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INCOME AND INDEPENDENCE EFFECTS ON MARITAL DISSOLUTION: RESULTS FROM THE FIRST THREE YEARS OF SIME/DIME

Center for the Study of Welfare Policy

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ABSTRACT

This paper uses data from the Seattle and Denver Income Maintenance Experiments to study the effect of income and changes in income on marital dissolution. In earlier reports, we presented evidence of the experiments' impact on marital dissolution and discussed how the observed pattern of effects could be explained by nonlinear income and independence effects. The income effect decreases the marital dissolution rate by increasing the family's economic well-being. The independence effect increases the dissolution rate by reducing the economic dependence of the more dependent partner (usually the wife) on the marriage. In this paper we present a model of nonlinear income and independence effects that accounts for much of the experimental-control difference. According to the model, the effect of an income maintenance program on marital dissolution depends not only upon the magnitude of the payment a couple would receive, but on their level of income before the program, the level of the wife's economic independence, and the magnitude of the change in the wife's independence. Results are presented for both 24- and 36-months of experimental time.

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I INTRODUCTION

Income maintenance experiments provide a rare opportunity to study the effects of variations in economic resources on the stability of marital arrangements. In these experiments, families are randomly assigned to treatments that alter their financial constraints. By observing marital dissolutions we can determine whether short-term (three- or five-year) changes in the structure of the constraints affect the rate at which marriages break up. If, as is often argued, marital stability reflects primarily the social origins of the partners and the early circumstances of the marriage, e.g., age at marriage, then we should find only slight effects, if any. On the other hand, if marital stability responds to current resource levels and to the quality of alternatives to marriage, such interventions ought to alter rates of marital dissolution.

In earlier reports (Hannan, Tuma, and Groeneveld, 1976, 1977a; Tuma, Groeneveld, and Hannan, 1976), we addressed these broad issues. We found that income maintenance interventions had little, if any, impact on the rate at which single women with children marry, except in the sample of Chicanas. However, income maintenance treatments substantially raised rates of marital dissolution for all the groups studied. We concluded that short-term alterations in financial circumstances do indeed affect marital stability.

Although this earlier research leaves little doubt that the experiment had effects, it leaves open the question of how these effects occurred. We had conducted what might be termed a purely experimental analysis. We relied heavily on the stratified-random assignment and asked simply: Do the experimental groups differ from the control group by more than that which would be expected by chance? Having satisfied ourselves that they do, we turn to explaining how the effects were produced.

A natural point of departure for explaining these effects is the seeming paradox of the support level effects. All negative income tax programs increase the rate of marital dissolution, but the effect varies inversely with the level of income support (Hannan, Tuma, and Groeneveld, 1977a). Programs with income support close to the poverty line significantly increase the dissolution rates of both black and white couples. This is also true of programs with a support level 25% above the poverty line, but programs with a support level 50% above the poverty line have smaller effects that are not statistically significant. This is the paradox. Slight changes in economic circumstances have strong effects on marriage, larger changes do not. This pattern holds for a variety of models and for two different estimators. Moreover, it is robust with respect to attrition bias (Hannan, Tuma, and Groeneveld, 1976).

The findings in Table 1 are typical. The entries are multipliers of the dissolution rate for controls[1] (those not on a financial treatment) who have the same values on other causal variables.[2] They represent the ratio of the dissolution rate for those at the specified support level to the rate for the control group. The estimates differ from those in earlier reports for several reasons. The observation period in this paper is either 24 or 36 months, rather than the 18 and 24 months of our earlier reports. We analyze only couples who are married at the beginning of the experiment, rather than all couples who are married during the experiment. We also omit childless couples, who were included in earlier reports. Some of the variables in the equations differ from our earlier analyses. Normal earnings level is replaced by family income, and we control for the level of the wife's preexperimental independence income. Dummy variables for the manpower treatment are added in these analyses. We also control for whether preexperimental levels of earnings and/or wage income dominate the NIT.

An earlier research memorandum (Hannan, Tuma, and Groeneveld, 1977b) reported our first attempts to explain the support level effects. This report extends the earlier report in a number of ways. Most importantly, the current report includes nonwage income in preexperimental levels of family disposable income and the wife's independence income. Several programming errors were also found and corrected.

Table 1

ESTIMATES OF SUPPORT LEVEL EFFECTS FOR COUPLES WITH CHILDREN:
MULTIPLIERS OF THE DISSOLUTION RATE
OF CONTROL COUPLES WITH SIMILAR CHARACTERISTICS†

	Blacks	Whites	Chicanos
24 Months			
Low support treatment	2.16***	1.94**	1.20
Medium support treatment	2.06***	1.56	.80
High support treatment	1.45	.88	.73
36 Months			
Low support treatment	1.92***	1.56*	1.02
Medium support treatment	1.82***	1.31	.89
High support treatment	1.10	.76	.68
Number of cases	844	1144	505

* $.05 < p \leq .10$
** $.01 < p \leq .05$
*** $p \leq .01$

†The other variables in the equations are listed in footnote 2.

The top panel of Table 1 shows results for the first 24 months of the experiment. For both blacks and whites the low support treatment doubles the dissolution rate; this effect is significant at the .01 level for blacks and at the .05 level for whites. The medium support level also doubles the dissolution rate for blacks and is significant at the .01 level. For whites, the medium support level increases the dissolution rate 56% but the effect is not statistically significant. The high support treatment increases the dissolution rate 45% for blacks and decreases the rate 12% for whites. Neither effect is significant.

In earlier reports we indicated a significant effect associated with the low support treatment for the Chicano sample. Although the multiplier for the low support treatment is higher than that reported in Table 1 for other support levels for this group, it does not differ significantly from one. The multiplier for this treatment apparently has been reduced by the addition of controls for initial levels of the wife's independence. Whatever the reason for the change in our findings, we now have no experimental effect to explain for Chicanos. Nonetheless, for purposes of comparability, we report analyses for all three racial ethnic categories.

The lower panel of Table 1 shows results from the same equations that were used for the upper panel but using data for 36 months rather than 24. The same cases were used in both periods. The pattern of the support level multipliers is the same for the two periods, but the 36-month multipliers are lesser. The 36-month results for the low and medium support treatments indicate substantial increases in the dissolution rates for blacks and smaller increases for whites. The high support treatment has essentially no effect.

The decline in the magnitude of the support level multipliers from the 24-month to the 36-month analysis results from several factors. In our analysis of the time dependence of the reported effects (Tuma, Hannan, and Groeneveld, 1977a, 1977b), we noted that the effects were greater in the first 6 months for whites than in the following periods. For blacks, the effects were highest in the second and third 6-month periods and declined in the fourth 6-month period. Our preliminary analyses of time dependence over 36 months indicate that the effects remain lower in the third year. Thus the 36-month results are less dominated by the peaks that occurred in the early part of the experiment than are the 24-month results.

The decline in the support level multipliers from the 24- to the 36-month analysis is also affected by the model we are using. Our model states that the impact of each support level is constant over time and across individuals. This has been a useful simplification for our work, but we know that it is not strictly true. The effects do vary over time and do depend upon individual characteristics. The result of the latter is that couples who respond most to the experimental treatment will tend to dissolve their marriages earlier than those whose response is lesser. Because we analyze only the first dissolutions of couples who were married at the start of the experiment, the average support level multiplier of those remaining at risk will decline as the experiment continues. The multipliers resulting from a 36-month analysis will be smaller than those from a 24-month analysis.

Earlier we proposed an explanation for the pattern of support level effects (Hannan, Beaver, and Tuma, 1974; Hannan, Tuma, and Groeneveld, 1976, 1977a). We argued that income maintenance has two opposing effects on rates of marital dissolution. It raises levels of family income, and, by providing new financial alternatives to marriage, it decreases the dependence of partners on the marriage. Both theory and empirical results indicate that the income effect lowers the rate of marital dissolution. The independence effect increases the rate. Depending on the strength and functional forms of the two effects, income maintenance can increase the rate of dissolution, decrease it, or leave it unchanged.

This argument bears directly on the paradox of the support level effects. We suspected that each support level induces a strong independence effect, but that only the high support program generates an income effect strong enough to offset the independence effect. The purpose of this paper is to evaluate this argument empirically.

Before we began to analyze these data, we proposed that both income and independence effects would have a threshold and floor (or ceiling). In Section II of this paper, we propose specific functional forms that are consistent with our understanding of the processes and that at least permit income maintenance treatments to produce the pattern we observed. Although the ideas that underlie the model are very simple, the mathematical statement of the model will undoubtedly appear both unfamiliar and complex. Therefore, we complement our algebraic treatment of the model with graphical displays of the functions. Some readers may prefer to rely only on the graphs which display the qualitative features of the model.

Our earlier arguments also emphasized nonpecuniary differences between income maintenance and welfare. This issue arises because the low support treatment has almost the same financial impact on a family as the welfare system available to control families, i.e., AFDC and food stamps. If income maintenance and welfare do not differ in other ways, we cannot explain the large difference in dissolution rates between controls and low support treatment subjects. Earlier we identified several differences between the two types of income support programs. They suggest that income from the current welfare system is discounted in its behavioral consequences. That is, for a married woman considering her financial situation if she leaves her marriage, a dollar of welfare has a smaller independence effect than a dollar of income maintenance. We discuss the procedure for incorporating the welfare discount in Section II.

We make brief remarks about the structure of the data and our estimation procedures in Section III. In Section IV, we report means of pre-experimental levels of family income and independence, as well as means of experimental changes in these variables. In Section V, we report two types of findings. We first present findings on income and independence effects, both parameter estimates and plots of the estimated curves. Then we show that by incorporating the income and independence effects of the experimental payments we can explain most experimental effects. This is the crucial demonstration of the paper. Finally, we show graphically in Section VI how the paradox of the support levels arises.

II INCOME AND INDEPENDENCE EFFECTS

Theoretical and empirical work on marriage (reviewed in Hannan, Tuma, and Groeneveld, 1976) suggests that the dissolution rate decreases with family income and increases with the income of the financially dependent partner (usually the wife) outside the marriage. Income maintenance generally has both effects, it increases both family income and the wife's income outside the marriage. In this section, we move beyond these qualitative statements and propose a parametric model for income and independence effects. We used several criteria in choosing among alternative specifications. Of course, we entertained only models consistent with the argument--this criterion ruled out nonmonotonic income and independence effects. We also insisted that the model fit our observations of both control families and those with a financial treatment. Finally, we used the results in Table 1 as benchmarks. We tested each candidate model for consistency with the benchmark. We concentrated on models that could produce the pattern observed in Table 1.

