data are disaggregated by wife's age and current contraceptive use. (The number of cases upon which these means and standard deviations rest, as well as those in Table 2, are reported in Table 3 below.) First, we can observe that in all three periods, there is virtually no difference between the mean number of children desired by women who are and are not currently practicing contraception. This result is consonant with the view that contraception is primarily used in Japan for purposes of child spacing and for limiting fertility only after family size goals have been achieved. While the average number of children desired by current contraceptive users and non-users are about the same, the standard deviation of number of children desired is, with only a single exception, higher among current non-users. Again, this result is observed in all three periods and like the results pertaining to the means, is consonant with the view that contraceptive use in contemporary Japan is a vehicle for child spacing and fertility control after family size goals are achieved. Current non-users of contraceptives will, of course, include subfecond and infecund women who desire few children and have not yet had them. But the pool of

non-users will also include the women who, cohort by cohort and age group by group, have higher family size goals which, of necessity, take longer to achieve. This swells the variance in desired number of children among non-users, but leaves the mean about the same as that observed for current contraceptive users.

Table 1. Means and Standard Deviations of Desired Number of Children, by Age and Current Contraceptive Use, for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Year and Age	Means			Standard Deviations		
	Total	Current Contraceptive		Total	Current Contraceptive	
		Users	Non-Users		Users	Non-Users
1963 (Total)	2.654	2.603	2.703	0.830	0.740	0.904
25-29	2.400	2.375	2.434	0.691	0.676	0.709
30-34	2.580	2.564	2.607	0.740	0.689	0.819
35-39	2.721	2.721	2.720	0.845	0.758	0.943
40-44	2.780	2.742	2.815	0.890	0.737	0.963
45-49	2.893	3.041	2.864	0.952	0.935	0.955
1971 (Total)	2.764	2.696	2.873	0.840	0.759	0.934
25-29	2.602	2.554	2.696	0.731	0.702	0.775
30-34	2.692	2.686	2.708	0.824	0.817	0.846
35-39	2.719	2.682	2.787	0.828	0.732	0.982
40-44	2.832	2.821	2.845	0.809	0.740	0.879
45-49	3.104	2.935	3.168	0.947	0.714	1.016
1981-84 (Total)	2.556	2.559	2.551	0.788	0.752	0.838
25-29	2.514	2.463	2.592	0.757	0.758	0.748
30-34	2.524	2.551	2.456	0.758	0.736	0.808
35-39	2.563	2.592	2.496	0.792	0.764	0.853
40-44	2.590	2.604	2.571	0.788	0.730	0.861
45-49	2.585	2.559	2.596	0.843	0.794	0.865

The gradual transformation of family size goals among successive cohorts of married Japanese women is also evident in Table 1. In both 1963 and 1971, the number of children desired is somewhat higher among older women. This holds whether the women were or were not using contraceptives. However, by 1981-84, family size goals are homogeneous with respect to age, each cohort of women desiring to have 2.5 and 2.6 children on the average. In 1963 and 1971, there is a difference of approximately half a child in the mean number of children desired by the youngest and oldest age groups of women. One can also see from the table, at least as between 1971 and 1981-84, that the younger cohorts, i.e., those reaching comparable ages in the latter of the two periods, desire somewhat fewer children. Although these changes are at best modest, one should remember that they were taking place after zero population growth had already been achieved. They represent, therefore, post-transition consolidation of the more massive changes which occured during the 1950s.

There is also evidence in Table 1 of the gradual homogenization of family size goals among Japanese women. The dispersion in the desired number of children observed for women reaching comparable ages in 1971 and 1983-84 is generally less in the later period. This generalization holds, excepting those reaching ages 25-29, for all women in pairs of successive age cohorts, but is especially marked among non-users of contraceptives. That this further consolidation of the rapid changes in the 1950s occurs in the 1970s rather than in the immediate post-transition period may not be accidental. By the 1970s, the oil crisis had hit, economic growth had slowed, and housing shortages in the largest cities were more acute as land available for new construction disappeared.

The data assembled in Table 2 parallels that reported in Table 1, save that it refers to actual number of children ever born rather than to desired family size. The evidence reported in Table 2 leaves scant doubt about how contraceptives are used by married Japanese women. In virtually every age group in all three periods, contraceptors have more children on the average than non-contraceptors. This is entirely consonant with the results of the more detailed examination of the 1981 data reported in our earlier paper (Hodge, Ogawa and Kobayashi, 1986). What was true of the dispersion in desired number of children among current contraceptive users and non-contraceptive users is

parallelled by the dispersion in their actual numbers of children. Current non-users exhibit greater variation in their actual family sizes than do current contraceptive users. This, of course, follows from the account of the differences observed in the dispersion of the number of children desired among users and non-users. Non-users contain the pool of subfecund and infecund women, as well as those with larger family size goals. It is, therefore, not surprising that the dispersion in their actual numbers of children ever born should exceed that observed among contraceptive users. This result holds in every age group in each of the three periods.

Table 2. Means and Standard Deviations of Number of Children Ever Born, by Age and Current Contraceptive Use, for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Year and Age	Total	Current Contraceptive		Total	Current Contraceptive	
		Users	Non-Users		Users	Non-Users
	Means			Standard Deviations		
1963 (Total)	2.398	2.321	2.472	1.411	1.146	1.620
25-29	1.287	1.407	1.127	0.880	0.816	0.938
30-34	2.092	2.187	1.932	0.995	0.847	1.189
35-39	2.583	2.721	2.412	1.200	1.072	1.325
40-44	3.090	3.181	3.042	1.440	1.154	1.573
45-49	3.443	3.367	3.457	1.655	1.093	1.742
1971 (Total)	2.083	2.117	2.034	1.003	0.809	1.228
25-29	1.416	1.602	1.058	0.781	0.692	0.817
30-34	1.976	2.109	1.635	0.786	0.679	0.931
35-39	2.144	2.254	1.937	0.829	0.710	0.986
40-44	2.280	2.335	2.220	1.010	0.867	1.143
45-49	2.766	2.713	2.787	1.230	1.005	1.306
1981-84 (Total)	2.035	2.144	1.877	0.899	0.749	1.061
25-29	1.384	1.579	1.079	0.822	0.752	0.834
30-34	1.968	2.146	1.522	0.792	0.638	0.951
35-39	2.153	2.258	1.906	0.835	0.705	1.042
40-44	2.257	2.339	2.144	0.858	0.729	1.000
45-49	2.267	2.331	2.238	0.940	0.765	1.007

