EDUCATION, MODERNITY AND FERTILITY IN COSTA RICA*

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One of the best known but least understood demographic regularities is the negative relation between education and fertility. It has led some developing country leaders to conclude that as education increases the problem of excessive fertility will take care of itself, or to recommend ever-increasing doses of education as the programmatic antidote to rapid population increase. Some time ago I wrote that 'Latin American countries that wait for 'education' to reduce birth rates may wait a long time' (Stycos, 1968: 269) because the data indicated that rather heavy doses of education were required to affect fertility significantly. This was written a decade ago, and while more is known about the generality of the education-fertility relation (see e. g., Timur: 1977), little progress has been made in specifying the way in which education affects fertility. In a recent review paper on the subject, Holsinger and Kasarda (1976: 154) had to conclude that 'the causal mechanisms that link the two have yet to be specified adequately and submitted to systematic empirical testing."

In an earlier study of the pattern of fertility decline in Costa Rica, I concluded that major breakthroughs in Costa Rican education in the 1940s and 1950s were in large part responsible for fertility declines that began in the 1960s.

It was certainly clear that since the 1950s the literacy level of a canton was a much better predictor of its fertility than was its degree of urbanization, agricultural employment, or infant mortality (Stycos, 1978). Further to identify the causal mechanisms, the Cornell University International Population Program, in collaboration with the Instituto de Estudios Sociales en Población (IDESPO) of the National University of Costa Rica, undertook in 1977-78 to reinterview all married women in the Encuesta Nacional de Fecundidad and to ask detailed questions in two areas that might intervene between education and fertility: Modernity and Family Size Attitudes.

Essentially our argument will be that one of the principal ways in which education affects fertility is by influencing an intervening complex of attitudes and perceptions known as modernity. Modernity, in turn, affects fertility by altering a number of attitudes and perceptions about family size that result in the will (or its absence) to limit the number of children. We will try to demonstrate that for the policy maker desiring to accelerate declines in fertility, there are easier ways than raising the general level of education.

Modernity. The sociological literature contains considerable controversy concerning the nature and consequences for fertility of a complex of attitudes known as modernity; but there is general agreement that it implies an openness to new ideas, an activist rather than fatalist world view, a "liberal" attitude toward sex and family roles, and a sense of personal efficacy (Inkeles and Smith, 1974). In our reinterviews with over 2000 women, we included a large number of questions in this area that were, after factor analysis and scale reliability tests, grouped into the following measures:

1) MASSINFO. The sum of three questions asking the respondent to name the North American President, the Costa Rican ex-Minister of Sports, and a Costa Rican southern city; and two communications items concerning degre of newspaper readership and television watching.
2) SEXROLES. The sum of six items from Rosen and Simmons' Female Role Attitude Scale (1971), four items from Goldberg's Sex Segregation Scale (1974), and three items on sexuality norms suggested by Dr. Abelardo Brenes of the National University of Costa Rica.
3) HUSBPOWR. The sum of nine items concerning who usually decides about various domestic problems - husband, wife, or both. "Both" received the highest, i.e., most modern score; "husband" the lowest score.

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4) INKELES. The sum of fourteen items stressing "instrumental activism" drawn from Inkeles and Smith's (1974) Overall Modernity Scale.

The intercorrelations of these four measures ranged from .30 to .54, low enough to justify separate use of the sub-scales, but high enough to justify adding the measures together to form an overall measure of Modernity (MODRNSUM) that correlates between .61 and .77 with the four components. I will also express the sum of the more attitudinal variables (SEXROLES, HUSBPOWR, and INKELES) as MODPSYCH, to distinguish them from the cognitive/behavioral measure MASSINFO.

The correlation between education and MODRNSUM is a close positive one (.68), and the correlation between education and number of live births (controlling age) is a negative one (-.35). Now let us see what happens when these variables are simultaneously controlled in a multiple regression analysis (Table 1). We have divided our sample into two age groups (under 35 and 35 and over) in order to describe the situation for women in the highly fecund age groups as compared with those who have largely completed their fertility. Not surprisingly, most of the explained variance is attributable to how long women have been married. But among the older women, an additional 14 percent of the variance is explained by education and modernity. As we see from the Beta weights, the Mass Communication/Information component of modernity is more important than education itself. This is also true among the younger women, where the Beta for education is not even significant when the other variable are held constant. The other components of Modernity - the Inkeles scale, Husband Power, and Sex Roles (i.e., MODPSYCH)- add nothing of consequence to the explained variance.