The Income Effect: Disregarding the experiment for a moment, the rate of marital dissolution, r, should be a monotonically decreasing function of a family's level of disposable income, Y. One possible specification is the linear function: $r = aY$. This choice has the advantage of simplicity and wide usage. We doubt, however, that a thousand dollar increase in income has the same effect for all levels of income, which this function implies. Another widely used specification, the log-linear relationship: $r = \exp(\alpha Y)$, avoids part of the problem. With this specification, the effect of increases in income becomes smaller as income increases (assuming α is negative), i.e., there is a floor. However, this model stipulates that the largest income effects occur at the lowest income levels. That is, the effect of moving from zero to one thousand dollars is larger than that of a thousand dollar increase at any other level. We doubt, however, that income changes below a subsistence level have strong effects on the rate of dissolution. We suspect that there is a threshold as well as a floor in the income-dissolution relationship. We argue that increases in family income do not have strong effects on rates of marital dissolution for either very low or very high levels of income. We expect the strongest effects to occur at some intermediate level.

A simple function that behaves in this fashion is:

$$r = A_1 \exp(\alpha Y^2) \tag{1}$$

where A_1 summarizes the effects of all other causal variables, including the wife's independence.

As long as $\alpha < 0$, the function in Equation (1) is a monotonically declining function of Y. As Y increases, $\exp(\alpha Y^2)$ approaches zero, so the rate cannot become negative. Inspection of the second derivatives of Equation (1) establishes that the function is downward bending for $Y^2 < -2\alpha$ and upward bending for $Y^2 > -1/2\alpha$. When $\alpha < 0$ and $|\alpha|$ is large, the point at which the shape of the function becomes convex is close to zero, and the dissolution rate declines exponentially over most of the range of Y. When $\alpha < 0$ and $|\alpha|$ is small, the function is very flat initially. The shape of the income effect for three values of α is shown in Figure 1. The choice of this functional form for the income effect does not greatly constrain our analysis. Depending on estimates of α, the income effect may be steep or flat over the entire range of incomes we observe; it may also have a pronounced backward-S shape. This flexibility plays an important part in what follows. It means that the functional form we have chosen permits, but does not constrain, the empirical results to explain our previous findings. In particular, we can explain the support level effects only if the income effect is fairly steep over the range of incomes that predominate in the sample assigned to the high support treatment.

Now condiser the experiment. Control families do not receive any income maintenance payments. On the average their incomes during the experimental period should be the same as during the preexperimental period. Families on financial treatments do receive an income guarantee,

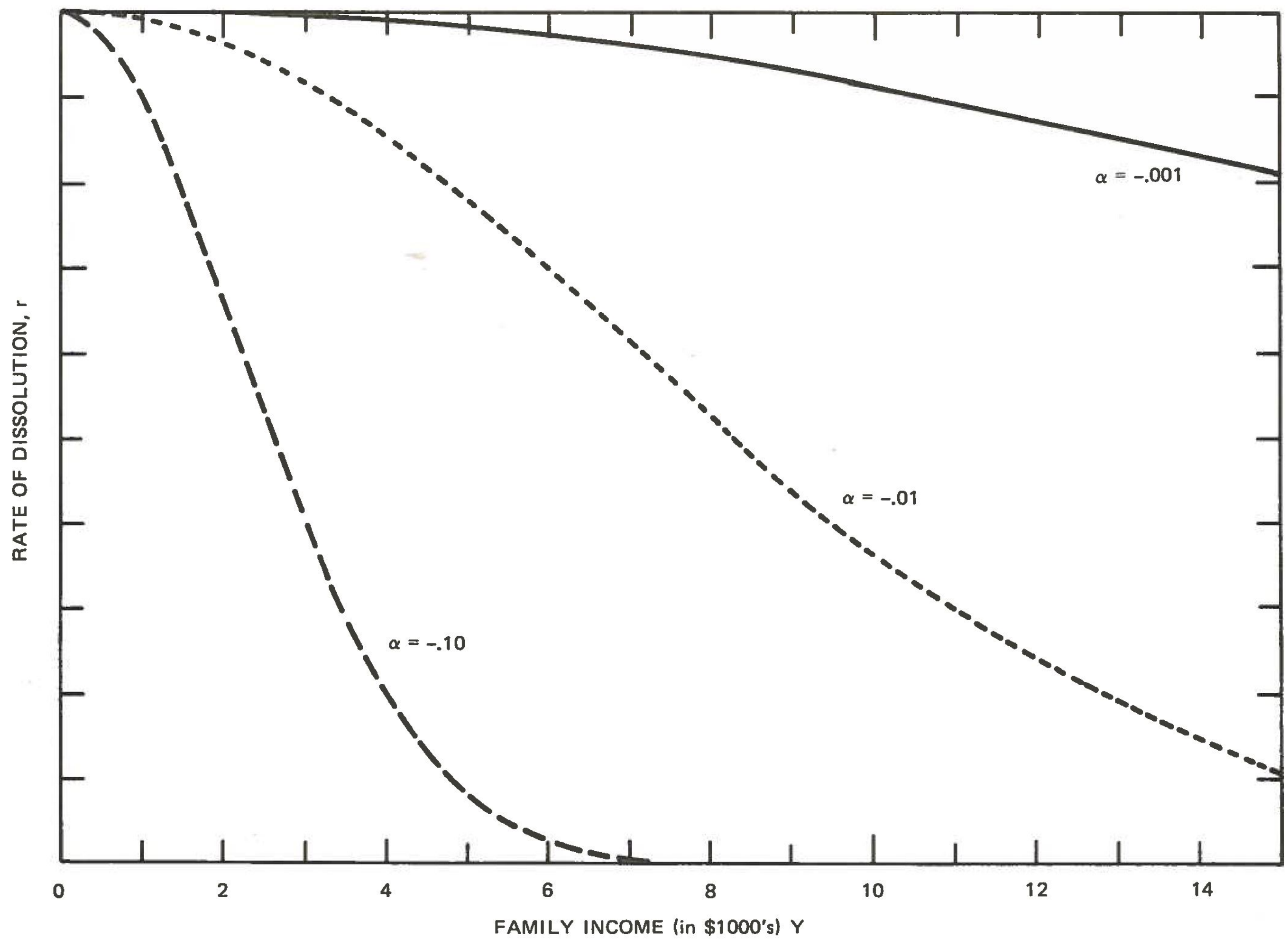

FIGURE 1 HYPOTHETICAL INCOME EFFECTS, $r = \exp(aY^2)$, FOR VARIOUS LEVELS OF a

however, and most have incomes low enough that they receive some payment. For simplicity we assume that families on financial treatments do not adjust their earnings under income maintenance.[3] The expected change in income due to the experiment, ΔY, based on preexperimental level of income, Y, may be calculated straightforwardly. On the average, a family on an experimental treatment will have an income level of $Y + \Delta Y$ during the experiment.

The simplest model consistent with the experimental effects is that exogenous changes in income, ΔY, have effects similar to those of levels of income, Y. That is,

$$r = A_1 \exp[\alpha(Y + \Delta Y)^2] \quad . \qquad (2)$$

We find that the simple model in (2) fits well for blacks and Chicanos but not for whites. For whites, we find we must use a model in which the effects of changes and of levels differ and in which the effect of a change depends on the level:[4]

$$r = A_1 \exp[\alpha Y^2 + \gamma \Delta Y^2 + \delta Y \cdot \Delta Y] \quad . \qquad (3)$$

<u>The Independence Effect</u>: The effect of independence, measured by the wife's disposable income if she were to become single, should monotonically increase, holding family income constant. Here we expect both a floor and a ceiling.[5] We suspect that small increases in independence will not alter rates of dissolution for couples with the most dependent wives--there is some threshold level of independence beyond which the effects of any given change in independence will increase. Also, we expect that a given change in independence will not greatly affect couples if the wife is already very independent (although our sample may not contain any such families).

A simple functional form that fits these requirements is

$$r = A_2 \exp\left(\beta Y_s^{-1}\right) \qquad (4)$$

where Y_s denotes wife's disposable income if she becomes single in the nonexperimental environment and A_2 denotes the effects of all other causal variables, including family income. Independence increases the dissolution rate if β is negative. In that case, the function is convex for $Y_s < -\beta/2$ and approaches the ceiling A_2 as Y_s increases. The shape of the function over the range of sample observations is determined by the estimate of β obtained from the data. If $\beta < 0$ and $|\beta|$ is large, the function has a threshold. It is initially relatively flat and then becomes steep. If $|\beta|$ is small, the function is steep for low values of Y_s and flattens more quickly. Three alternatives are shown in Figure 2. Depending on estimates of β, we may obtain independence effects over the range of our sample observations that are flat, steep for small values of Y_s and then relatively flat, or flat for small values, steeper for intermediate values, and flat again for higher values. As we pointed out in our discussion of the income effect, this flexibility is important to our ability to test the model. Unless the independence effect is steep over the observed range of values of Y_s, we cannot explain the support level effects.

The measurement of a wife's independence involves two issues, estimating what a wife thinks she would earn as a single woman and estimating the effect of welfare payments. Of course, we do not know what level of earnings a wife would achieve were she a single woman. We do not even know that this is the proper variable. What we wish to measure is the level of income a wife expects (or is expected by her husband) to achieve as a single woman. We tried two procedures to measure expected earnings. The first assumes that earnings as a married woman is the best proxy for subjective assessments of earnings as a single woman. The second involves predicting earnings from the earnings of single women with similar characteristics. Results from analyses using the two measures are usually quite similar; however, the estimates based on the actual-earnings measure have smaller standard errors. We restrict attention to the use of that measure in presenting results.