Vestiges of the rapid decline in fertility during the 1950s are also evident in Table 2. As one can see, in 1963, the mean number of children ever born increased rapidly with wife's age, with women aged 45-49 in 1963 having almost three times as many children as those aged 25-29. By 1971, the oldest group of women have only about twice as many children as those in the youngest age bracket. In 1981-84, women aged 30-34 have only about .3 of child less than those aged 45-49. These results, of course, reflect the hypothetical experiences of a synthetic cohorts which behaved over their life cycles like successive cohorts observed in each of the three periods. However, some fairly rough real cohort comparisons can be traced out in Table 2. They suggest, like the cross-sectional evidence for 1981-84, that married Japanese women have largely completed their fertility by ages 30-34, when they have on average something like one-quarter of a child or about 15 percent of their total fertility yet to achieve. One can safely surmise that this represents a very marked change from the pre-transition fertility behavior of Japanese women. The foregoing account refers to the data for all women. However, reference to Table 2 reveals that, except for some minor variations in detail, it holds both for women currently using and for those not using contraceptives.

Table 2 also harbors significant evidence for the homogenization of achieved family size goals among Japanese couples. With only a few modest exceptions, Table 2 shows that the dispersion in number of children ever born has declined among successive cohorts of married Japanese women reaching comparable ages in 1963, 1971, and 1981-84. This result pertains, as one might expect, primarily to women in the three oldest age categories, i.e., those aged 35-39, 40-44, and 45-49, who have largely completed their families. The phenomenon is often quite marked and it pertains to all women, as well as to groups of women who were current users and non-users of contraception. For example, among women who were aged 45-49 in 1963, the variance in number of children ever born was $(1.655)^2 = 2.739$, while among those aged 45-49 in 1981-84 it was $(0.940)^2 = 0.884$. This represents a reduction in the variance of completed family size in these two cohorts of 68 percent. Married Japanese women are plainly doing what the data in Table 1 suggested they desired to do, viz., achieve an increasingly homogeneous family size goal of two to three children.

While the data in Tables 1 and 2 reveal that the family size goals and accomplishments of Japanese women are becoming increasingly homogeneous, the data in Table 3 indicates that they are also becoming more efficacious in achieving their desires. The upper panel of Table 3 reports, by age and contraceptive use, for each of the three periods, the correlation between children ever born and desired number of children.

Table 3. Correlations Between Desired Children and Children Ever Born, by Age and Current Contraceptive Use, for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Year and Age	Total	Current Contraceptive	
		Users	Non-Users
	Product Moment Correlations		
1963 (Total)	.3484	.3464	.3475
25-29	.2531	.3070	.2159
30-34	.3303	.3170	.3587
35-39	.3788	.3058	.4434
40-44	.2838	.2232	.3052
45-49	.2149	.0870	.2340
1971 (Total)	.4074	.4344	.4027
25-29	.1386	.2709	.0468
30-34	.4139	.4766	.3659
35-39	.4160	.4427	.4274
40-44	.4056	.4555	.3746
45-49	.4380	.4817	.4293
1981-84 (Total)	.4029	.4436	.3780
25-29	.2925	.3532	.3064
30-34	.4052	.4805	.3203
35-39	.4783	.4787	.4862
40-44	.4176	.4573	.3867
45-49	.4442	.4629	.4423
	Number of Cases		
1963 (Total)	2373	1154	1219
25-29	492	280	212
30-34	588	369	219
35-39	544	301	243
40-44	442	155	287
45-49	307	49	258
1971 (Total)	2608	1534	1074
25-29	498	327	171
30-34	636	458	178
35-39	597	390	207
40-44	483	251	232
45-49	394	108	286
1981-84 (Total)	5321	3153	2168
25-29	808	492	316
30-34	1268	906	362
35-39	1143	802	341
40-44	1127	654	473
45-49	975	299	676

As can be seen in the column pertaining to all women, there is a relatively sharp increase between 1963 and 1971 in the correlation between desired and actual number of children. What is true for women as a whole also pertains, with the exception of those aged 25-29, to the comparisons within successive cohorts of women reaching comparable ages in the two periods. Further inspection of Table 3 reveals that the shift between 1963 and 1971 toward a closer correspondence between actual and desired number of children occurs primarily among contraceptive users, particularly when age-specific contrasts are drawn. With some minor exceptions, the results for 1981-84 are surprisingly close to those observed in 1971.

Japan in the 1950s must have been, for those who experienced that period as adults, something kindred to the mythical kingdom of Camelot, particularly in comparison to the 1930s and 1940s. Population growth was reduced to a negligible amount. The economy had taken and was in full swing with economic growth commonly in excess of 10 percent per annum. The heyday of the Japanese Camelot has now past; though the country prospers, economic growth has slowed. Too few births in the recent past has created a population problem in reverse. The eerie specter of a potential decline in the real standard of living hangs over contemporary Japan as a rapidly aging population becomes increasingly dependent upon the smaller cadres of younger workers.

The results in this section permit a succinct, albeit somewhat simplified, account of Japanese demographic history during and after "Camelot." During the 1950s, Japanese women reduced their fertility dramatically to a replacement level. In the following decade they enhanced the correspondence between their desires and their fertility performances. Finally, in the 1970s they consolidated the experiences of the previous two decades by moving toward an increasingly accepted norm of two to three children. This remarkable homogenization of family size goals and accomplishments was accomplished while the differentiation and diversification of the Japanese socioeconomic structure continued without cease, albeit perhaps at a slower pace.

V. Alternative Evidence on the Changing Relation between Desired and Actual Numbers of Children

It is sometimes instructive to examine the same data using alternative analytic strategies. In this section, we use log linear models to examine and test hypotheses about the changing relationship between family size desires and family size achievements which was evident in Table 3. Of necessity, the tabular materials studied in this section represent a simplification of the analyses undertaken using linear correlations. Even the fairly large sample sizes of the studies at hand will not support the simultaneous cross-classification of children ever born by desired children, contraceptive use, period (or year) and age. However, we saw in Table 3 that changes in the relationship between actual and desired number of children were observed between 1963 and 1971 in all but the youngest age group. Consequently, we have dropped wife's age from the tabular analysis. It was also necessary to dichotomize the distributions of actual and desired number of children. Both of these variables were collapsed in the same way by making distinctions between women wanting or having two or fewer children and those wanting or having three or more children.

