The Interracial Context of Educational Partnering within Marriage*

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1 Introduction

Since the mid-1960s, black/white interracial marriage rates in the United States have increased rapidly. Although such marriages are still only a small fraction of total marriages, their prevalence continues to grow. This rise has renewed interest among social scientists in classic theories which attempt to understand how the context of interracial unions affects matching on other status characteristics.

Various theories of interracial marriage patterns have been developed, and these theories have been implemented in empirical research using an equally-wide variety of methods. While most researchers have developed their own theories and methods in contrast to other research, there has been little explicit comparison between competing models. In the research outlined here, I develop log-linear models from various theoretical perspectives and compare them using a consistent data source and consistent methodological techniques. The results suggest that educational homogamy fails to capture important patterns in interracial unions, and that these patterns are best captured not by the prominent caste-status exchange theory but by a model which emphasizes the isolation of lower-class blacks.

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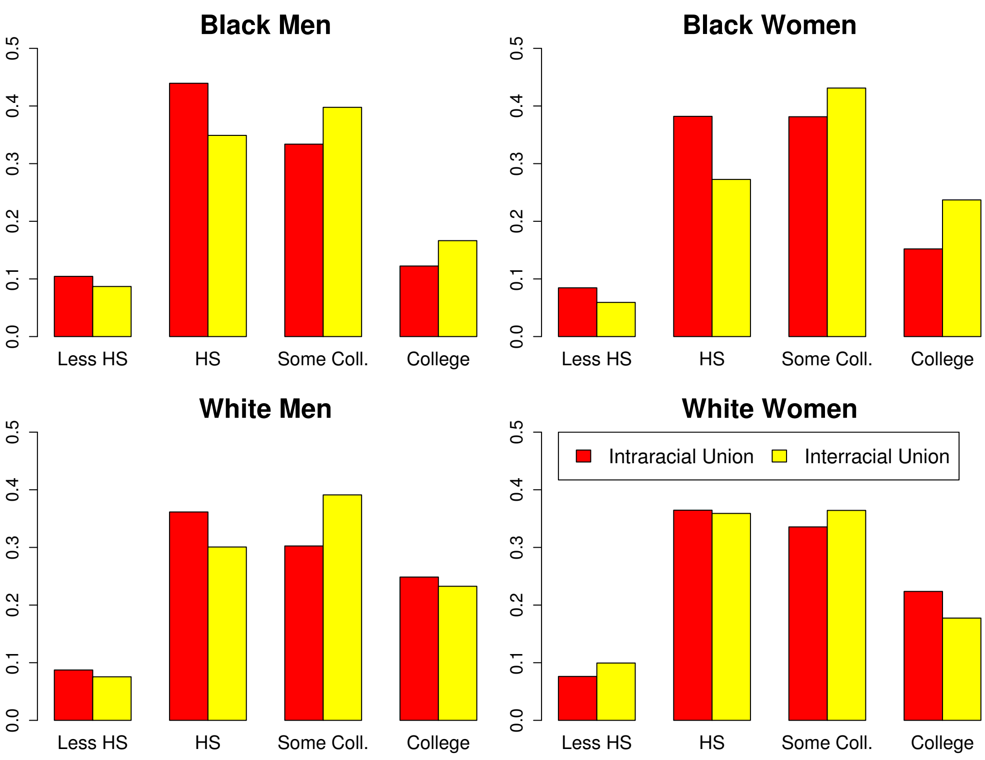
2 The Selectivity of Interracial Marriage

The characteristics of those who enter interracial unions have long been a subject of much speculation and theory. Early in the twentieth century, many observers believed that only the lowest orders of both races engaged in such unions. This viewpoint gradually shifted, particularly as evidence became available to the contrary. It became clear that blacks (mostly men) in interracial marriages were on average more highly educated than blacks in intraracial marriages. A recent example of this selectivity is shown in Figure 1, based on data from the 1990 census. The educational distribution of black men and women in interracial marriages with whites is skewed more toward higher educational levels than the educational distribution of black men and women in intraracial marriages with other blacks. The modal educational category for blacks in interracial marriages is some college education, while the modal category for blacks in intraracial marriages is high school graduation. The selectivity of whites in interracial marriages, on the other hand, is less clear. White men in interracial unions may be slightly more educated on average than white men in intraracial unions, but this does not appear to be true for white women.

2.1 Theories of Interracial Marriage

Numerous theories have been developed to account for this black selectivity. Most of these theories have focused particularly on how educational partnering within interracial marriages might be different than educational partnering within intraracial marriages. The most prominent theory was proposed by Merton (1941) and Davis (1941), in independent papers published at the same time. These two scholars proposed that interracial marriages would frequently involve an exchange of status characteristics. The black spouse would trade a high educational status in order to receive the high racial status of the white spouse. Thus, black/white intermarriages were likely to involve a black spouse with greater education than their white spouse, because these types of individuals would each have something to gain from the union. Interracial marriages involving white spouses with greater education than their black spouses would be much less likely because blacks would have nothing to offer their potential white spouse in return for the white spouse marrying "down" in terms of race. This particular pattern was thought more applicable to black male/white female pairings because the black male's educational characteristics would be tied to future potential earnings in a way a black woman's educational characteristics would not be. Although neither Merton or Davis gave the theory a name, it has frequently been called "caste-status exchange" theory or simply "status exchange" theory. I will use the latter term in this work.