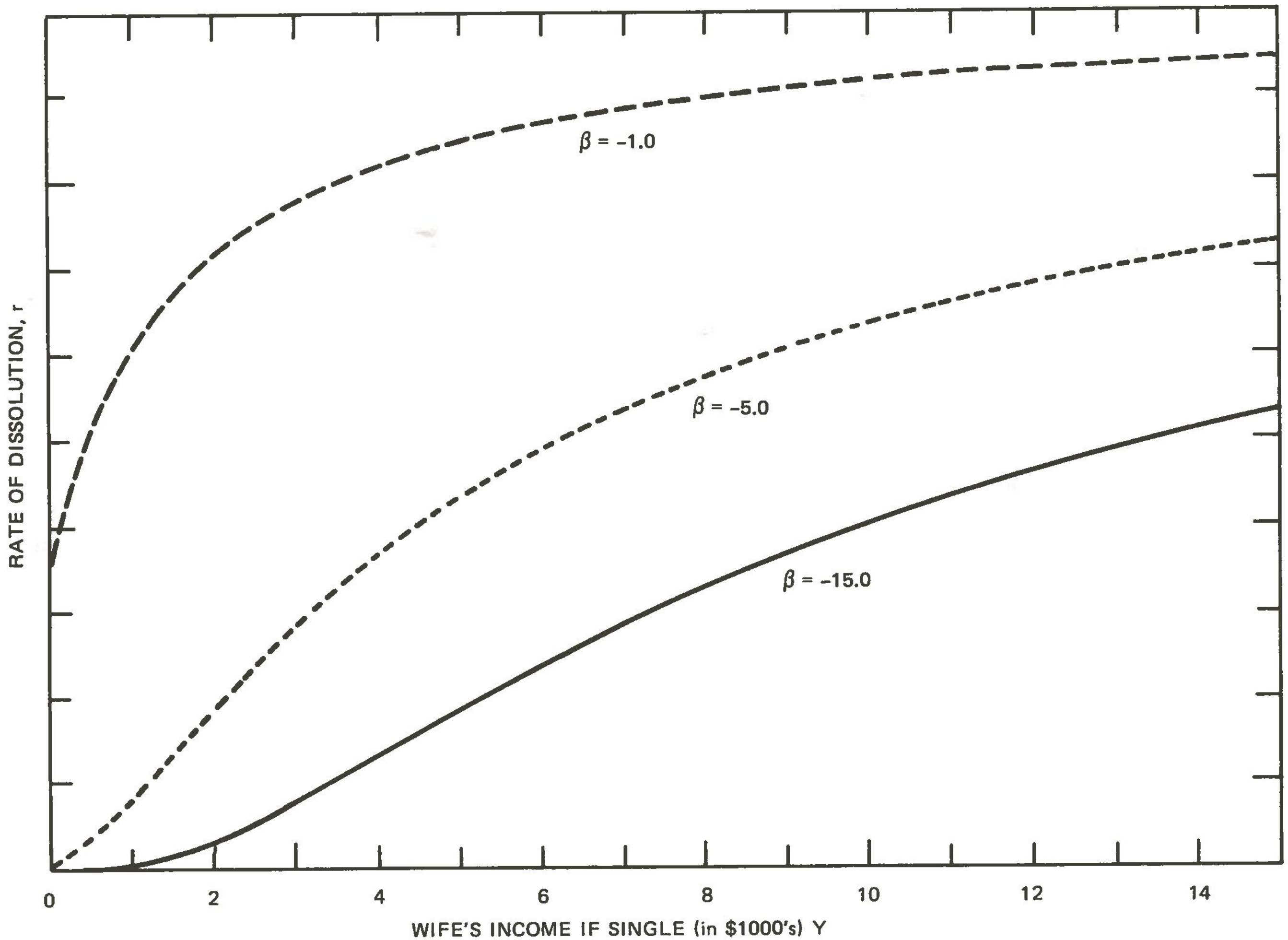

FIGURE 2 HYPOTHETICAL INDEPENDENCE EFFECTS, $r = \exp(\beta Y_s^{-1})$ FOR VARIOUS LEVELS OF β

The environment of control families contains welfare (AFDC and food stamp programs). Hannan, Tuma, and Groeneveld (1977a) identified four nonpecuniary differences between SIME/DIME and welfare relevant to this analysis:

- Unlike welfare, participation in income maintenance programs presumably involves no public (nor perhaps private) stigma.
- Benefits and rights under SIME/DIME are thoroughly explained to participants; AFDC and food stamp benefits are not.
- Participation in income maintenance involves much less effort than welfare. Since only minimal contacts with any bureaucracy are required, transaction costs for income maintenance are probably lower than for welfare.
- All financial families in SIME/DIME receive some minimal payment. Thus SIME/DIME may be more salient to married women than welfare and therefore have a greater impact on decisions to end a marriage.

For these reasons, the impact of a dollar of the welfare benefit available to a married woman upon becoming single should be less than the impact of a dollar of income maintenance. The potential welfare benefit should be discounted.

High welfare participation rates among those eligible do not necessarily conflict with this view. The population of unmarried women with children overrepresents women with low welfare discounts. We are modeling the behavior of married women. At least some may be married at the beginning of the experiment only because they refuse the alternative of welfare. These women should react most strongly to income maintenance.

We have made a number of attempts to estimate a welfare discount. However, the nonlinear functional form chosen for the independence effects has frustrated our attempts to this point. For the present we must choose a discount a priori. We have used discounts in our analyses ranging from 25% to 75%. The qualitative inferences do not vary much with the discount used. However, we do not do as well in explaining the experimental effects when the discount is as low as 25%. So we choose to present findings based on a 50% discount. We assume that it takes two dollars of welfare guarantee to produce the level of independence produced by one dollar of earnings or income maintenance benefits.

To incorporate the welfare discount, we calculate a wife's disposable income if single as follows. Let E_s denote a woman's expected earnings when single (which is just her earnings during the preexperimental year), and let N_s denote nonwage income other than welfare. Based on E_s, N_s, and family size, we calculate potential AFDC and food stamp grants, the sum of which is denoted as W_s. The discounted welfare benefit, W_s^*, is then simply $.5W_s$. Finally, the control level of disposable income when single is defined as

$$Y_s = E_s + N_s + W_s^* \quad . \tag{5}$$

To consider the contribution of income maintenance to the independence effect, we calculate an income maintenance payment if single, P_s, for each woman receiving financial treatment, ignoring W_s. Because the experiment taxes welfare payments at 100%, we define the change in Y_s due to the experiment as

$$\Delta Y_s = \max \begin{cases} P_s - W_s^* \\ 0 \end{cases} \quad . \tag{6}$$

By definition ΔY_s is zero for controls.

The simplest model for a payment effect is that a change in independence, ΔY_s, has the same effect as the initial level, Y_s:

$$r = A_2 \exp\left[\beta(Y_s + \Delta Y_s)^{-1}\right] \quad . \tag{7}$$

For all three racial ethnic groups this model fits as well as any of the more complex models we tested. Permitting ΔY_s to have effects different from Y_s does not significantly improve the fit of the model.

Family Size Interactions: At the risk of overly complicating the model, we introduce one additional consideration. To this point we have made no allowance for the effects of family size. We expected, however, that both income and independence effects would vary with family size, particularly in low income populations.[6] A unit increase in either family income or wife's income as single may have an effect in small families different from that in larger families. Social scientists typically adopt some standardization for such effects. The available family size indices are designed to reflect the effects of income on consumption. Thus they may not reveal anything about the effects of income and independence on rates of dissolution. Instead of adjusting Y and Y_s for family size, we estimate models in which income and independence effects depend on family size.

Families without children face different conditions in both the control and experimental environments. Single controls without children are not eligible for AFDC. Single experimentals without children receive payments that do not vary by support level; that is, the guarantee to a one-person family is constant across experimental programs ($1,000 in 1971 dollars). Rather than attempt to parameterize these differences, we have restricted the analysis to families with children.

We began analysis with complex models that included family size interactions and compared the fit with simpler models. Because the various sets of family size interactions were at least partially hierarchically ordered, we used tests of significance to choose the functional form of the family size adjustment for each racial ethnic group. We began with a more complex model and tested whether eliminating certain interactions significantly reduced the fit of the model, evaluated in terms of a likelihood ratio test. If the fit was reduced at or beyond the .10 level, we retained the more complex model. Only for whites do we find that family size interactions significantly improve the fit of our models.

The model we estimated for blacks and Chicanos is:

$$r = \exp\left[\alpha(Y + \Delta Y)^2 + \beta(Y_s + \Delta Y_s)^{-1} + \underline{X}\,\underline{\Theta}\right] \quad . \tag{8}$$

The remaining term in Equation (8) is the vector of background variables listed in footnote 2, $\underline{X}$.

The model estimated for whites is:

$$r = \exp\left[\alpha^* Y^2 + \gamma^* \Delta Y^2 + \delta^* Y \cdot \Delta Y + \beta^* (Y_s + \Delta Y_s)^{-1} + \underline{X}\,\underline{\Theta}\right] \quad , \qquad (9)$$

with

$$\alpha^* = \alpha_0 + \alpha_1 C \quad ,$$

$$\beta^* = \beta_0 + \beta_1 C \quad ,$$

$$\gamma^* = \gamma_0 + \gamma_1 C \quad ,$$

$$\delta^* = \delta_0 + \delta_1 C \quad ,$$

where C denotes the number of children in the family.

III METHODOLOGY

We use information on changes in family composition of the black, white, and Chicano families enrolled in SIME/DIME. The sample selection and experimental design have been discussed elsewhere (Hannan, Tuma, and Groeneveld, 1976, 1977a). In this paper we analyze only couples who are married at the beginning of the experiment and who have children. We analyze dissolutions that occur during the first two years of the experiment. To estimate the parameters of the model we use two pieces of information, whether the marriage ended, and if it did, the ending date in experimental time. Because the estimation procedure is the same as that used in our earlier reports, we note only the essential details.

Let $F(t|t', \underline{X})$ denote the probability distribution function that a marriage existing at time t' with characteristics $\underline{X}$ breaks up by t. (Here $\underline{X}$ includes measures of income and independence as well as other causal variables and t' is the date of enrollment in the experiment.) The the instantaneous rate, $r(t|t', \underline{X})$ is defined as

$$r(t|t', \underline{X}) = \frac{\frac{dF(t|t', \underline{X})}{dt}}{[1 - F(t|t', \underline{X})]} \quad . \qquad (10)$$

The likelihood function for the joint distribution of observed ending dates is given by

$$L = \prod_{i=1}^{N} \left[\frac{dF(t_i|t_i', \underline{X}_i)}{dt}\right]^{y_i} \left[1 - F(t_i|t_i', \underline{X}_i)\right]^{(1 - y_i)} \qquad (11)$$

where N is the number of couples and $y_i = 1$ if the marriage of couple i breaks up before the end of the observation period. It equals 0 otherwise. We use Equation (8) or Equations (9), (10), and (11) to write the likelihood function straightforwardly in terms of the observable variables and parameters. We estimate the parameters and their standard errors by an iterative maximum likelihood procedure using a FORTRAN program called RATE. [See Tuma and Crockford (1976) for documentation.] A detailed treatment of the technical literature on this estimator and results with small sample properties is found in Tuma and Hannan (1979). The advantages of this estimation strategy and our ability to fit the observed data using it are discussed in Tuma, Hannan, and Groeneveld (1979).