The simultaneous cross-classification of children ever born (F) by desired number of children (D), contraceptive use (C), and year of observation (Y) is given in Table 4. The upper panel of the table contains the underlying frequencies, which are used in subsequent statistical analyses (and which the reader may use to replicate or refine the statistical results presented herein). The second panel of the table reduces the raw frequencies to the odds-specific to desires, contraceptive use, and age--that a women actually has three or more children. First, let us examine the row of odds that refer to women who were currently using contraceptives. In that row, within each of the three years, we can see that women who desire three or more children exhibit higher odds of actually having those children than do women who desire less than three children. If we inspect the row that refers to women who were not currently using contraceptives, we find the same thing. This tells us that there is association between desired and actual number of children which persists within years and holds among both users and non-users of contraceptives.

Table 4. Frequency Distributions and Odds Three or More Children by Desired Number of Children and Contraceptive Use, for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Contraceptive Use and Children Ever Born	Year and Desired Number of Children					
	1963		1971		1981-84	
	≤ 2	3 or more	≤ 2	3 or more	≤ 2	3 or more
	FREQUENCIES					
Total						
Three or More	211	810	44	710	162	1240
Two or Less	789	728	985	1011	2491	1600
Contraceptive Users						
Three or More	101	347	17	391	92	753
Two or Less	415	369	643	570	1485	896
Non-Users						
Three or More	110	463	27	319	70	451
Two or Less	374	359	342	441	1006	704
	ODDS THREE OR MORE CHILDREN EVER BORN					
Total	0.267	1.113	0.045	0.702	0.065	0.753
Contraceptive Users	0.243	0.940	0.026	0.686	0.062	0.840
Non-Users	0.294	1.290	0.079	0.723	0.070	0.641
	ODDS RATIO OF HIGH TO LOW DESIRED CHILDREN					
Total	4.169		15.600		11.585	
Contraceptive Users	3.868		26.385		13.548	
Non-Users	4.388		9.152		9.157	

As a second step in examining the odds in the second panel of Table 4, we can look among the contraceptive users who desired two or fewer children. If we compare the odds that these women had three or more children in the different years, we find that odds are distinctly larger in 1963 than in either 1971 or 1981-84. If we look at non-contraceptive users who desire few children and at both contraceptive users and non-users who desire three or more children, we find the same thing, i.e., the odds of having three or more children are lower in the later two periods than they are in the first period. This tells us there is association between period and actual number of children which holds among not only contraceptive users and non-users, but also among those desiring relatively few and relatively more children.

Yet a third obvious way to inspect the odds in the second panel of Table 4 is to compare, within each column, the odds that contraceptive users and non-users have three or more children. For five of the six possible comparisons, one can see that the odds non-users have three or more children are ever so slightly higher than the odds for contraceptive users. This suggests there may be a slight impact of contraceptive use on actual number of children, but it is modest relative to the associations between year and actual children and between desires and actual children.

If one regards the odds in the second panel of Table 4 as parallel to the within group means in an analysis of variance, then we have seen to this juncture that there are at least main effects for year and for desires. In addition, there may be a main effect for contraceptive use, but if so, it is small. None of this is surprising; it is perfectly consonant with what we already knew from the analyses presented in our earlier paper (Hodge, Ogawa and Kobayashi, 1986). What we really want to know is not whether main effects are present, but whether they interact, which is what we alleged was the case in conjunction with our interpretation of Table 3. To that end, we examine the bottom panel of Table 4, which contains ratios of the odds observed in the second panel of the table. In particular, in each year, for contraceptive users and non-users we have taken the ratio of the odds that those who desire three or more children to the odds that these who desire two or fewer children exceed those desires by having three or more children. We see, for

example, the value of this ratio of odds for contraceptive users in 1963 was just 3.868 which was simply calculated by dividing 0.243 into 0.940 (see the second panel of the table). The values of these odds-ratios are one way of assessing the present of association between desired and actual number of children. If the value of this odds-ratio were unity, then there would be no association between desired and actual numbers of children. Negative association between desires and achievement would be reflected if these odds-ratios were less that one. However, as one can see from the bottom panel of Table 4, all of these odds-ratios are several times larger than one, which reflects the known positive association between desired and actual numbers of children. The larger these odds-ratios are, the greater is the association between desired and actual numbers of children.

The odds-ratios in the bottom panel of Table 4 are not uniform in magnitude. For example, examining the row which refers to contraceptive users, we see that the odds-ratios for 1971 and 1981-84 are higher than that for 1963. The same result is also observed among women who were not currently using contraceptives. This implies, as was also evident from the correlations exhibited in Table 3, that the association between desired and actual number of children increased somewhat between 1963 and 1971. Stated otherwise, there is an interaction of the relationship between actual and desired children with year or period. The bottom panel of Table 4 also reveals an additional interaction. If we look only at the odds-ratios for 1971 and 1981-84, we can see that they are larger for those using contraceptives than for those not using contraceptives at the survey dates. Since the odds-ratios reflect the congruity between actual and desired number of children, this result implies that current contraceptive users are more likely to realize their family size goals than are those who are currently not using contraceptives. This pattern was also present, though not quite so clearly, in the correlations reported in Table 3. We may also observe that in 1963, the odds-ratios for contraceptive users and non-users are more nearly the same. Indeed, in contradiction to the pattern observed in 1971 and in 1981-84, the odds-ratio for non-users is somewhat larger than that for users. This indicates that there is potentially a two-way interaction of the relationship betweeen actual and desired children with both period and contraceptive use.

Some basic results from fitting selected log-linear models to the frequencies reported in the upper panel of Table 4 are reported in Table 5, which gives both the likelihood ratio and Pearson χ^2-statistics associated with each model and with selected model contrasts. At the outset, we should indicate that we are not so much interested in the present situation in finding the best fitting model as in testing for the present of certain associations thought to be present in the data. Consequently, we take for a benchline a model, (DCY)(DF)(CF)(YF), which already presumes the presence of associations which one might ordinarily regard as problematical. Here we are interested only in how desired children (D), contraceptive use (C), and period (Y) are related to children ever born (F). In particular, we are not interested at this juncture in how desires, contraceptive use, and period are themselves interrelated. Consequently, we include the term DCY in our benchline model and in all other models; inclusion of this term secures that all of the models will reproduce the three-way association between desires, contraceptive use, and period. (The models we are fitting are hierarchical ones, so the inclusion of a higher order term implies capturing all lower terms; thus, fitting DCY implies fitting the marginals of D, C, and Y, the pairwise associations DC, DY, and CY, as well as the three way association DCY.) In addition, to the association between desires, contraceptive use, and period, which we take as given, we allow in the benchline model for each of these factors to be associated with children ever born. This is accomplished by including the terms DF, CF, and YF in the benchline model. Ordinarily, one would test for these associations. However, there is more than ample evidence in this paper and some of our earlier papers (Ogawa and Hodge, 1983) that there is association between children ever born and each of these variables. Thus, we postulate in our benchline model what one can regard as the main effects so that we can move directly to the examination of the interactions between these effects which were postulated on the basis of our inspection of the odds and odds-ratios in Table 4.