Thus, education produces higher general information levels and greater exposure to the mass media, which in turn lead to lower fertility. But how? There are at least three important channels, only one of which will be investigated here. The first channel refers to knowledge of and attitudes toward contraceptives, but in the Costa Rican setting these variables, at least as crudely measured by the survey, are less relevant than in many developing countries. According to the Encuesta Nacional de Fecundidad, 100 percent of the ever mated women aged 20-49 have heard of at least one efficient contraceptive method (Dirección General de Estadística y Censos, 1978: Table 56). Our reinterviews with these women disclosed that 99 percent knew at least one place to get the pill and 97 percent knew at least one place to get a sterilization.[1] Moreover, fully 81 percent have already used a contraceptive.[2] Thus, we' are dealing with a population where fertility variation cannot be explained by gross ignorance of or opposition to birth control, and the study of other sources of fertility variation is thereby simplified.

Table 1

MULTIPLE REGRESSION: LIVE BIRTHS BY AGE GROUP[a/]

	Under 35		35+	
	Beta	R^2	Beta	R^2
Years married	.49***	.28	.40**	.21
Education	-.06	.32	-.16***	.31
MASSINFO	-.16***	.35	-.24***	.35
MODPSYCH	-.08**	.35	-.01	.35

a/ Betas refer to standardized regression coefficients, holding the other variables in the model constant. R^2s have been computed in a step-wise fashion.

* ≤ .05
** ≤ .01
*** ≤ .001

A second possible intervening variable may be termed conjugal efficiency; i.e., the degree to which spouses connunicate and reach decision efficiently and effectively. However, this area failed to account for much variance in either fertility or contraceptive behavior in a Test Survey of 206 Costa Rican women carried out in 1977 (Seeley and Stycos, 1978). Therefore, it was not includes as a major variable in the larger survey. However, two brief questions concerning whether or not the respondent had ever discussed desired family size or contraception were included, but when they were introduced in the regression for live births shown in Table 1, the Betas failed to reach statistical significance in either age group.[3]

The third critical variable refers to the will to have or not have children, often referred to as the "demand' for children. If fertility is limited by voluntary means,

1 There is the possibility that the present sample somewhat over-estimates knowledge, in part because of a sampling bias in favor of the better educated. For example, in a recent national survey of contraceptive prevalence in Costa Rica, although 98 percent of the women had heard of the contraceptive pill, only 76 percent knew where to obtain it (Asociación Demográfica Costarricense *et. al.*, 1978: 40-41). It is obvious that in societies such as Costa Rica where knowledge and use of contraceptives is extensive, the traditional KAP questions to measure knowledge, attitude, and practice are much too crude.

2 There is virtually no relation between ever use of contraception and fertility. With live births as the dependent variable and age and education held constant, the Beta for birth control use (O = ever used, 1= never used) is only -.04, barely significant at the .05 level. Among non-sterilized women, the Beta drops to -.03,which is not significant. Thus, if contraception affects fertility in Costa Rica, it must be in terms of its timing, regularity and intrinsic effectiveness, rather than in terms of use or non-use. Subsequent analysis will use more refined measures of use, such as how early in the pregnancy history birth control practice was initiated.

3 However, this variable is strongly and positively related to MODRNSUM (.32) and education (.35), and negatively to age (-.35). With age and education held constant, MODRNSUM's relation is .15, significant at the .001 level.

there must be a prior will to stop or to delay conception. This dimension tends to be only crudely measured in surveys, often by a single question on preferred family size; or wether or not more children are wanted, or whether or not more children are intended. Confusions of concept and problems of measurement obscure the importance of this variable in many studies I believe that there are at least three aspects or stages of demand that need to be measured. The first is a *general predisposition* regarding the psychic and economic costs and benefits of children. For many men and women, specially early in their marriages, it may be only a vague feeling of favorability toward a 'large' or toward a 'small' family. Second, this might lead to or be accompanied by a vague to well crystalized preference for a certain number of children. Third, and much closer to behavior than either of the foregoing, there is the *desire* to have or not to have a child at any one moment; and, closest of all to behavior, is an *intention* to have or indifference toward having or not having a child. Thus, ideally we have a progression of "psychic states" that might look like this:

Predisposition toward family size	Preferred number of children	Desire for a child	Intention to have a child

We devised a variety of measures for each of these concepts, evaluated them in Costa Rica in a Test Survey (Seeley and Stycos, 1978), and included the best ones in the larger survey described here.

Predisposition: Four questions were taken from Arnold *et. al.*'s (1975) questionnaire on Value of Children and the responses were summed. Each question involved a statement about children with which the respondent was asked to agree or disagree on a five point scale; e.g., "People respect you more when you have children." Another three questions asked the extent to which having a child in the next two years would provide company for other children, help to stabilize the marriage, and make the respondent feel more like a mother. In a factor analysis of the various family size attitude scales, these three items and the four Arnold items loaded highly on the same factor and were,there fore , summed to form a scale called ARNIMP.