IV LEVELS OF INCOME AND INDEPENDENCE

Given the nonlinear specifications of income and independence effects, it is particularly important to understand the typical levels of these variables and of their changes in our samples. The average levels of the components of these variables are tabulated by support level in Table 2.

Table 2

MEANS OF COMPONENTS OF INCOME AND INDEPENDENCE VARIABLES BY SUPPORT LEVEL

	Control	\$3,800 Support	\$4,800 Support	\$5,600 Support
Preexperimental family income (Y)	\$6,594	\$5,286	\$6,226	\$7,164
Payments to families (ΔY)	0	1,092	1,695	2,146
Preexperimental wife's income ($E_s + N_s$)	1,274	697	1,052	1,507
Discounted welfare benefit if single (W_s^*)	1,233	1,452	1,264	1,208
Payments to the wife upon becoming single (P_s)	0	3,145	3,721	4,383
Number of families	1,117	467	557	352

The average family income for control families is roughly \$6,600. For those on income maintenance plans the average preexperimental level of family income varies from \$5,286 for the low support to \$7,164 for the high support. This difference reflects the stratified assignment by family normal income. The typical payments to families (assuming no change in labor supply) also vary by support level. The difference is less than one might imagine, however, because of the stratified assignment. Those on the low support plan receive an average payment of roughly a thousand dollars while those on the high support receive roughly double that amount.

Next consider the preexperimental levels of the wife's income if single. For the controls the average was $1,274. Families assigned to the low support plan had the most dependent wives, with an average income of $697. Those on the high support earned slightly more than the controls. The next row of Table 2 reports discounted welfare guarantees (half the actual guarantee) to women leaving marriages, based on earnings and family size. Finally, we report the average levels of payments to women upon leaving marriage. This averages $3,145 for those on the low support treatment and $4,383 for those on the high support. On average (under our assumptions), the high support treatment increased family income by about a thousand dollars more than did the low support treatment. The high support treatment also paid a woman leaving her marriage about a thousand dollars more than did the low support treatment.

V RESULTS

We have two concerns. The first is whether the empirical results yield substantively meaningful and statistically significant income and independence effects. The second is whether our model for the effects of income maintenance accounts for the support level effects reported in Table 1.

We continue to report results from both 24- and 36-month analyses, but we will stress the 24-month findings. First, the longer the period studied, the more unrealistic is the restriction of our analysis to first events. We analyze first dissolutions because we have preexperimental measures of income only for originally married couples. But because even in the nonexperimental environment couples have varying rates of marital dissolution, the population at risk of a first dissolution is characterized by continually declining average rates as couples with high rates are removed from the sample by dissolutions. A second reason for stressing the 24-month over the 36-month results is that the independent variables included in our analyses are measured at or before enrollment. Yet we must use those variables to predict behavior throughout the analysis period. Some of the variables such as age and duration of marriage could be updated in a natural way, but the income variables cannot. The further the experiment progresses, the less confidence we have that preexperimental income accurately measures throughout the period the variables affecting behavior. A third reason is that the third year is the final year of the experiment for about three-fourths of those receiving the financial treatment. At this time we have no evidence that there are effects attributable to anticipating the end of the experiment, but if termination does have an effect upon marital behavior, it would confound our 36-month results. We doubt that it has an effect on the 24-month analysis.

The Independence Effect: We look first at estimated parameters to assess the statistical significance of the independence effect and then at graphical displays of the effect to judge substantive importance. The upper half of Table 3 reports estimates of the various parameters of the independence effect for both 24 and 36 months.

The 24-month independence effect is positive for blacks and is significant at the .01 level. Recall that given the functional form of the independence effect, a negative coefficient indicates a positive effect. So, for blacks the higher the level of independence the higher is the dissolution rate. For whites the dissolution rate varies with family size. Except for couples with one child, the independence effect is positive for whites. We have estimated the equation for whites constraining the independence effect to be positive for all family sizes and have found that the constrained model fits as well as the unconstrained model reported in Table 3. We cannot statistically reject the hypothesis that the white independence effect is positive for all numbers of children. For Chicanos, the independence effect is positive but not significant. For the 24-month analysis the results are clear; the independence effects are positive as expected. The coefficients are significant for blacks and for whites, the two groups for whom there is an experimental impact. The general pattern of results for the 36-month analysis is similar to that for 24 months.

The estimates in Table 3 are difficult to understand directly. It is much easier to grasp their significance from graphical displays of the estimated relationship between Y_s and the rate of dissolution. Using the 24-month results from Table 3, we focus attention on whites and on blacks. For whites, we plot estimated curves for families with two and three children, the most common family sizes in our sample.

Recall that our model is multiplicative. The independence effect for any couple must be multiplied by the base rate, i.e., that predicted by all other variables, to give the actual estimated rate of dissolution for that couple. The base rate varies from family to family, depending on background variables and income effects. We denote in the model as r*

Table 3

EFFECTS OF INDEPENDENCE AND INCOME ON THE LOG OF THE DISSOLUTION RATE†
(C = number of children)

	24 Months	36 Months
Independence Effect (in \$1,000s)		
Blacks	$-3.046^{***}(Y_s + \Delta Y_s)^{-1}$	$-2.405^{***}(Y_s + \Delta Y_s)^{-1}$
Whites	$(1.923^{*} - 1.266^{**}C)(Y_s + \Delta Y_s)^{-1}$	$(1.123 - 1.105^{*}C)(Y_s + \Delta Y_s)^{-1}$
Chicanos	$-.3222(Y_s + \Delta Y_s)^{-1}$	$-.5871(Y_s + \Delta Y_s)^{-1}$
Income Effect (in \$1,000s)		
Blacks	$-.0055^{**}(Y + \Delta Y)^2$	$-.0043^{**}(Y + \Delta Y)^2$
Whites	$(.0095 - .0053^{**}C)Y^2$	$(.0014 - .0028C)Y^2$
	$(.1001^{*} - .0480^{*}C)\Delta Y^2$	$(.0459 - .0327C)\Delta Y^2$
	$(-.0592 + .0247C)Y \cdot \Delta Y$	$(-.0534 + .0160C)Y \cdot \Delta Y$
Chicanos	$-.0012(Y + \Delta Y)^2$	$-.0034(Y + \Delta Y)^2$

* $.05 < p \leq .10$
** $.01 < p \leq .05$
*** $p \leq .01$

†See text for explanation of symbols.

the rate of dissolution given by all other variables. Thus r* is the rate of dissolution that holds for a family if the independence effect is unity, i.e., if Y_s is very large. At all lower levels of Y_s, the rate is smaller; it is some fraction of r*. The fraction depends on Y_s and on estimates of the independence effect. We plot independence effects in these terms. The vertical axis in Figure 3 is the rate of dissolution, which varies from zero to r*. So, the metric of this dimension varies from family to family depending on r*. The horizontal axis is the wife's income if single.

The simplest comparisons in Figure 3 are for a couple shifting from one level of Y_s to another. If a specified change in Y_s shifts a couple from .4r* to .6r*, their rate of dissolution is increased by 50%. In inspecting the curves in Figure 3 it is important to keep in mind the range of variation in Y_s. Recall from Table 2 that the mean of Y_s before the experiment was two to three thousand dollars. Few women in our sample had Y_s exceeding six thousand dollars. We are therefore most interested in the behavior of the estimated independence curves in the one- to six-thousand-dollar range of Y_s. The curves imply considerable increases in dissolution rates for each thousand dollar increase in independence over this range. Moreover, the levels of Y_s at which the effects are strongest are close to the minimum levels of independence in our samples. In other words, the independence effect is strongest in marriages in which the wife was initially most dependent.

The Income Effect: Estimates of the income effect are also reported in Table 3. As with the independence effect, we find significant effects in the 24-month analysis for blacks and whites but not Chicanos. We noted in Section II that for blacks and Chicanos a simple model in which experimental changes in income and initial levels of income have the same effect fits as well as more complex models. Thus, the 24-month estimates in Table 3 imply that both levels and experimental changes in income significantly decrease the dissolution rate for blacks. Income maintenance has an income effect for the black sample.