Table 5. Log Linear Models of Relationship Between Number of Desired Children(D), Contraceptive Use(C), Year(Y), and Number of Children Ever Born(F), for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Log Linear Models	Degrees of Freedom	χ^2 - Statistic	
		Likelihood Ratio	Pearson
1. (DCY)(DF)(CF)(YF)	7	120.304	119.376
2. (DCY)(YF)(DCF)	6	109.796	110.288
3. (DCY)(CF)(DYF)	5	35.852	36.365
4. (DCY)(DF)(CYF)	5	100.257	99.363
5. (DCY)(DCF)(DYF)	4	29.865	29.945
6. (DCY)(DCF)(CYF)	4	89.230	93.001
7. (DCY)(DYF)(CYF)	3	15.124	15.494
8. (DCY)(DYF)(CYF)(DCF)	2	10.500	10.547
9. (1) VS (2)	1	10.508	9.088
10. (1) VS (3)	2	84.452	83.011
11. (1) VS (4)	2	20.047	20.013
12. (5) VS (8)	2	19.365	19.398
13. (6) VS (8)	2	78.730	82.454
14. (7) VS (8)	1	4.624	4.947

The next three models we examine allow for three way interactions that enable us to test whether or not there is a marginal interaction between the way in which pairs of the basic predictor variables are related to children ever born. For example, our second model is given by (DCY)(YF)(DCF), which not only allows period to be associated with children ever born, but also permits the relationship between desired and actual children to be conditioned by current contraceptive use. A comparison of the second model with the benchline model is executed in the ninth row of Table 5, which indicates that one cannot reject (at the .05 level) the hypothesis that the relationship between actual and desired children is conditioned by contraceptive use. While statistically significant, this interaction is, however, rather weak as revealed by the modest value of χ^2 associated with the contrast between the two models. The value of χ^2 is not, of course, a measure of association, but here the number of cases runs in the thousands and the value of χ^2/N, which does reflect association, is very small.

The third model allows for the relationship between desired and actual number of children to interact with period, while the fourth model allows the way contraceptive use is related to children ever born to change from one period to the next. The tenth and eleventh lines of Table 5 effect the contrasts between the benchline model and the models containing the marginal interactions shown on the second and third lines and of the table. Each of these contrasts is significant, so we must entertain two hypotheses; 1) desired and actual children are associated depending upon period and 2) the relationship of actual children to contraceptive use is likewise conditioned by period. Thus, all of the possible three-way associations between children ever born and pairs of the predictor variables are potentially present, since allowing for any one of these three-way associations yields a marginal improvement in the model fit over the benchline model that incorporates only the two-way associations or main effects. Among these three-way associations, we may note that the one involving actual children, desired children, and period yields the largest marginal reduction in χ^2. This, of course, was the relationship which was most apparent in Table 3.

Given that all of the three-way associations involving children ever born and pairs of the predictor variables generate a marginally significant improvement in the model fit, one needs to effect further

contrasts designed to isolate which of these three way associations are partially significant, i.e., yield an improvement in model fit even after the other three-way associations have been incorporated in the model. The three-way associations of interest are designed by the terms (DCF), (DYF), and (CYF). Models five, six and seven incorporate pairs of them into the benchline model, while model eight incorporates all three of them. Contrasts between model eight and models five, six, and seven reveal whether or not each of the three-way associations has an impact which is partially significant. These contrasts are given on the last three lines of Table 5. For example, the twelfth line compares model five with model eight. Since the fifth model does not contain the term CYF, the contrast between model five and model eight tells us that this term is partially significant, that is, the relationship between children ever born and contraceptive use changes with period. Allowing for this three-way association improves the model fit even after allowance has been made for the other possible three-way associations. The remaining contrasts effected on the thirteenth and fourteenth lines of Table 5 reveal that the other three-way associations are also partially significant. However, it should be noted that the partial association for the three-way relationship between actual children, desired children and contraceptive use is quite weak, while that involving family size goals, children ever born and period is rather more substantial.

In sum, the log linear analysis of Table 4 confirms in broad outline the substantive conclusions picked out from the table by examination of the odds and odds-ratios. It should, however, also be noted that model eight, which allows for all possible three-way associations in the four-way table, also does not fit the data. This implies there is four-way association in the table, a possibility we noted in our verbal description of the odds-ratios. However, the four-way association is not particularly strong and we are loathe to place any substantive interpretation upon it. Indeed, shifting one of the odds-ratios in the bottom panel of Table 4 might well eliminate it altogether.

In concluding this section, we observe that the log linear analysis also dovetails nicely with the correlation analysis presented above, though it does not lend itself to the observation of increasing homogeneity in family size goals and family size outcomes for the

simple reason that these variables were dichotomized in analysis. We may also note that we have scrutinized Table 4 and the log linear analysis of it in perhaps more detail than is warranted. The reason for such a close reading of Table 4 was to prepare the reader who is unfamiliar with odds, their ratios, and log-linear analysis for the remaining analyses in this paper.

VI. The Twilight of Differential Desires in Fertility

Evidence relevant to the way the associations between desired number of children, wife's education, wife's age, and urban/rural residence have been shifting over time is contained in Tables 6.1, 6.2, and 6.3 which show the cross-tabulation of these four variables in 1963, 1971, and 1981-84, respectively. The frequency distributions are given in the upper panels of the tables, while the odds of desiring three or more children (D), specific to wife's age (A), education (E), and urban/rural residence (U) are shown in the bottom panel of the table for each year (Y). Our strategy for discussing these tables is (a) to focus on a particular relationship and (b) then examine if that relationship is replicated from one year to the next. Having inspected the tables in this way, we then fit selected log-linear models to the five-way tables (UEAYD) which include year or period as an additional variable. Those models are designed to test the generalizations culled from inspection of the odds that women with various combinations of traits desire three or more, as opposed to two or less, children.