We also adapted Kothapani's (1971) version of the Semantic Differential Scale applied to family size attitudes, by means of three five point scales that evaluate a small family in terms of three concepts: empty-full; selfish-selfless; and sober-happy. In the factor analysis this scale was closely associated with the summed scores of four items measuring the expectation of future help from one's children: e.g., whether the respondent expects to rely on them for financial assistance when she is old. We will term the sum of these two scales SEMEXH.

Respondents were asked how many children constitute a large family and how many constitute a small one. These were combined into a measure termed LRGESMLL. Thus, the three summary measures we have outlined above reflect rather general attitudes about having children, about the hypothetical consequences of more children, and the perceptual boundaries of large and small families.

Numerical Preferences. To assess the respondent's preferred number of children, we first showed them pairs of photographs of Costa Rican families of different sizes and asked them to pick the one they prefer red and tell us why it was picked. A score combining responses to these questions was termed FOTOPREF. A more traditional question asked "If you were about to marry and could choose exactly the number of children you would like, how many children would you have?" (CHLDWANT). Finally, they were given a short version of the Coombs scale of preference (1974) which takes systematically into account preferences beyond the first choice articulated (COOMBS). [4]

Desire/Intention for Additional Children. Respondents were asked whether or not they wanted more children and, if more, how many (NUMBMORE). Responses to this item were combined with those to a similar item regarding the wishes of their husbands (HUWIMORE). The women were also asked whether or not they intended to have a child in the next two years, and how sure they felt about that intention (CHLDSCLE). The factor analysis showed the last two scales to load highly on the same factor and consequently they have been summed to form a single scale that is the operational definition of our concept of will or demand: HUWISCLE.

In addition to being the attitudinal complex closest to behavior, these variables are of particular interest since Costa Rican women, despite their unusual degree of knowledge and use of birth control, are surprisingly traditional with respect to wanting more children, when compared to other Latin American women in the World Fertility Surveys. Whereas over one-half of the Peruvian and Colombian and 41 percent of the Mexican women with two children want no more, only 35 percent of the Costa Ricans want no more (Kendall, 1979: M-84).

Figure 1 shows how the clusters of variables we have been discussing are hypothesized to affect fertility It should be noted that the relation between the demand for children and fertility is viewed as a circular one: the demand affects fertility, which then changes the demand. I have already shown that modernity helps to explain the relation between education and fertility. We now look at the steps in between. Table 2 concerns the degree of relation between the family size preferences and modernity. The pattern of correlations is quite clear: both modernity and education are closely and negatively related to the predisposition variables ($r = -.31$ to $-.47$), moderately related to the size preference measures (-.11 to -.26), and scarcely at all to desire or intention to have more children. The closer we get to behavior (i.e., desire/intention), the more attenuated the relation to education and modernity. In terms of the magnitude of the relations, education and modernity are almost identical with respect to

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[4] "If you could have an equal number of girl and boy children, how many would you prefer in all: 0, 2, 4, 0r 6?" This is followed by successive paired comparisons until the respondent chooses O or 6. Scores range from one to eight.

predisposition and numerical preference items; but education's relations, though minimal, are positive with the desire/intention items. When education and age are controlled, all the relations between MODRNSUM and the family size attitudes remain significant and in the expected direction while education's relation is somewhat smaller, holding the other variables constant (Table 2B). Thus, modernity, as much or more than education itself, helps to determine the general attitudes toward children, though not even modernity seems a very good predictor of whether women will want or have more children.

Exactly the opposite is true for age, whichs shows small positive relations to predisposition for children, moderate positive relations to numerical preferences, and strong *negative* relations to desire/intention for more children (Table 2A). What this probably means is that the basic predispositions for children change little as a woman ages. The relation to age that does exist is at least as likely to be due to generational change; i.e.