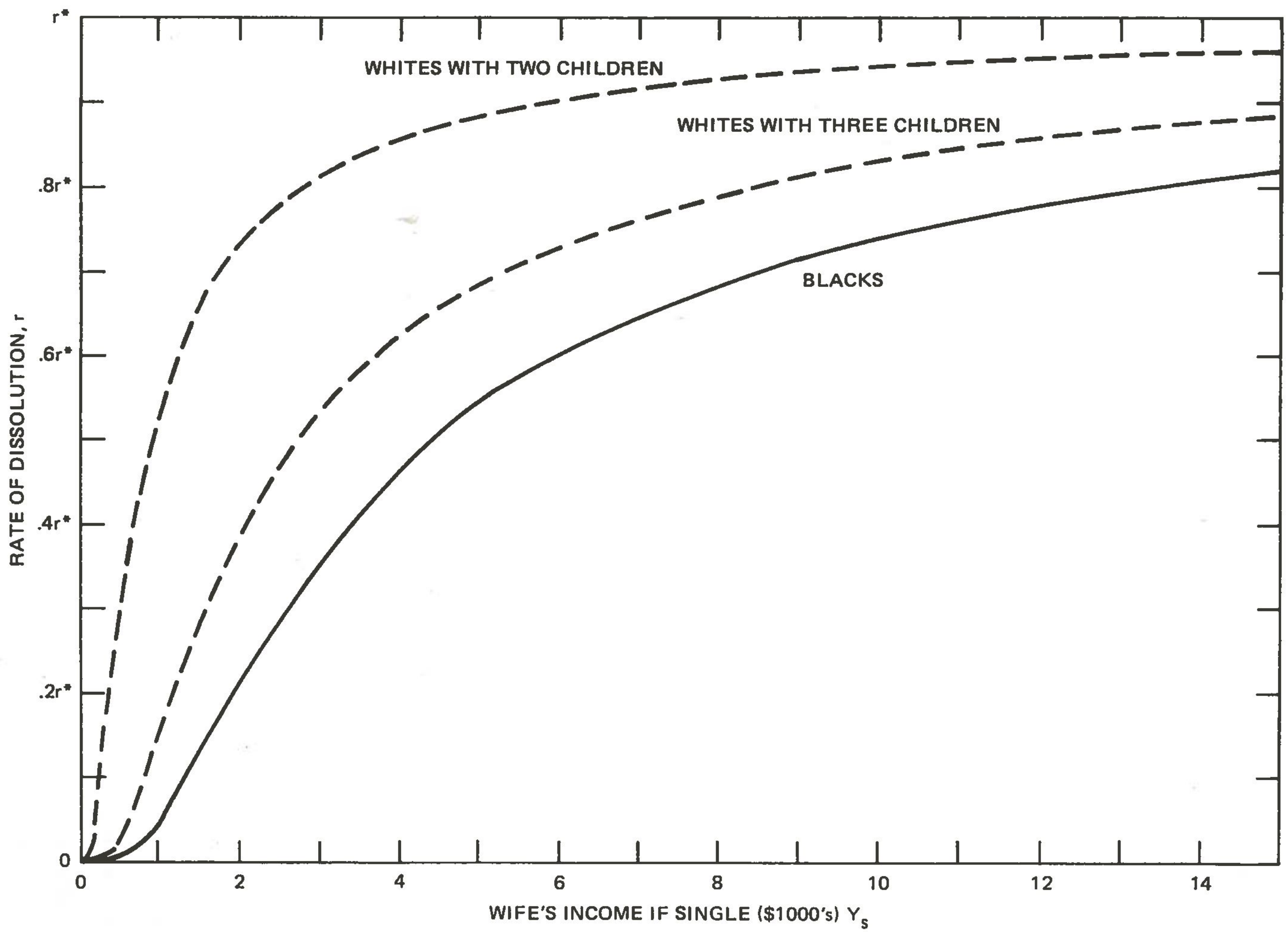

FIGURE 3 ESTIMATED INDEPENDENCE EFFECTS. SEE TEXT FOR DEFINITION OF r*.

For whites we must use a model in which levels and changes in income have different effects. However, it is meaningful to compare the effects of initial levels of income for whites with those of levels as well as changes for blacks. The results for initial level of income for whites are quite similar to those for blacks. Initial levels of family income significantly decrease the dissolution rate, and the effect becomes more negative with each additional child. As in the case of independence effects in whites, the income effect has the wrong sign for families with one child. However, the data fit a model constrained to have negative income effects for all family sizes almost as well as the model reported in Table 3. In fact, a model constraining both the income and independence effects to have the proper sign for all family sizes fits almost as well as the model in Table 3.

The 36-month income effects for blacks are slightly weaker than the 24-month effects, but are still significant at the .05 level. For whites none of the 36-month income effects is significant, although the effects are negative for almost all family sizes. The 36-month income effect for Chicanos is small, negative, and statistically insignificant, as is the 24-month effect.

We turn to plots of the estimated effect to explore the substantive meaning of the estimates. Figure 4 plots the income effects for both control and experimental black families and for white control families with two and three children using the 24-month estimates.[7] The structure of Figure 4 is similar to that of Figure 3. The vertical axis is the rate of dissolution in multiples of $\tilde{r}$, the rate predicted from the levels of all other variables in the model, including the independence effect.

All three curves have a backward-S shape, as hypothesized. The effect of increases in family income on the dissolution rate is slight at low income levels, but the curves decline in the neighborhood of four to six thousand dollars. They are steep from this point to beyond fifteen thousand dollars. The effect is strongest (i.e., steepest) at 21.3 thousand dollars for whites with two children, at 8.8 thousand for whites with three children, and at 9.5 thousand for blacks. For whites, income variations in the lower range have stronger impacts on larger families.

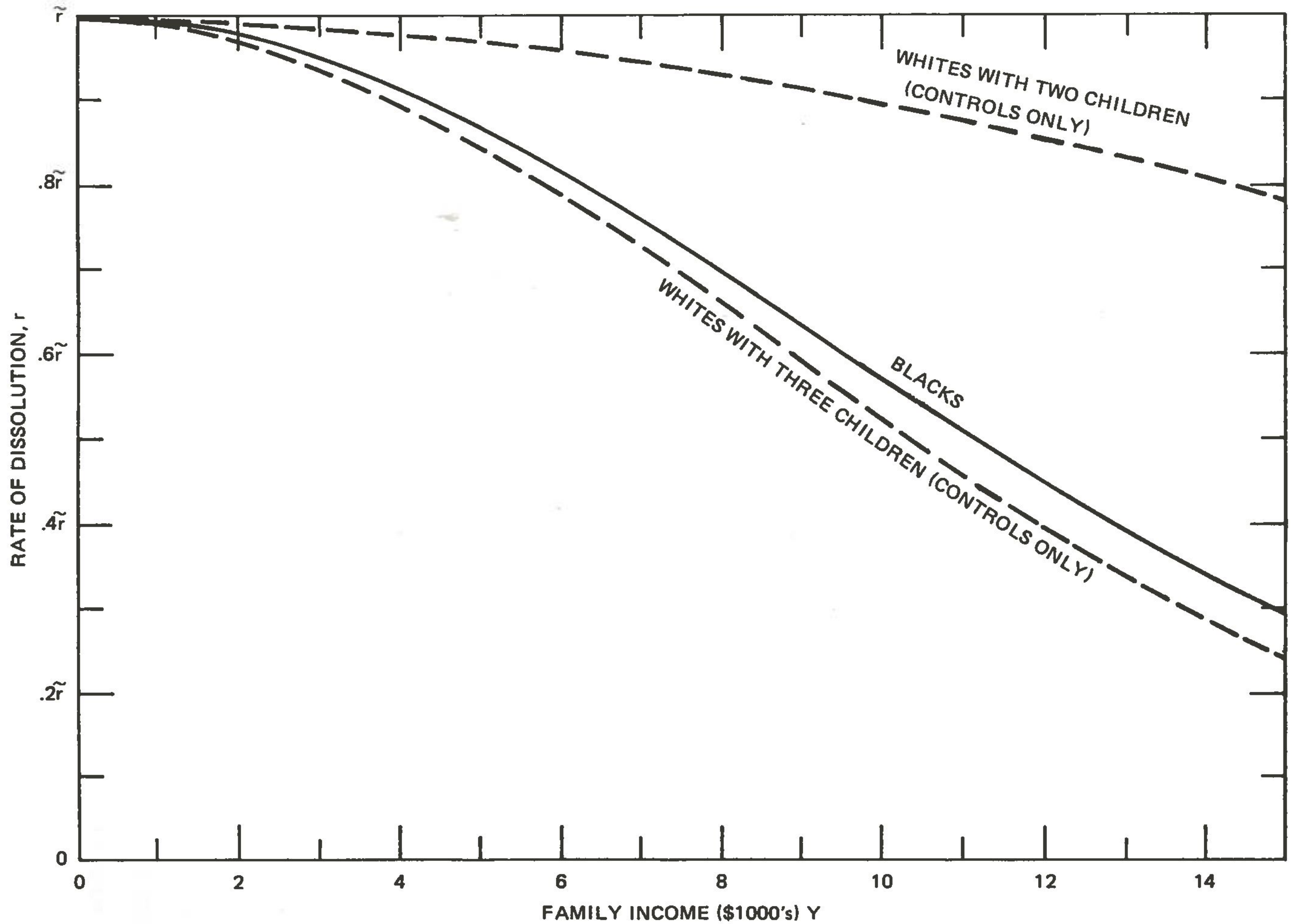

FIGURE 4 ESTIMATED INCOME EFFECTS. SEE TEXT FOR DEFINITION OF $\tilde{r}$.

As in the case of the plotted independence effects, we find that the effects are strong in the regions that characterize the SIME/DIME samples. The curves in Figure 4 imply that marital dissolution rates for families at the poverty line (about $4,000 in 1971) differ markedly from those for families with incomes near the national median (about $10,000). Moreover, the addition of a thousand dollars in the six- to twelve-thousand-dollar range has a large effect. Because changes in income have the same effects as levels of income for blacks, these curves imply that income maintenance has a strong income effect on the marital dissolution rate of the black sample.

We turn next to the estimated effect of changes in income for whites. Recall that this involves both "main" and "interaction" effects. The main effect is significant but the interaction is not. However, we cannot explain the paradox of the support levels for whites without this interaction. Although the interaction is not statistically significant, it appears to be important substantively.

Both main and interaction effects of experimental changes in income vary with family size. These effects do not have the expected sign for all combinations of family size, level of income, and changes in income. Once again we wished to test the constraint that the effect has on the predicted sign. The natural constraint is that the entire income effect be negative for each family in the sample. However, we could not employ this constraint in our estimation procedure. Instead we used the more stringent constraint that each of the three pieces be negative. Introducing these constraints does not significantly worsen the fit of the model reported in Table 3. The data are consistent with the argument that both levels and increases in family income stabilize marriages.

The results for whites are necessarily more complex than those reported for blacks. On the whole, however, they lead to the same qualitative conclusions: income maintenance has strong income effects on the marital dissolution rate of the white sample.

Support Level Effects: The results in Table 3 generally support our argument that income maintenance has both income and independence effects. However, our argument also holds that the combined operation of the two types of effects accounts for the support level impacts reported in Table 1. We now evaluate this portion of the argument.

The test is simple. The support level multipliers in Table 1 come from models that are identical in every respect but one to those used to calculate the income and independence effects of Table 3. The models in Table 1 ignore the experimental changes in income and independence, ΔY and ΔY_s. We repeat the procedure used to calculate the effects in Table 1, but this time we introduce ΔY and ΔY_s into the income and independence effects as in Equations (8) and (9). The results are reported in Table 4.

Table 4

ESTIMATES OF SUPPORT LEVEL EFFECTS FOR COUPLES WITH CHILDREN: MULTIPLIERS OF THE DISSOLUTION RATE OF CONTROL COUPLES WITH SIMILAR CHARACTERISTICS FROM A MODEL INCLUDING EXPERIMENTAL INDEPENDENCE AND INCOME EFFECTS†

	Blacks	Whites	Chicanos
24 Months			
Low support treatment	1.26	1.50	.78
Medium support treatment	1.08	1.13	.49
High support treatment	.77	.56	.46
36 Months			
Low support treatment	1.16	1.03	.62
Medium support treatment	1.00	.82	.51
High support treatment	.61*	.45	.40*
Number of cases	844	1,144	505

†The variables included in the model are the same as those in Table 1, with the exception that ΔY and ΔY_s have been added to the measures of income and independence as described in Table 2.