We begin our discussion with Table 6.1, where we first look at the row pertaining to women aged 18-29 in 1963 and, more specifically, within that row we contrast the odds observed for urban and rural women having only a primary education. As can be seen, the rural women with a primary education have slightly higher odds of desiring three or more children than do urban women with only a primary education. If one contrasts the odds for urban and rural women aged 18-29 who have secondary and college educations, the results are the same; the rural women are a bit more likely, regardless of educational level, to desire three or more children. Undertaking comparisons of urban and rural women with similar educational

Table 6.1. Frequency Distribution and Odds Desired Family Size Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1963

Desired Children and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Desire Two or Less						
18-29	63	73	12	57	30	5
30-39	86	139	12	84	50	4
40-49	67	50	6	49	13	2
Desire Three or More						
18-29	65	64	4	68	28	3
30-39	118	182	20	253	89	11
40-49	175	123	12	178	47	5
	ODDS THREE OR MORE DESIRED					
Age						
18-29	1.032	0.877	0.333	1.193	0.933	0.600
30-39	1.372	1.309	1.667	3.012	1.780	2.750
40-49	2.612	2.460	2.000	3.633	3.615	2.500

Table 6.2. Frequency Distribution and Odds Desired Number of Children Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1971

Desired Children and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Desire Two or Less						
18-29	73	95	11	29	17	...
30-39	160	171	23	72	33	1
40-49	71	84	15	37	17	2
Desire Three or More						
18-29	65	120	27	21	28	1
30-39	180	246	45	148	61	1
40-49	179	162	15	160	47	5
	ODDS THREE OR MORE DESIRED					
Age						
18-29	0.890	1.263	2.455	0.724	1.647	...
30-39	1.125	1.439	1.957	2.056	1.848	1.000
40-49	2.521	1.929	1.000	4.324	2.765	2.500

Table 6.3. Frequency Distribution and Odds Desired Number of Children Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1981-84

Desired Children and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Desire Two or Less						
18-29	34	198	133	10	60	8
30-39	173	572	211	56	78	30
40-49	285	373	74	99	54	9
Desire Three or More						
18-29	28	184	117	20	51	22
30-39	129	545	220	74	158	33
40-49	254	401	96	178	89	19
	ODDS THREE OR MORE DESIRED					
Age						
18-29	0.824	0.929	0.880	2.000	0.850	2.750
30-39	0.746	0.953	1.043	1.321	2.026	1.100
40-49	0.891	1.075	1.297	1.798	1.648	2.111

backgrounds among those aged 30-39 and 40-49 reveals again that the rural women are more likely to favor having three or more children. However, in these older groups of women, the odds for the rural women are substantially higher than those observed among urban women falling in the same educational category. Thus, the examination of the 1963 data reveals (1) that there is an impact of urban/rural residence upon desired children and (2) this impact appears to interact with age, being rather more pronounced among older than among younger women. Examining Tables 6.2 and 6.3 reveals patterns of odds which are remarkably parallel to that observed in Table 6.1. There are a few perturbations which can be easily attributed to the very small number of rural women with college backgrounds. Otherwise, the patterns are much the same, save that the interaction of the impact of urban-rural residence with age seems to be attenuated somewhat in the final period. The odds of desiring three or more children are, across the board, generally less in each successive period, though there are numerous perturbations in the overall downward trend which is especially marked when comparing the final to either one of the two earlier time periods.

Having examined the impact of urban/rural residence upon number of desired children, we now turn to examine the association between age and number of children desired. If we read down the column in the bottom panel of Table 6.1, it is readily apparent that the older cohorts of women exhibit higher odds of desiring three of more children. Women aged 40-49 in 1963 passed through the prime years of childbearing just as Japan's demographic revolution was swinging into high gear. It is hardly surprising that they should exhibit a preference for larger families than the cohorts following them. The age pattern in Table 6.1 is quite regular and the only major discrepancy from the overall pattern occurs among rural women with college background where the number of cases is very small. Thus, in 1963, regardless of their educational level and their type of place of residence, successive cohorts of Japanese women exhibited successively lower odds of desiring larger families of three or more children.

The age pattern of family size goals exhibited in 1963 is reproduced in large measure in Table 6.2 for 1971. There is, however, one noteworthy exception to the overall similarity. For college women residing in urban areas, the typical age pattern of fertility desires

is reversed. We are inclined to believe that this is a sampling error, despite the fact that the observed reversal rests on a modest number of cases. The age pattern of the odds for desiring three or more children observed in 1981-84 stands in stark contrast to the systematic patterns observed for successive cohorts in both 1963 and 1971. For many groups of women, there is no clear pattern and, where the pattern characteristic of 1963 and 1971 is found, it is severely attenuated relative to the preceding periods. Thus, by 1981-84, wife's age is basically unrelated to her family size goals. This, of course, is not surprising since all of the cohorts observed in the terminal period passed through their prime years of childbearing after Japan's demographic transition was complete. For example, women aged 40-49 in 1981 were aged just 16-25 in 1957, a date commonly selected as marking the end of the great postwar downswing in fertility. In sum, at least through the early 1970s, successive cohorts of Japanese women exhibited lower odds of desiring relatively large, above replacement level families. By the 1980s, this phenomenon had passed from the Japanese age structure as the pre-transition and transition aged cohorts passed out of their reproductive ages. Thus, age is associated with family size goals, but it interacts with time and dwindles off to next to nothing within two decades spanned by the data at hand.

Finally, we attend to the association between desired children and wife's educational level in each of the three periods. In 1963, among urban women aged 18-29, the odds of desiring three or more children decline monotonically as their educational level rises. The same pattern is also observed for younger rural women. In the older cohorts, the same general pattern is present, but two exceptions are observed among those aged 30-39. These exceptions have the same root cause, to wit, an excess in the relative numbers of urban and rural, college educated women desiring three or more children. The underlying sample frequencies are, however, small and one has to expect perturbations of this kind.