Table 2

CORRELATIONS BETWEEN EDUCATION, MODERNITY, AND FAMILY SIZE PREFERENCES

A. ZERO ORDER CORRELATIONS

Predisposition		*Age*	*Education*	*MODRNSUM*
ARNIMP:	Value of children, implications of another child	.02	-.43	-.47
SEMEXH:	Semantic differential small family; expectation of help from children	.10	-.41	-.42
LRGESMLL:	Definition of large & small family	.16	-.31	-.33
Numerical Preferences				
CHLDWANT:	Preferred number of children	.28	-.24	-.26
COOMBS:	Forced choice preferences: 0,2,4,6	.25	-.22	-.19
FOTOPREF:	Forced choice, photographs of families	.22	-.11	-.12
Desire/Intention				
NUMBMORE:	Number additional children desired	-.37	.06	-.03
HUWISCLE:	Number additional children desired by husband and wife, plus intention to have another	-.43	.01	-.08

B. PARTIAL CORRELATIONS

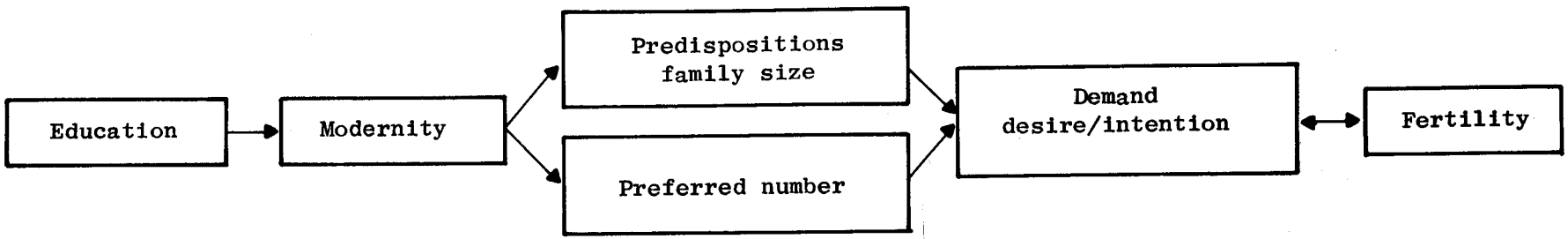
	With education, holding age and MODRNSUM constant	With MODRNSUM, holding age and education constant
ARNIMP	-.19***	-.26***
SEMEXH	-.17***	-.21***
LRGESMLL	-.10***	-.18***
CHLDWANT	-.04*	-.16***
COOMBS	-.08***	-.07***
FOTOPREF	00	-.07***
NUMBMORE	.01	-.07**
HUWISCLE	.01	-.09***

the older *generation* of women are more favorably inclined toward children and have larger numerical size preferences than the younger. On the other hand, as a woman ages and has children, she becomes more and more reluctant to have more.

Table 2B shows that when age and modernity are controlled, education is unrelated to desire or intention to have more children, but that modernity maintains an independent if modest negative relation. In Figure 2, we show for each parity the relation between modernity (as measured by the MODRNSUM scale) [5]

[5] The sample of non-sterilized women was divided into roughly equal thirds on the MODRNSUM scale: traditional, transitional, and modern. Only the extreme thirds are shown in the Figure. Mean HUWISCLE values for the middle third fell in between the two extremes at all parities after the first.

Figura 1.- MODEL OF SELECTED PATHS BETWEEN EDUCATION AND FERTILITY



and the desire/intention for more children (HUWISCLE in standard or Z scores). Women with only one child almost all want and intend to have more children regardless of their level of modernity; but soon thereafter the line for more modern women declines more steeply, indicating their greater disinclination to have additional children. [6]

However, we have suggested that modernity acts on desire/intention through a predisposition about children and the numerical preference for large or small families. This hypothesis is tested in Table 3 where we have performed separate regressions for women of specific parities; i.e., for women with the same number of living children, we have tried to ascertain what accounts for variation in the desire/intention to have more. With only one exception, neither education nor modernity (MASSINFO and MODPSYCH) show a significant relation to desire/intention for more children. At each parity the single most important variable is age. After these variables are taken into account, the family size preferences add substantially to the explained variance. This is specially true for women with two or three children, where they add 18 and 15 percentage points respectively to the variance explained by age, education, and modernity. At the lowest parities, almost all the preference variables play a role, but no one of them is influential among all parities. In short, other than age and parity, the predisposition and numerical preference variables are what determine desire and intention to have more children. The influence of modernity is largely indirect.