* $.05 < p \leq .10$

Including income maintenance payments in income and independence effects does reduce the support level multipliers substantially; compare Table 4 and Table 1. Moreover, none of the support level effects is now significant at even the .10 level in the 24-month analysis. The model works best for the black sample in which the low and medium support multipliers are close to unity. We are somewhat less successful with whites; the low support dissolution rate is still 50% higher. We may have overcorrected for the high support treatment; its multipliers now fall below unity. We can still improve on the specification used here--presumably by taking into account labor supply changes during the experiment. In the 36-month results we find that for both blacks and whites on the low and medium support levels the multipliers are very near unity. We overcompensate for blacks and whites on the high supports. Both the 24- and 36-month results indicated that we have succeeded in explaining a good deal of the previously reported experimental effect on rates of dissolution. The effects in Table 1 do reflect, at least partly, the combined operation of income and independence effects.

VI DISCUSSION

The key to understanding how income and independence effects eliminate the support level effects for blacks and diminish those for whites lies in considering the combined operation of the two effects. To this point we have presented curves in only two of the three relevant dimensions. We obtain more insight into the nature of the process by considering slices from the three dimensional surface relating Y and Y_S to the dissolution rate.

In Figures 5 and 6, we display independence curves for several selected levels of family income. In both figures the vertical axis is the rate of dissolution, predicted on the basis of the control variables and denoted as $\check{r}$. The interpretation of each independence curve is the same as that in Figure 3. However, we now see how the independence effect varies with family income, whereas in Figure 3 we included the effects of family income in r*. Our model implies that the curves differ for blacks and whites and that for whites where are different curves for each family size. Because our purpose in this section is illustrative, we choose cases with strong income and independence effects so that the nature of the joint impact is clear. The same process works for other family sizes, though the magnitude of the effects differs.

Figure 5 shows the relationship of independence and income to the dissolution rate for blacks. Figure 6 shows the same relationship for white control families with two children. We delay consideration of white experimentals because it requires yet another dimension, ΔY.

In both Figures 5 and 6 the independence effect is steepest at the lowest levels of family income and becomes less steep with each positive increment to family income. This shows how increases in family income offset independence effects. At a sufficiently high level of family income, an increase in independence has little effect on the dissolution rate.

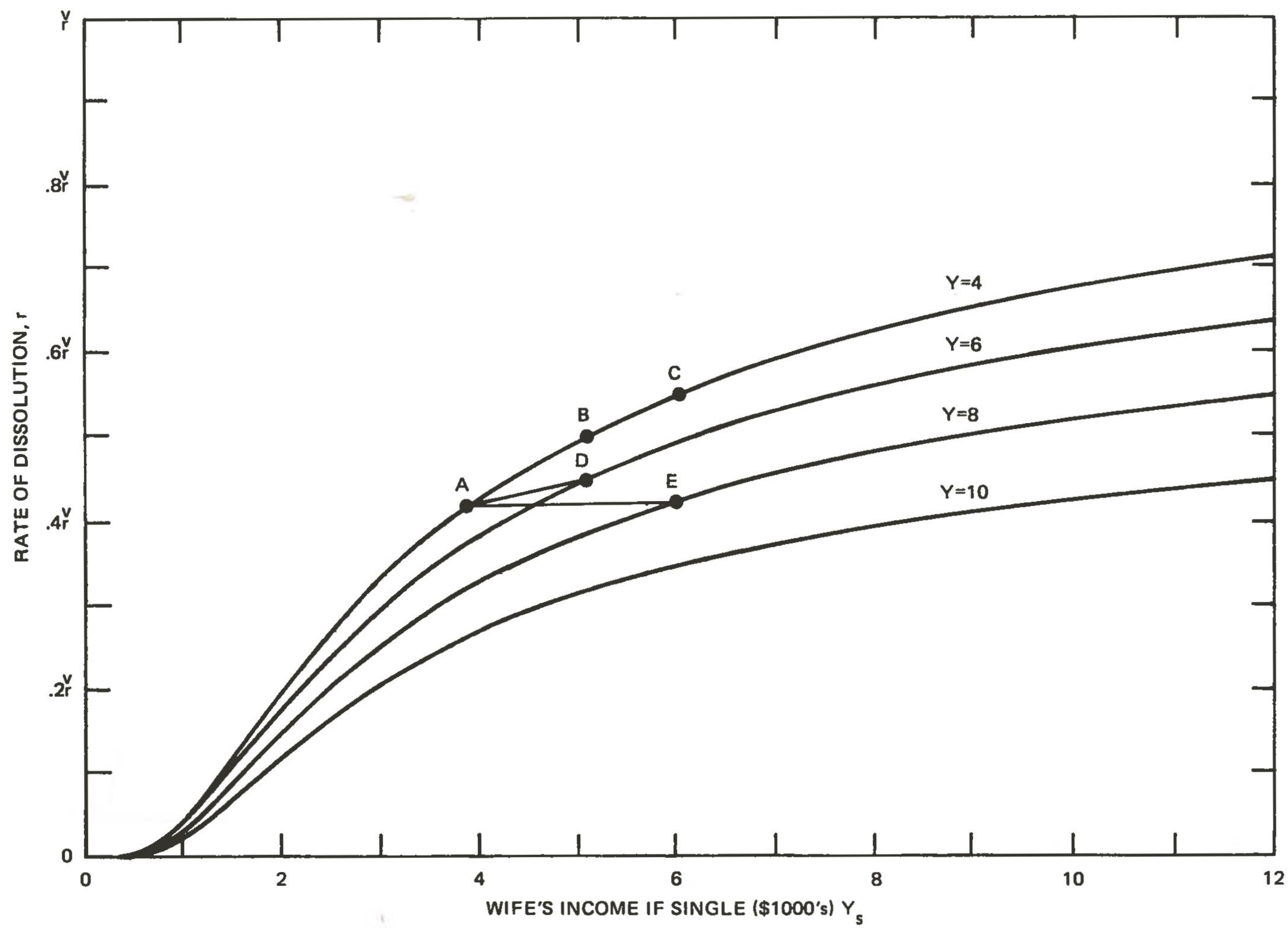

FIGURE 5 ESTIMATED INCOME AND INDEPENDENCE EFFECTS FOR BLACKS WITH TWO CHILDREN, ONE OR BOTH LESS THAN AGE TEN. Y DENOTES FAMILY INCOME. SEE TEXT FOR DEFINITION OF $\check{r}$.

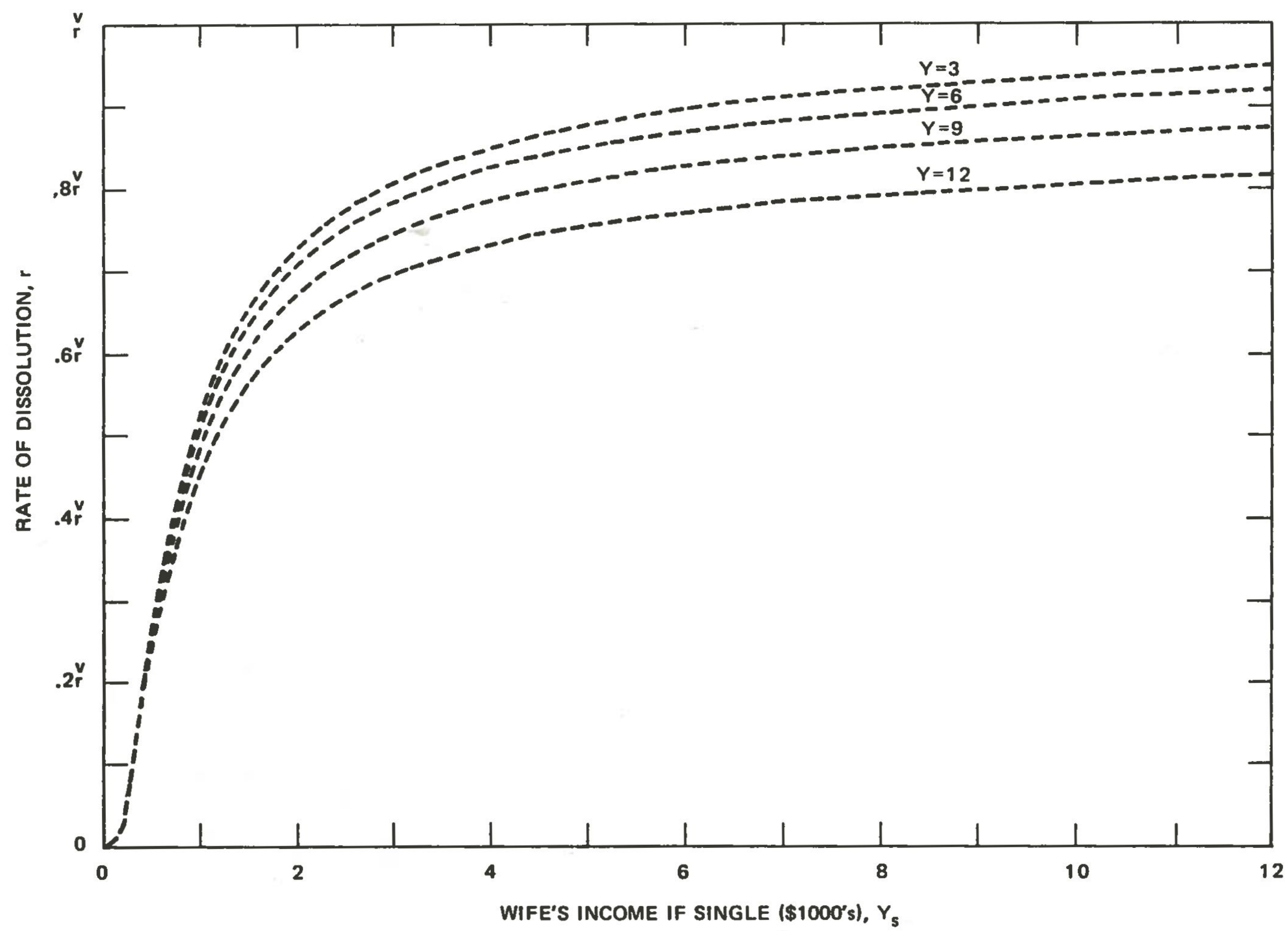

FIGURE 6 ESTIMATED INCOME AND INDEPENDENCE EFFECTS FOR WHITE CONTROLS WITH TWO CHILDREN.
Y DENOTES FAMILY INCOME.
SEE TEXT FOR DEFINITION OF $\check{r}$.