What was typical of the relationship between education and family size desires in 1963 is not systematically replicated in 1971. Among both urban and rural women aged 18-29, as well as among urban women aged 30-39, tha pattern is reversed, with the better educated women having the higher odds of desiring three or more children. By 1981-84,

any systematic relationship between education and desired number of children has virtually disappeared. Thus, the three time periods examined here reveal a virtually complete demise in educational differentials in the number of children desired. If anything, the data suggest a reversal of the traditional inverse relation between education and family size goals may be underway, a prospect consistent with the finding that the wives of well-educated husbands are less likely to find paid employment (Ogawa, 1987). In sum, education, like age, was once associated with desired children, but the impact has dwindled with the passage of time and the homogenization of family size goals.

The main conclusions drawn from an examination of the odds presented in Table 6.1 through Table 6.3 can now be statistically examined via the fitting of selected log-linear models to the five-way crossclassification of desired number of children (D) by urban-rural residence (U), wife's education (E), wife's age (A) and period or year (Y). The χ^2-statistics associated with selected fitted models and contrasts between them are exhibited in Table 7. As in the log-linear analyses presented previously, we are not here interested in finding the best fitting model, but rather in detecting whether or not certain postulated relationships can be statistically isolated. Our focus is clearly upon how family size goals are associated with urban-rural residence, education, age, and time. The associations between urban-rural residence (U), education (E), age (A), and year (Y) are taken as given in the present context, so each of the models studied herein assumes the full, four-way association, UEAY, between these conceptually independent variables. Furthermore, there is ample evidence in our earlier work (Ogawa and Hodge, 1983) that there is association between each of these four independent variables and family size desires. Thus, there is scant interest in running statistical tests for what can conceptually be regarded as main effects. What is of interest is whether or not, as suggested by our discussion of Tables 6.1, 6.2, and 6.3, there is interaction between period and the association of desired children with each of the remaining three predictors. We begin our log-linear modelling, therefore, with tests for each of these possibilities.

Table 7. Log-Linear Models of Desired Family Size(D), by Urban/Rural Residence(U), Education(E), Age(A) and Year(Y), for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Log Linear Models	Degree of Freedom	χ^2 - Statistic	
		Likelihood Ratio	Pearson
1. (UEAY)(DU)(DEY)(DAY)	38	64.274	65.134
2. (UEAY)(DA)(DEY)(DUY)	40	99.486	99.461
3. (UEAY)(DE)(DAY)(DUY)	40	73.763	74.085
4. (UEAY)(DEY)(DAY)(DUY)	36	62.479	63.363
5. (UEAY)(DEY)(DAY)(DUE)(DUA)	34	52.982	53.397
6. (UEAY)(DEY)(DAY)(DUA)(DAE)	32	52.734	53.113
7. (UEAY)(DEY)(DAY)(DAE)(DUE)	32	58.046	58.541
8. (UEAY)(DEY)(DAY)(DAE)(DUE)(DUA)	30	50.318	50.591
9. (1) VS (4)	2	1.795	1.771
10. (2) VS (4)	4	37.001	36.098
11. (3) VS (4)	4	11.284	10.722
12. (5) VS (8)	4	2.664	2.806
13. (6) VS (8)	2	2.416	2.522
14. (7) VS (8)	2	7.728	7.950

To simplify the analysis, we move directly to the examination of tests for the partial associations for the postulated interactions. For these purposes, model four in Table 7 serves as a convenient reference point. This model reproduces the four-way association between urban-rural residence, education, age, and year and allows the associations of urban-rural residence, education, and age with desired number of children to interact with year. The first model also incorporates the four-way associations between predictor variables (UEAY) and allows for the three-way associations between desired children, education, and year (DEY) and between desired children, age, and year (DAY). Unlike the fourth model, however, the first model does not permit the association of desired children with urban-rural residence to interact with year. Thus, the first model includes only the term DU, while the fourth allows this association to vary between

years by including DUY. The ninth line of Table 7 effects a comparison between model one and model four. The χ^2-statistic for the difference between them is not significant at any conventional level, so we may reject the hypothesis that the impact of urban-rural residence on desired number of children interacts with year. This result is wholly consonant with our discussion of Tables 6.1, 6.2, and 6.3, in which we observed no evidence for such an interaction.

We did, however, assert that both age and educational differences in desired number of children were disappearing from one period to the next. As can be seen by inspection of Table 7, a comparison of model two with model four yields a test for the potential interaction of the relationship of desired children and age with period, while the contrast of model three with model four permits evaluation of the hypothesis that the association between education and desired children interacts with year. Inspection of the χ^2-statistics on the tenth and eleventh lines of Table 7 reveals that neither of the two following hypotheses can be rejected; (1) the relationship between family size goals and age interacts with period, and (2) association between family size goals and education dwindles through time. These statistical results confirm what we observed by examining the odds of desiring three or more children among women of varying age, educational levels, and type of place of residence in each of the three periods.

Although we did not detect any interaction of the relationship between desired children and urban-rural residence with period, we did suggest that urban-rural differences in the odds of desiring three or more children were less pronounced among younger than among older women. This pattern does not itself appear to be changing from year to year. Such an age-graded, urban-rural differential in desired children could be generated in a variety of ways. For example, as rural women age and have relatively more children and as urban women age and have relatively fewer children, their reported family size goals may change in response to these actual experiences. We believe, however, that family size goals are relatively, albeit not perfectly, stable over the life cycle. The observed pattern could also be generated by selective migration if rural women with small family size goals gradually drift to the city over their life course, leaving behind in the rural areas their peers with larger family size goals

and contributing themselves to the lower family size goals of women born in urban areas. Such selective migration would, in successive periods, regenerate the interaction with age of the association between urban-rural residence and desired children. It also does not require one to postulate changes over the life cycle in family size goals.

To test for the potential interaction of age and urban-rural residence upon family size goals, we fit some rather more complex log-linear models to the data in Tables 6.1, 6.2., and 6.3. The reference model in this case is the one given in the eighth line of Table 7. This model allows, of course, for the four-way association between the predictor variables; it also contains terms--DEY and DAY--to allow for the interactions with period of the relationships of desired children to both age and education. Finally, this reference model introduces terms which reproduce the three-way associations of desired children with all possible pairs of the social and demographic predictors, i.e., education, urban-rural residence, and age. Thus, the term DAE allows the impacts age and education on desired children to interact, while the terms DUE and DUA allow the impact of urban-rural residence on desired children to interact, respectively, with education and age. In contrast to model eight, model seven is missing the potential interaction of age and urban-rural residence in their impact on family size goals. As can be seen from the fourteenth line of Table 7, the comparison between these models yields a significant value of χ^2, which implies that we cannot reject the hypothesis that the association of desired children with urban-rural residence is affected by age. Contrasts between model eight and models five and six do, however, allow us to reject the hypotheses that the impact of education on desired children interacts with either age or urban-rural residence. The statistical results, therefore, are once again in conformity with our visual inspection of the odds of desiring three or more children among women of varying characteristics. In concluding this section, we may note that none of the models estimated herein fits the data satisfactorily, though models five through eight come rather close to doing so. Our sense, given the sample sizes underlying the basic tables, is that forcing yet higher order terms into these models would run a very high risk of detecting sample errors rather than revealing substantial findings.