Returning to fertility, we now look at whether the family size attitudes explain away modernity's relation to the number of live births. Table 1 showed that after years of marriage were controlled, education and modernity added 7 percentage points to explained variance among women under 35 and 14 percentage points for women 35 and over. In Table 4 we have reduced modernity to the MASSINFO measure, have added two family size preferences -SEMEXH and COOMBS- and a measure of household economic status (DURGOOD) based on the number and kind of household possessions. [7] These variables, combined with years since first marriage, and education, account for half of the variance in fertility for the younger, and 41 percent for the older women. MASSINFO has a statistically significant negative relation to live births in both age groups, while education does not. The family preference measures show significant positive relations in both age groups. These findings are especially noteworthy in view of the fact that economic status (which also shows an independent negative relation to fertility) has been held constant. To make sure that the family's socio-economic status was not responsible for the modernity and size preference impacts on fertility, we added several additional independent variables to the regression: husband's education, highest education of respondent's parents, rural-urban residence until age twelve, and frequency of attendance at religious services. Among the younger women, none of these variables had a relation with fertility approaching significance, and the Betas for MASSINFO and size preferences remained unchanged. Among the older group, attendance at religious services showed a Beta of -.09, significant at the .05 level, [8] and urban childhood residence a highly significant Beta of -.32. While the family size preference variables remain unchanged, as a consequence of holding early residence constant, the Beta for MASSINFO drops to -.07 (not significant) and the Beta for education becomes positive and significant at the .05 level.

Table 3

MULTIPLE REGRESSION: *HUWISCLE*, BY NUMBER OF LIVING CHILDREN

	Number of Living Children			
	2	3	4	5+
Age	-.22***	-.27***	-.22**	-.38***
Education	.15	.08	.09	.02
MASSINFO	-.03	.17*	.04	.01
MODPSYCH	.05	. 0	-.10	-.06
COOMBS	.16**	.28***	.15	.09
LRGESMLL	.08	-.06	.17*	.11*
ARNIMP	.28***	.17*	.15	.20***
SEMEXH	.13*	.12	. 0	-.03
FOTOPREF	.16**	.06	.16*	.01
R^2	.27	.29	.24	.21
Number of Cases	(238)	(227)	(151)	(439)

[6] The weak relation to HUWISCLE in Table 2 was largely due to the fact that more modern women have fewer children. Those women who do go on to higher parities probably represent a special sample skewed toward large family desires. Thus the differences shown in the graph at higher parities in one sense underestimate the impact of modernity.

[7] The DURGOOD index was devised by Ann Pebley and consists of the sum of a number of price-weighted posessions: refrigerator, electric iron, television set, radio, clock, shower or bath, and flush toilet. Each of these items was weighted by the item's retail value in Costa Rica in 1975, based on figures from the Costa Rican Bureau of Statistics and Census. Since the MASSINFO scale depends heavily on television exposure, we decide to eliminate this item from the DURGOOD scale used here, despite a correlation of .95 between the scales with and without the item. The revised scale correlates .51 with education, .59 with MASSINFO, and .40 with MODPSYCH. When added to the independent variables in Table 4, DURGOOD shows no significant relation to HUWISCLE in any of the parity categories; and does not affect the relation of the family size preference variables to desire/intention for more children.

[8] In Latin America frequent attendance at religious service is more likely to reflect higher social class and more urban residence than doctrinal orthodoxy. What is surprising here is that holding such variables constant, there is *still* a negative relation between frequency of attendance and fertility. Perhaps women with many children find it more difficult to attend church services.

Table 4

MULTIPLE REGRESSION BETAS, LIVE BIRTHS, BY AGE

	Age	
	35	35+
Years married	.58***	.40***
Education	.02	-.08
MASSINFO	-.11***	-.12*
DURGOOD	.10**	-.21***
SEMEXH	.07*	.08*
COOMBS	.16***	.14***
R^2	.50	.41

Table 5

STEP-WISE MULTIPLE REGRESSION: *MASSINFO*

	R^2	Beta
Parents Highest Education	.21	.07***
Education	.39	.30***
Urban Residence	.44	.10***
Employed or Seeking Employment	.45	. 0
Age	.45	-.03
DURGOOD	.55	.40***
Number of Siblings	.56	-.04*
Religious Services	.56	.05***

Finally, since the communications/information component of modernity has emerged as one of the most critical elements of education affecting fertility, we should take a closer look at MASSINFO. Table 5 shows that age, labor force status, and frequence of attending religious services are unrelated to MASSINFO, and that the Betas for parents education, place of residence, and the number of siblings are statistically significant, but small. The major variables are education, and, with the largest Beta, possession of consumer durables. Because of the cross-sectional nature of the survey, we cannot determine whether it is MASSINFO that has produced high economic status or vice-versa.