These curves also show how an income maintenance program affects rates of dissolution. In general, income maintenance increases both Y and Y_S. It has the consequence of shifting couples to the right on an independence curve and down to a higher income curve. The total effect of income maintenance on the rate of dissolution combines the two changes.

Examination of hypothetical cases shows how income and independence effects could produce the pattern of support level effects in Table 1. Consider two identical families assigned to income maintenance plans with different support levels. Suppose both families begin at point A in Figure 5. Our hypothetical income maintenance program shifts the woman on the low support plan along the independence effect curve to B and the woman on the high support to C. So far the richer program produces a larger increase in the dissolution rate. But we must also consider the income effect. Suppose the family on the lower support program receives a three thousand dollar increase in income. This family is shifted to a new income level, i.e., from one indpendence curve to another, from B to D. Suppose the family on the higher support gets six thousand and is shifted from C to E. The total effects of the two negative income tax programs are the vertical distances between A and D and between A and E. As we have chosen the points and as has apparently occurred in SIME/DIME, E is below D. The lower support program increases the dissolution rate, but the higher support does not.

Finally, we consider the response of white experimentals. We can construct a figure suitable for showing the experimental income and independence effects for whites by fixing the level of preexperimental family income. Figure 7 shows curves similar to those of Figures 5 and 6 for a family with an income of six thousand dollars. The curves are similar to those in Figure 6, except that the effect of each thousand dollars of income maintenance payment is much larger than the effect of a similar change in levels of nonexperimental income. Relatively small differences in levels of payments may make a substantial difference in marital dissolution rates.

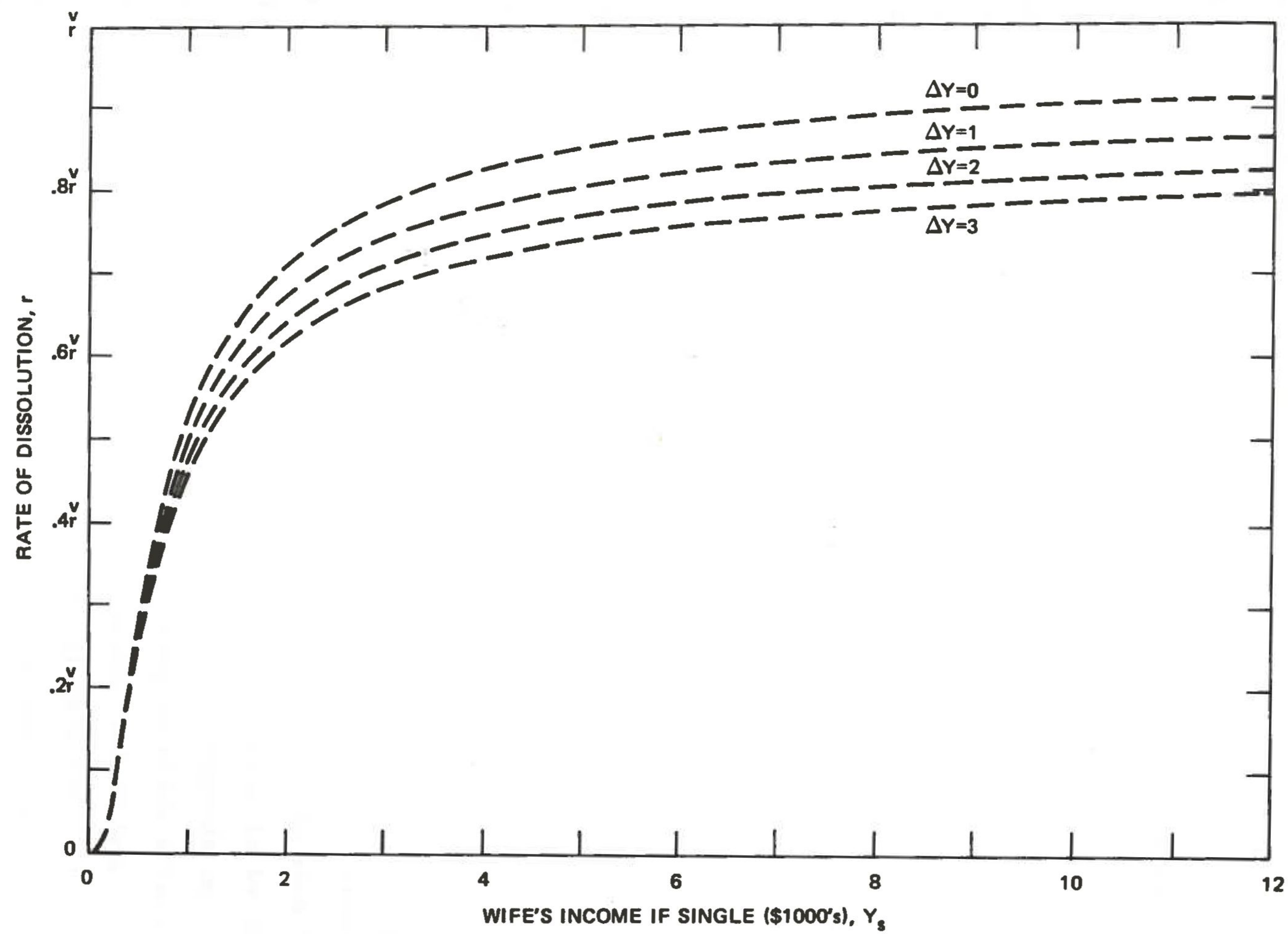

FIGURE 7 ESTIMATED INCOME WITH INDEPENDENCE EFFECTS FOR WHITE FAMILIES WITH TWO CHILDREN AND PREEXPERIMENTAL INCOME OF $6000 ON INCOME MAINTENANCE TREATMENTS.
ΔY DENOTES THE CHANGE IN FAMILY INCOME DUE TO INCOME MAINTENANCE.
SEE TEXT FOR DEFINITION OF $\check{r}$.

This series of illustrations shows why the nonlinearities in our model play an essential role in explaining the experimental response. It also shows that the stratified random assignment of families to treatments in SIME/DIME (Hannan, Tuma, and Groeneveld, 1977a) contributes to the differences among support level impacts (see Table 1). Higher income families were more often assigned to the high support treatment. The same ΔY and ΔY_S have a smaller combined effect on the dissolution rate for richer families than for poorer families. This can be seen easily by considering a family that begins at point E in Figure 5 and receives a treatment with the same ΔY and ΔY_S that we gave to the family that began at A and ended at D. This family ends up below D. As a consequence of initial levels of income and independence, families assigned to the high support treatment respond differently to any income maintenance program.

Although the scheme for assigning families to experimental plans apparently contributes to the paradox of the support level effects, it cannot account singlehandedly for the paradox. The spport level effects reported in Table 1 are adjusted for preexperimental levels of income and independence. Moreover, we estimate multipliers of initial rates of dissolution rather than additive effects. Thus the estimates in Table 1 give the relative increase in the rate of dissolution for each support level after adjusting for the assignment and including preexperimental levels of income and independence.

We are left with a simple conclusion. Our earlier supposition that income transfer programs have two competing effects can, indeed, explain much of the support level paradox. Income transfers do seem to have both income and independence effects. Both effects appear to be nonlinear so that a family's response to any transfer program depends on its initial levels of income and independence. Depending on which effect is stronger and depending on a family's initial situation, income transfer programs can increase or decrease rates of marital dissolution. In the Seattle and Denver experiments, the high support programs have an income effect that partially offsets the destabilizing influences of increased independence. But for the low and medium supports, the indpendence effect tends to dominate the income effect so that overall the rate of dissolution rises.

FOOTNOTES

1. The coefficients in Table 1 are multipliers of dissolution rates for control families with specified characteristics (see footnote 2). A treatment with no effect has a multiplier of one. Multipliers greater than unity indicate that the program increases the rate. The proportional change (increase or decrease) is found by subtracting 1 from the multiplier. The proportion of marriages ending in dissolution may be used as a "typical" control rate. In the control group of couples with children, the fraction of marriages that end within one year after the beginning of the experiment is .084 for blacks, .058 for whites, and .084 for Chicanos.

2. The causal variables included are the duration of marriage at the beginning of the experiment, ages of husband and wife, education of husband and wife, number of children, a dummy for the presence of children less than age 10, a dummy for previous AFDC experience, a dummy for the site, dummy variables for the experimental manpower treatments, a dummy variable for experimentals enrolled for 3 years of the experiment, and preexperimental levels of family income (squared) and wife's income as single (inverse). The latter two variables indicate whether preexperimental levels of earnings and/or nonwage income dominate the NIT. Means of these variables are given in Appendix A.

3. We presume no effects of the experiment on earnings to postpone the throny problem of modeling the combined effects of labor supply and family behavior. For the same reason, we use measures of income over the year immediately preceding the experiment for families on financial treatments. Thus our estimates of experimental effects include both direct effects and indirect effects mediated by impacts on work. We are beginning to analyze more complex models that interrelate experimental changes in work effort to changes in marital status.

4. We had no a pirori expectations about the precise nature of such interactions. We have experimented with several forms. All the forms that we tried led to the same qualitative conclusions concerning the main issue under study, the explanation of the support level effects. However, some specifications give larger standard errors for income effects than others. One reviewer of an earlier version of this paper suggested that we use a quadratic form with a linear, squared, and interaction terms. However, our maximum likelihood program would not converge under this specification because of collinearity. The specification in Equation (3) gives smaller standard errors for income effects than other interactions tried. We cannot explain the support level effects for whites without this term.

5. Again, we reject the more usual linear and log-linear specifications on theoretical grounds. The former implies that increments in independence have the same effect on the dissolution rate at each level of independence so that experimental effects hold with equal strength over the entire range of preexperimental independence. The log-linear specification with a positive coefficient implies that the rate increases exponentially with increases in independence, so the more independent a woman is initially, the greater the effect of any increase in independence. The specification in Equation (4) avoids both problems. We did, nonetheless, fit linear and log-linear independence effects. They rarely fit as well as, and never better than, the model in Equation (4).

6. We presume throughout that the children in a marriage stay with the wife following a marital dissolution.

7. The model for white experimentals is more complex and cannot easily be represented in a two-dimensional graph. For this group, it is necessary to have a third dimension so that ΔY can have effects different from Y.