VII. Fertility Outcomes in the Post-Transition Period

We have already seen from the results of a previous section that Japanese women have become increasingly efficacious in translating their family size desires into real families whose numbers coincide with their dreams. For this reason alone, there must be some general correspondence between desires and reality with respect to fertility behavior. Given this generalization, one can readily expect to observe association between actual fertility and urban-rural residence, wife's education, wife's age, and time. That this is, indeed, the case is apparent upon inspection of Tables 8.1, 8.2, and 8.3 which show the four-way associations between children ever born, urban-rural residence, education, and age for 1963, 1971, and 1981-84, respectively. The expected patterns do not always materialize in these tables, but the exceptions are typically observed where the number of cases available for analysis are rather small.

Apart from the overall direction of the main effects, careful inspection of the odds of actually having three or more children, which are reported in the bottom panels of the three tables, suggested three ways in which the main impacts of urban-rural residence, education, age, and period are conditioned by one another. First, and surely most striking, is the way the impact of age upon fertility changes from year to year. The age differentials in children ever born generally diminish from year to year. This shifting pattern of age differentials in fertility is brought about not only because successive cohorts of married Japanese women want and have fewer children, but also because processes of family formation are also being transformed. Japanese couples most recently often postpone marriage until they are ready to embark upon childbearing and childrearing. Thus, once married, Japanese couples often move rapidly into pregnancy and the accomplishment of their increasingly limited family size goals of two to three children. Effectively, this means that increasing numbers of Japanese women have completed their families by their late twenties, a phenomenon which surely leads to a sharp reduction in age differentials in the numbers of children ever born.

Another factor operative in Table 8.1 through Table 8.3 involves the way education and age jointly impact upon children ever born. Although there are disturbances which occasionally upset the monotonicity in the relationship, in most age groups in all years and for urban and rural women alike, there is an inverse association between wife's education and number of children ever born. Still further, there is a modest tendency for this relationship to be somewhat more pronounced among older than among younger women. This is a sensible pattern, since obviously women with different educational background begin their childbearing experiences on an equal footing. Educational differentials in fertility can emerge only after the processes of family formation are underway. Thus, it is not surprising that more mature women, nearing the end of their reproductive cycles, should exhibit somewhat larger educational differentials. The other side of the same coin, of course, is that age differentials in fertility tend to be more pronounced among less educated than among better educated women.

The final pattern of interactions which can be teased out of the odds displayed in the bottom panels of Tables 8.1, 8.2, and 8.3 involves education and urban-rural residence. Although there are numerous exceptions, we observe that as a general rule the educational differentials in number of children ever born are rather more pronounced in the rural than in the urban areas. Pooling the data across age groups and years, we can construct the following table of overall odds of having three or more children, specific only to education and urban-rural residence:

Table 8.1. Frequency Distribution and Odds Number of Children Ever Born Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1963

Children Ever Born and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Children Ever Born Two or less						
18-29	117	131	14	111	54	7
30-39	123	236	24	132	76	11
40-49	63	59	8	43	10	4
Children Ever Born Three or More						
18-29	11	6	2	14	4	1
30-39	81	85	8	205	63	4
40-49	179	114	10	184	50	3
	ODDS THREE OR MORE CHILDREN EVER BORN					
Age						
18-29	0.094	0.046	0.143	0.126	0.074	0.143
30-39	0.659	0.360	0.333	1.553	0.829	0.364
40-49	2.841	1.932	1.250	4.279	5.000	0.750

Table 8.2. Frequency Distribution and Odds Number of Children Ever Born Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1971

Children Ever Born and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Children Ever Born Two or Less						
18-29	123	209	38	43	41	1
30-39	259	331	54	123	64	2
40-49	131	154	23	59	32	4
Children Ever Born Three or More						
18-29	15	6	0	7	4	0
30-39	81	86	13	97	30	0
40-49	119	92	7	138	32	3
	ODDS THREE OR MORE CHILDREN EVER BORN					
Age						
18-29	0.122	0.029	--	0.163	0.976	--
30-39	0.313	0.260	0.241	0.789	0.469	--
40-49	0.908	0.597	0.304	2.339	1.000	0.750

Table 8.3. Frequency Distribution and Odds Number of Children Ever Born Greater Than Two, by Age, Education, and Urban/Rural Residence, for Married Japanese Women of Childbearing Age, 1981-84

Children Ever Born and Age	Education and Type of Place of Residence					
	Urban			Rural		
	Primary	Secondary	College	Primary	Secondary	College
	FREQUENCIES					
Children Ever Born Two or Less						
18-29	51	363	246	22	101	28
30-39	217	889	345	74	140	50
40-49	365	553	113	137	74	18
Children Ever Born Three or More						
18-29	11	19	4	8	10	2
30-39	85	228	86	56	96	13
40-49	174	221	57	140	69	10
	ODDS THREE OR MORE CHILDREN EVER BORN					
Age						
18-29	0.216	0.052	0.016	0.364	0.099	0.714
30-39	0.392	0.256	0.249	0.757	0.686	0.260
40-49	0.477	0.400	0.504	1.022	0.932	0.556

Educational Level of Wife	Rural		Urban	
	2 or less	3 or more	2 or less	3 or more
	Frequencies			
Primary	744	849	1449	756
Secondary	592	358	2925	857
College	125	36	865	187
	Odds Three or More			
Primary	1.141		0.522	
Secondary	0.605		0.293	
College	0.288		0.216	

These pooled results leave scant doubt that educational differentials in fertility are rather more marked in rural than in urban areas. The other side of this scenario, of course, is that urban women are paving the way to the disappearance of differentials in real fertility so that both average desires and the average actual numbers of children become homogeneous with respect to schooling.