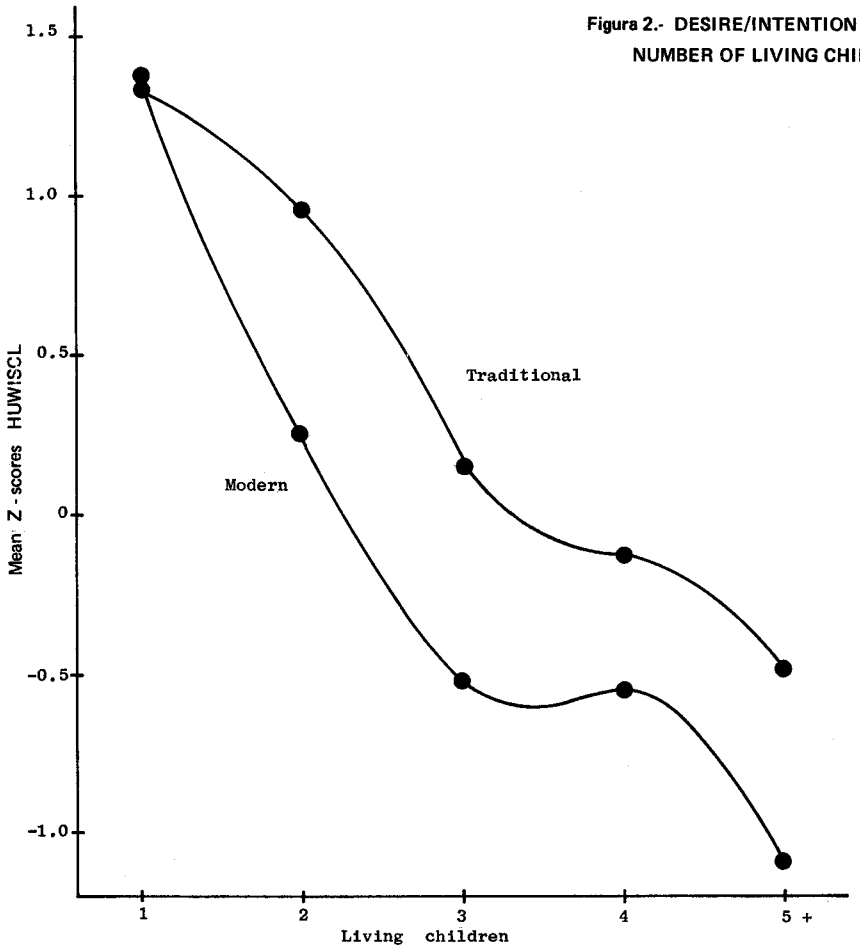


Figura 2.- DESIRE/INTENTION FOR MORE CHILDREN, BY NUMBER OF LIVING CHILDREN AND MODERNITY

CONCLUSIONS

Modernity is negatively related to fertility in Costa Rica and explains most of education's relation to fertility. It affects family size attitudes and predispositions which, in turn affect both the demand for additional children and fertility itself. A higher social class background and early urban residence help to determine a woman's educational achievement and her current level of consumption, but they do not explain away the relation to fertility of family size preferences, or, among younger women, of modernity. Among the older generation of women,economic status and being brought up in a rural area are stronger predictors of their fertility than among the younger generation, where attitudes or "tastes" with respect to children are more critical. The younger generation has had effective contraceptive technology readily available over the past decade and class distinctions in knowledge of and accessibility to contraceptive methods have probably lessened (Stycos, 1978). We have not attempted here to trace the impact of such variables on fertility, but have been looking at more psychological paths between education and fertility. I believe these paths should be of some interest to policy makers.

First, we have seen that it is not education in general that affects fertility, but the effect that education has on "modernizing" the individual. Moreover, modernizing in the context of fertility change does not require the alteration of basic sex roles or redistribution of power between husbands and wives, or the changing of basic concepts about personal efficacy. What is required is something that might be much more within the grasp of a policy maker: improving the information and mass communication level and directing specific educational efforts toward family size preferences. This may not be as easy as it sounds, but it is certainly easier than changing the more psychological aspects of modernity, and is probably easier than making major breakthroughs in the level of formal education. We now need to know more about the way the complex we have termed MASSINFO actually works, how it is produced by formal education, and how it could be stimulated by more direct means. We also need to know more about how numerical family size preferences are formulated and influenced, since these are crucial in decision making about additional children. Finally, we should further investigate whether the phenomena we have described operate in societies at earlier stages of demographic and economic development than that of Costa Rica, where knowledge of and access to birth control is almost universal. Nevertheless, perhaps we have identified, for societies at a moderate level of development, a key ingredient for fertility decline that is amenable to social programming.

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Resumen

El propósito del artículo es tratar de clarificar, en alguna medida, el mecanismo causal por el que opera la ampliamente conocida relación de tipo inverso que existe entre educación y fecundidad.