Appendix A

BACKGROUND VARIABLES USED IN THE ANALYSIS OF POPULATION OF COUPLES WITH CHILDREN AT ENROLLMENT IN EXPERIMENT

Table A.1

BACKGROUND VARIABLES USED IN THE ANALYSIS OF POPULATION OF COUPLES WITH CHILDREN AT ENROLLMENT IN EXPERIMENT

	Blacks		Whites		Chicanos	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Background Variables						
Wife's age at enrollment (years)	31.70	9.57	30.04	8.71	28.85	8.58
Wife's years of education at enrollment	11.26	1.96	11.38	2.16	9.74	2.15
Husband's age at enrollment (years)	35.04	9.77	32.75	9.28	31.69	8.80
Husband's years of education at enrollment	10.82	2.94	11.56	2.69	9.37	2.86
Number of children at enrollment	2.63	1.33	2.43	1.22	2.69	1.33
Proportion of couples that had children under 10 years old at enrollment	.80	.40	.85	.35	.86	.35
Duration of marriage at enrollment (years)	9.39	7.58	8.97	7.15	10.80	10.79
Proportion on AFDC before enrollment	.16	.37	.16	.36	.26	.44
Proportion in Denver	.51	.50	.45	.50	*	
Proportion enrolled on 3-year financial treatment	.36	.48	.38	.48	.44	.50
Financial Treatment						
Proportion enrolled on $3,800 support	.18	.39	.17	.38	.22	.42
Proportion enrolled on $4,800 support	.22	.41	.23	.42	.22	.42
Proportion enrolled on $5,600 support	.13	.34	.13	.34	.17	.38
Proportion of couples on the financial treatment who were estimated to be above the break-even point† because of the size of their preexperimental nonwage income	.05	.22	.05	.21	.05	.23
Proportion of couples on the financial treatment who were estimated to be above the break-even point† because of the size of their preexperimental earnings	.06	.24	.04	.20	.05	.22
Manpower Treatment						
Proportion on M1 (counseling only)	.19	.39	.18	.38	.21	.41
Proportion on M2 (counseling + 50% educational subsidy)	.25	.43	.23	.42	.26	.44
Proportion on M3 (counseling + 100% educational subsidy)	.14	.35	.15	.36	.14	.35
	N=844		N=1144		N=505	

*Instead of being distributed between Denver and Seattle, the Chicano sample was entirely from Denver. Thus the variable location was excluded from the Chicano analysis.

†The break-even point is defined as the point at which a financial family stops receiving a payment because of the size of their income. The break-even point is determined by the financial family's tax rate and particular support level in which it is enrolled.

Appendix B

COEFFICIENTS OF BACKGROUND VARIABLES AND STANDARD ERRORS OF EXPERIMENTAL VARIABLES

Table B.1

COEFFICIENTS OF BACKGROUND VARIABLES INCLUDED
IN EQUATIONS REPORTED IN TABLE 3, 24-MONTH ANALYSIS

	Blacks		Whites		Chicanos	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Background Variables						
Wife's age at enrollment (years)	-.0390*	.0200	-.0003	.0255	-.0256	.0306
Wife's years of education at enrollment	.0470	.0504	-.0443	.0409	-.0404	.0607
Husband's age at enrollment (years)	-.0127	.0150	-.0265	.0206	-.0005	.0258
Husband's years of education at enrollment	-.0420	.0304	-.0354	.0347	-.1103***	.0405
Number of children at enrollment	-.0198	.0760	.5670**	.2473	-.0315	.1142
1 = Couples that had children under 10 years old at enrollment	-.0618	.3073	-.3680	.4296	.7878	.5989
Duration of marriage at enrollment (years)	-.0391*	.0205	-.0631**	.0266	-.0120	.0289
1 = Couple was on AFDC before enrollment	.1655	.2122	.8115***	.2070	.4409*	.2612
1 = Couple located in Denver	.0628	.1656	-.3683**	.1766	†	
1 = Enrolled in experiment for 3-year financial treatment	-.1723	.1829	.0085	.2130	-.0485	.2668
Manpower Treatment						
1 = M1 (counseling only)	.0681	.2279	.3972*	.2204	.6273**	.2809
1 = M2 (counseling + 50% educational subsidy)	.2222	.1964	.0591	.2184	-.1228	.3130
1 = M3 (counseling + 100% educational subsidy)	.3177	.2351	.3362	.2334	-.1649	.3993
1 = Couple on the financial treatment estimated to be above the break-even point because of the size of their preexperimental nonwage income	-.4763	.4029	.1921	.3567	.7162*	.3703
1 = Couple on the financial treatment estimated to be above the break-even point because of the size of their preexperimental earnings	-.2163	.3381	.7464**	.3693	.1543	.5353
Constant	.9903	.8910	-1.152	1.054	-.8750	1.339

* $.05 < p \leq .10$
** $.01 < p \leq .05$
*** $p \leq .01$

†Instead of being distributed between Denver and Seattle, the Chicano sample was entirely from Denver. Thus the variable location was excluded from the Chicano analysis.

Table B.2

STANDARD ERRORS OF EXPERIMENTAL VARIABLES REPORTED IN TABLE 3, 24-MONTH RESULTS

	Blacks		Chicanos	
	Coefficient	Standard Error	Coefficient	Standard Error
Independence effect	-3.046***	.6764	-.3222	.7780
Income effect	-.0055**	.0026	-.0012	.0035

	Whites	
	Coefficient	Standard Error
Income at enrollment squared, Y^2	.0095	.0060
Income at enrollment squared times number of children, $Y^2 \cdot KIDS$	-.0053**	.0023
Experimental changes in income squared, $(\Delta Y)^2$	.1001*	.0058
Experimental changes in income squared times number of children, $(\Delta Y)^2 \cdot KIDS$	-.0480*	.0262
Interaction, $Y^2 \cdot (\Delta Y)^2$	-.0592	.0514
Interaction times number of children, $Y^2 \cdot (\Delta Y)^2 \cdot KIDS$	.0247	.0180
Independence effect	1.923*	1.026
Independence effect times number of children	-1.266**	.5588

*$.05 < p \leq .10$
**$.01 < p \leq .05$
***$p \leq .01$

Appendix C

THE EFFECT OF VARYING THE WELFARE DISCOUNT

Appendix C

THE EFFECT OF VARYING THE WELFARE DISCOUNT

In discussing the independence effect we argued that because of stigma, lack of information, and nonpecuniary differences between welfare and NIT, the effect of welfare on the dissolution rate should be discounted relative to the effects of the wife's earnings and NIT payments outside the marriage. Accordingly, we defined wife's income as single as

$$Y_s = E_s + N_s + dW_s \qquad (C.1)$$

where E_s denotes a woman's expected earnings as single (which is her earnings in the year immediately preceding the experiment), N_s her expected nonwage income other than welfare, and W_s the calculated potential AFDC and food stamp grants based upon E_s and N_s. The welfare discount is denoted by d. Setting $d = .5$ makes Equation (C.1) equivalent to Equation (5) in the text.

In this appendix we consider the effect of different values of d on the estimation of the income and independence effects and upon our ability to account for the support level effects. We choose values for d of 1.0, .75, .50, .25, and 0. These correspond to discounts of 0% (i.e., welfare is not discounted at all), 25%, 50%, 75%, and 100%.

We explored the effects of varying the welfare discount only for whites. The results reported in this appendix differ from those reported in the main body of the report in several ways. Childless couples are included in this analysis. We estimated but do not report separate income and independence coefficients for childless couples. Financial families receiving minimum payments are represented by a single dummy variable in those equations. The other variables in the equations are the same as those in the equations reported in the main body of this report. The results in this appendix for the 50% discount do not differ greatly from the results for whites in Tables 3 and 4.

To assess the effect of the welfare discount we look first at the estimated income and independence effects for the various discounts. The results reported in Table C.1 are comparable to the results for whites in Table 3. The equations do not include the support level variables.

The independence effects have significant coefficients only for the 50% and 75% discounts. Except for the 25% discount the magnitude of the effects decreases as the discount increases. Recall from the discussion of Figure 1 that as the independence coefficient decreases in absolute value, the curve becomes steeper. So for higher discounts we find strong effects on the rate of dissolution for lower income couples. This is not unexpected because increasing the welfare discount decreases Y_S, the wife's expected income if single. This shifts the distribution of Y_S on the horizontal axis of Figures 1 and 3 to the left.

The income coefficients are unaffected by changes in the welfare discount. This is reassuring because the components of family income are unaffected by the welfare discount. In general, Table C.1 shows that the choice of the welfare discount has no effect on the income effect and a small effect on the independence effect.

Table C.2 shows the support level multipliers for various welfare discounts for the equations containing NIT payments. The equations are comparable to those used in Table 4. Notice that with no discount the low support effect is significant and large. None of the support level multipliers is significant with a nonzero discount, and the higher the discount the lower the multipliers. The greatest difference in the support level coefficients occurs between the 0% and 25% discounts.

We draw two conclusions from this exercise. First, only a nonzero welfare discount can explain the support level effects. Second, the size of the discount does not matter greatly. Our results are not sensitive to changes in the discount. Had a different discount been chosen, the results reported in Tables 3 and 4 would have been much the same as the 50% discount results we have reported. We still intend to estimate the

Table C.1

INDEPENDENCE AND INCOME EFFECTS
OF VARIOUS WELFARE DISCOUNTS FOR WHITES

	Discounts				
	0%	25%	50%	75%	100%
Independence Effect					
$(Y_s + \Delta Y_s)^{-1}$	1.09 - .103C	1.36 - 1.08C	1.03 - .916*C	.492 - .432**C	.397 - .424C
Income Effect					
Y^2	.006 - .004*C	.006 - .004*C	.006 - .004*C	.006 - .004*C	.006 - .004*C
ΔY^2	.088 - .042C	.086 - .042*C	.085 - .043*C	.087 - .044*C	.085 - .044*C
$Y \cdot \Delta Y$	-.085* + .039**	-.084 + .035*C	-.083* + .032*C	-.083* + .032*C	-.087* + .033*C

$*.05 < p \leq .10$

$**.01 < p \leq .05$

Table C.2

WHITE SUPPORT LEVEL MULTIPLIERS FROM EQUATIONS, INCLUDING PAYMENTS FOR VARIOUS WELFARE DISCOUNTS

	Discounts				
	0%	25%	50%	75%	100%
Low support	1.86*	1.72	1.64	1.60	1.61
Medium support	1.32	1.22	1.18	1.18	1.18
High support	.82	.75	.74	.74	.75

*.05 < p ≤ .10

welfare discount directly and will provide those results in a future report.

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19	*The Payment System for the Seattle and Denver Income Maintenance Experiments,* M. Kurz, R. G. Spiegelman, and J. A. Brewster, June 1973.
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