To test for the presence of the interactions noted above, we fitted various log-linear models to the five-way cross-classification of children ever born by urban-rural residence, wife's education, wife's age and period. In order to secure an analysis parallel to the one conducted on the preceding tables for desired children, we fitted the same set of models as were fitted and contrasted in conjunction with Tables 6.1, 6.2, and 6.3. The logic of the contrasts between the fitted models is , therefore, identical to that used in conjunction with Table 7. In keeping the models fitted to Tables 8.1, 8.2, and 8.3 parallel to those fitted to Tables 6.1, 6.2, and 6.3, we had to include a term in the last four models, viz., CEY, which was shown to be insignificant by comparisons between the initial models we fitted to the data on children ever born. Including this insignificant term uses up some degrees of freedom unnecessarily, but it does not

invalidate the relevant comparisons of models and does make the two log-linear analyses parallel to one another.

Table 9. Log Linear Models of Children Ever Born(C), by Urban/Rural Residence(U), Education(E), Age(A) and Year(Y), for Married Japanese Women of Childbearing Age, 1963, 1971, and 1981-84

Log Linear Models	Degree of Freedom	χ^2 - Statistic	
		Likelihood Ratio	Pearson
1. (UEAY)(CU)(CEY)(CAY)	38	63.215	67.573
2. (UEAY)(CA)(CEY)(CUY)	40	150.733	163.475
3. (UEAY)(CEY)(CAY)(CUY)	40	69.213	71.693
4. (UEAY)(CEY)(CAY)(CUY)	36	62.841	67.081
5. (UEAY)(CEY)(CAY)(CUE)(CUA)	34	53.334	56.584
6. (UEAY)(CEY)(CAY)(CUA)(CAE)	32	45.726	59.190
7. (UEAY)(CEY)(CAY)(CAE)(CUE)	32	38.041	51.270
8. (UEAY)(CEY)(CAY)(CAE)(CUE)(CUA)	30	36.393	50.149
9. (1) VS (4)	2	0.344	0.492
10. (2) VS (4)	4	87.892	96.394
11. (3) VS (4)	4	6.372	4.612
12. (5) VS (8)	4	16.941	6.435
13. (6) VS (8)	2	9.333	9.041
14. (7) VS (8)	2	1.648	1.121

The χ^2-statistics associated with the various models and contrasts between are displayed in Table 9. The results leave scant doubt that the association between children ever born and age interacts with year. The three way association between children ever born, wife's education, and urban-rural residence is likewise significant. The likelihood ratio chi-square statistic which is preferred, but not the Pearson chi-square statistic, also reveals that the association between children ever born and education is contingent upon age. These statistical results are, therefore, wholly consistent with our discussion of Table 8.1 through Table 8.3. In order to perform the log-linear analyses of the present table for children ever born, as well as the previous one for desired children, a small positive number--0.1 to be exact--was placed in the empty cells of the tables.

VIII. Homogeneous Processes of Family Formation in a Heterogeneous Social Structure

Economic development everywhere is associated with increasing differentiation and expanding complexity. Japan is no exception to this general rule. As family size goals and actual family size achievements have become increasing homogeneous, crystallizing around two to three children, the Japanese population has itself become socioeconomically more, rather than less, heterogeneous. One aspect of the increasing heterogeneity of the Japanese population is revealed by the changing educational distribution of women in response to expanding educational opportunities, particularly in post secondary education. The measure of information in a distribution is given by $h = -\sum_{i=1}^{m} p_i(\log p_i)$, where there are m mutually exclusive categories in a distribution and the p_i's are the proportions of persons in each category so that $\sum_{i=1}^{m} p_i = 1$. Information indices were computed from the census educational distributions for women of childbearing age in 1960, 1970, and 1980. These distributions show only the proportions of women with primary, secondary, and university training. The values of h, disaggregated by five year age groups, were as follows:

Age of Woman	Year		
	1960	1970	1980
	Value of h		
20-24	0.352	0.408	0.389
25-29	0.351	0.409	0.421
30-34	0.345	0.387	0.420
35-39	0.306	0.367	0.410
40-44	0.275	0.357	0.394
45-49	0.263	0.318	0.376

Source: Bureau of Statistics, Office of the Prime Minister, Population Census of Japan, 1960, 1970 and 1980.

These indicators of the information in the educational distributions observed among successive cohorts leave no doubt that the educational backgrounds of Japanese women are increasingly heterogeneous. In each year, there is more information in the educational distributions for younger women. In successive years, women exhibit more educational heterogeneity than their comparably aged predecessors of a decade earlier. The only exceptions to these generalizations are occasioned by the relatively low amount of information observed among women aged 20-24 in 1970 and in 1980. Some of these women may still be completing their education, so that ultimately the information in the educational distributions for these cohorts may rise. We may also note in the table that the information in the educational distributions of real cohorts tends to rise over their life cycles. For example, the value of h for women aged 25-29 in 1960 was .351. Ten years later in 1970, when these same women were aged 35-39, the observed value of h had risen to .367. Shifts of this kind may be partially attributable to differential mortality of poorly educated women and/or to errors in the census data. These changes may also be real ones created by women returning to school to earn their diplomas

and further their careers.

Education is, of course, just one aspect of the increasing socioeconomic heterogeneity of the Japanese population. The movement of married women into the labor force, particularly into paid employment, rather than into self-employment and unpaid family work, is another aspect of expanding heterogeneity. This is especially the case since the jobs available to women as paid employees are considerably more diverse than the kind of work women do in family firms or create for themselves as self-employed entrepreneurs. The male occupational distribution has also been moving in the direction of further heterogeneity, particularly as blue collar workers in heavy industries face the threat of competition from abroad and as Japanese firms both diversify and create overseas plants which are managed from corporate headquarters in Tokyo.

Rather than helping to sustain differential fertility and processes of family formation, the increasing socioeconomic heterogeneity of the Japanese population has been associated with mounting homogeneity in family size goals and outcomes. One important lesson from the Japanese case is that it may not be enough just to open up the educational horizons and job prospects of women. Such changes may, of course, be critical in inducing at first differential fertility and setting the wheels of change in motion. But, in addition, steps must be taken to undermine the traditional roles of women and to provide both men and women with sources of satisfaction and security which can be attained outside of their reproductive behavior. One needs not only to convince the women who take advantage of educational opportunities and build occupational careers to act in non-traditional ways, but also to convince women in rural settings, in family enterprises, and with little education to act in comparable ways so that an entire population of women, rather than just an educated and intellectual vanguard, achieves zero population growth.

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