El procedimiento consiste en utilizar la información obtenida de la reentrevista de todas las mujeres casadas de la Encuesta Nacional de Fecundidad de 1976, para someter a verificación empírica la hipótesis de que una de las principales vías por medio de las cuales la educación afecta los niveles de fecundidad e influenciando un complejo de actitudes y percepciones conocido como modernismo. El punto es importante, pues si tal mecanismo causal se puede detectar, implicaría que existen maneras más simples de acelerar el descenso en la fecundidad que confiando en elevar el nivel general de educación.

Demás está decir que modernismo es un concepto cuyo efecto sobre la fecundidad ha sido bastante controvertido. Sin embargo, existe consenso en que significa una apertura a las nuevas ideas, un punto de vista activista del mundo (en contraposición con la visión fatalista tradicional), actitudes liberales hacia el sexo y el papel de la familia, etc.

Considerando estos elementos y empleando la técnica de análisis de factores, el concepto de modernismo se operacionalizó aglomerando las siguientes dimensiones:

1. MASSINFO. Comprende ciertos elementos de conocimiento y acceso a los medios de comunicación.
2. SEXROLES. Esta dimensión se forma aglomerando seis ítems de la escala de actitudes femeninas de Rosen y Simmons, más cuatro de la escala de segregación sexual de Goldberger y finalmente tres ítems acerca de normas sexuales sugeridas por el Dr. Abelardo Brenes.
3. HUSPOWR. Se agrupan aquí nueve ítems acerca de quien decide en el hogar sobre ciertos problemas domésticos.
4. INKELES. Es la suma de catorce ítems extraídos de la escala de Inkeles y Smith sobre modernismo global.

Estas cuatro dimensiones son agregadas para constituir una sola medida de modernismo denominada MODRSUM, en la que existe un componente cognitivo representado por MISSINFO y otro componente de comportamiento, que se ha denominado MODPSYCH y que agrupa a SEXROLES, HUSPOWR e INKELES.

El análisis se lleva a cabo diviendo la muestra en dos fracciones, mujeres menores de 35 años y mayores de esa edad. Empleando la técnica de regresión con variables estandarizadas, en la que hijos nacidos vivos es la variable dependiente se concluye, en los aspectos relevantes de la hipótesis sometida a verificación, que el componente MASSINFO de modernismo es más importante que educación en sí. Las otras dimensiones, agrupadas bajo MODPSYCH no agregan nada al porcentaje de la varianza explicada. De esta manera se llega a argumentar que la educación lleva a niveles más altos de información y mayor exposición a los medios de comunicación de masas, lo que a su vez se traduce en una menor fecundidad.

La etapa siguiente está orientada a investigar el mecanismo por medio del cual la secuencia causal apuntada se lleva a cabo en la práctica. A juicio del autor, existen tres canales, de los cuales sólo el último será estudiado detalladamente: (*1*) Conocimiento y actitudes hacia la anticoncepción; (*2*) Eficiencia en la comunicación conyugal y (*3*) Deseo de tener más hijos o demanda por niños.

Se proponen a su vez tres aspectos de la demanda, que deben ser tomados en consideración. El primero de ellos es una predisposición general en relación con los aspectos psíquicos, económicos y beneficios de los niños. El segundo aspecto se refiere al deseo de tener o no tener más hijos en un momento determinado y finalmente, aún más cercano al nivel de comportamiento, la intención de tener más niños. Para un nivel de menor o mayor conciencia se tendría la estructura:

Predisposición acerca del tamaño de familia	Número deseado de hijos	Deseo por un niño	Intención de tener un niño

Cuando estos elementos se integran en una secuencia causal, tomando en cuenta el nivel de educación y modernismo, se obtiene:

Educación Modernismo	Predisposición acerca del tamaño de familia Número deseado de hijos	Demanda: deseo/intención	Fecundidad

Al igual que en el caso previo, una serie de medidas fueron desarrolladas para los conceptos involucrados. En el caso de predisposición se tomó en cuenta las dimensiones *1*) ARNIMP, valor de los niños, implicaciones de un niño adicional; *2*) SEMEXH, compuesta por concepciones semántico-diferenciales sobre familias pequeñas y esperanza de ayuda de los niños y *3*) LRGESMLL, definición de familias grandes y pequeñas.

Por su parte, las preferencias numéricas fueron evaluadas utilizando los elementos: *1*) CHLDWANT, número de hijos deseados; *2*) COOMS, preferencias forzadas y *3*) FOTOPREF, escogencia forzada de tamaño de familia basada en fotografías.

Finalmente, a nivel de deseo-intención se consideró las variables: *1*) NUMBMORE, número de hijos adicionales deseado y *2*) HUWISCLE, número de hijos adicionales deseado por marido y mujer más la intención de tener otro.

Al analizar el patrón de correlaciones entre las variables involucradas, se obtiene que tanto educación como modernismo están negativamente relacionadas con las variables que componen la predisposición, mostrando coeficientes de correlación que oscilan entre -.31 y -.47, valores que descienden a un rango de -.11 y -.26 cuando se consideran las medidas de tamaño preferido. Tal asociación prácticamente desaparece cuando se analiza el deseo y la intención de tener más hijos. En otras palabras, conforme se desciende de predisposición a comportamiento, más atenuada se encuentra la relación

con educación-modernismo. En términos de magnitud de las relaciones, estas variables son casi idénticas con respecto a predisposición y preferencias numéricas, pero las relaciones de educación, aunque mínimas, son positivas con respecto a los ítems agrupados bajo deseo-intención. Cuando se controla educación y edad, todas las relaciones entre MODRSUM y actitudes acerca de tamaño de familia son significativas y se encuentran en la dirección esperada, mientras que, manteniendo constantes edad y MODRSUM, educación presenta-asociaciones de menor magnitud. Es decir, modernismo, más que educación en sí, ayuda a determinar las actitudes generales hacia los niños, aunque tampoco parece ser un buen predictor de si las mujeres quieren y/o intentan tener más hijos.

En el caso de la variable edad, cabe destacar que muestra relaciones positivas modestas con predisposición; moderadas y positivas con preferencias numéricas; y fuertes relaciones inversas con los ítems que conforman deseo-intención, lo que se podría interpretar diciendo que la generación de mujeres más vieja está más favorablemente inclinada hacia los niños y tiene preferencias numéricas mayores, pero, conforme la mujer se va envejeciendo y tiene niños, se vuelve más reacia a tener más.

En lo que se refiere a las relaciones de paridez con modernismo, claramente se establece que las mujeres con un solo niño desean e intentan tener hijos adicionales, independientemente de su nivel de modernismo, pero aparentemente la función es tal que pronto se presenta una notable desinclinación a tener más hijos. Cuando se analiza, para mujeres con una paridez específica, cuál es la causa de la variación en el deseo-intención de tener más niños, ni educación ni modernismo muestran una notable relación con el deseo o intención de aumentar el tamaño de la familia. Para cada paridez, la variable más importante es edad, y después, las preferencias acerca del tamaño de la familia. Es decir, a parte de la edad y paridez, predisposición y preferencias numéricas son las que determinan el deseo e intención de tener más hijos, y así la influencia de modernismo es en gran parte indirecta.

Tratando de explicar la relación entre modernismo y el número de nacidos vivos, se vuelve a examinar el comportamiento de las actitudes acerca del tamaño de familia. Así, se muestra que cuando se remueve el efecto de duración de la unión, modernismo y educación agregan un 7 por ciento a la varianza explicada para el número de nacidos vivos de mujeres de menos de 35 años, porcentaje que asciende a 14 por ciento cuando se considera el grupo de edad de mayores de 35 años. Por otra parte reduciendo la variable MODRSUM únicamente a la dimensión MASSINFO, agregando SEMEXH y COOMS, así como una medida de status socioeconómico (DURGOOD, basada esencialmente en posesión de bienes durables), duración del matrimonio, y educación, se explica un 50o/o, aproximadamente, de la fecundidad en las mujeres jóvenes y un 41o/o de la fecundidad en mujeres del grupo de más edad. Es importante destacar además que MASSINFO muestra una relación negativa, y estadísticamente importante, con nacidos vivos en ambos grupos de edad, mientras que educación no alcanza significación. Finalmente, las medidas de tamaño de familia muestran relaciones directas y significativas en ambos grupos de edad.

Estos resultados son importantes en vista de que el status socioeconómico ha sido mantenido constante. Finalmente se introduce en la regresión una serie de variables independientes adicionales, obteniéndose que tanto en el grupo de mujeres jóvenes como en el de más edad, los coeficientes de regresión estandarizados de MASSINFO y tamaño de familia preferido se mantienen inalterados, o bien su variación no es estadísticamente significativa. Este comportamiento significa que el nivel socioeconómico no explica el impacto del modernismo y tamaño de familia sobre la fecundidad.

Se concluye de esta manera que modernismo está relacionado inversamente con la fecundidad en Costa Rica y explica gran parte de la asociación existente entre esta variable demográfica y educación. Por su parte, aquella afecta las actitudes y predisposiciones acerca de tamaño de familia, lo que a su vez influye tanto en la demanda de niños adicionales como en la fecundidad en sí. Puede establecerse que la educación afecta la fecundidad en la medida en que se traduce en una "modernización" de los individuos.