Figure 1: Educational Distributions of Spouses by Race and Union Type, Census 1990



Source: 1990 Census Data (IPUMS)

Only marriages between native-born individuals where the husband was 25-35 years of age. Interracial marriages refer only to black/white interracial marriages.

Status exchange theory has been hotly contested. Numerous observers have noted that, like intraracial marriages, interracial marriages are predominantly homogamous with respect to education (Monahan 1976; Porterfield 1978; Heer 1974; Bernard 1966). Individuals have a strong tendency to marry others of a similar educational background, and this tendency has been increasing over the last half-century (Mare 1991; Mare 2000). Strictly speaking, Merton (1941) predicted that marriages involving white hypergamy would be more common than homogamous marriages, so the evidence presented by these scholars appears to invalidate Merton's original hypothesis.

However, Merton's prediction is actually not an appropriate test of status exchange theory. We expect that individuals are making all kinds of considerations when they consider marriage besides the possibility of status exchange, and so it should not be surprising that homogamy is strong in interracial unions, given that it seems to be such a strong determinant of marriage formation in general. The important question is whether the pattern of non-homogamous educational partnering within interracial marriages is different from the pattern in intraracial marriages. Kalmijn (1993) has suggested the use of a hypergamy ratio to test for differences in these patterns. The hypergamy ratio is calculated as the number of people in a certain group marrying up in education divided by the number of people in that group marrying down.[1] In order to test status exchange theory, Kalmijn (1993) compares the actual hypergamy ratios within interracial marriages to the expected hypergamy ratios from log-linear models which assume that there is nothing different about educational partnering within interracial marriages. Using vital statistics data from 1970 to 1986, he finds that both black men and black women are more likely to marry up in education within interracial unions than would be expected if they simply followed the pattern within intraracial unions. For example, the hypergamy ratio of women in black male/white female unions over the period 1970-1986 was 1.252, while the expected ratio was only 0.928, indicating that white women are much more likely to marry up than would be expected under a model which assumes no difference. Similarly, the hypergamy ratio of women in white male/black female unions was 0.910, compared to an expected value of 1.289, indicating significant upward marriage for white men in these unions. Qian (1997) used these hypergamy ratios in his analysis of interracial marriage in the 1980 and 1990 Census data and produced similar results.

The hypergamy ratio approach seems to be a valid test of Merton's and Davis's original

[1] Traditionally hypergamy has been treated as if it applies exclusively to women, so that hypergamy means downward marriage for a woman on some status characteristic. This terminology is unfortunate because it makes discussing hypergamy among other groups inaccessible. Technically, we could think of white or black hypergamy as well. The expectation of status exchange theory is that interracial unions will be hypergamous for whites

works. Kang Fu (2001), however, has suggested a complete reformulation of status exchange theory more consistent with exchange theory broadly defined. He argues that status exchange theory makes two basic assertions. First, highly-educated spouses are more valued on the marriage market than less-educated spouses. Second, white spouses are more valued on the marriage market by both blacks and whites than black spouses. These two conditions are necessary for the exchanges Merton and Davis outlined to occur. Kang Fu argues that the best way to test these two assertions is to observe how blacks and whites perform when they compete for highly-educated spouses of both races. When whites and blacks compete for a black spouse, whites should on average be able to acquire black spouses with greater education than the spouses acquired by blacks. Similarly, when whites and blacks compete for a white spouse, whites should on average be able to acquire white spouses with greater education than the spouses obtained by blacks. Kang Fu develops a log-linear model which tests these assertions. He finds support for the theory in 1990 Census data, although the results are weaker when men are competing for women, than when women are competing for men. Later in this chapter, I will outline his model in more technical detail.

Aside from status exchange theory, there is a more mechanical reason to expect selectivity of spouses within interracial marriages. If two groups have different distributions of a status characteristic, such as education, then homogamous marriages between these two groups will be selective of both parties. Intermarriages would be rare at the upper end of the distribution for the privileged group and rare at the lower end of the distribution for the disadvantaged group, because of the fewer educational matches across groups available at those ranges. Therefore, the disadvantaged group will be positively selected while the privileged group will be negatively selected. This expectation is identical to the expectation of status exchange theory, but for different reasons. Therefore, it is necessary to account for the different racial distributions of education and the general pattern of educational partnering before testing for status exchange explicitly. The log-linear framework of both Kalmijn and Kang Fu controls for these distributions. The Kang Fu approach also allows for a direct comparison (in terms of goodness-of-fit) between the status exchange model and a model which assumes that no additional parameters are necessary, and the evidence from the 1990 census supports his model. The Kalmijn approach unfortunately provides no way of comparing models or generating inferential statistics.

In general, tests of status exchange have not been compared to other plausible theories which could account for black selectivity within interracial marriages. It has long been argued that the propensity to marry interracially will increase with educational level, particularly at the college level (Kalmijn 1993), which in and of itself could explain black selectivity. There are several reasons to expect such a relationship. First, universities provide local marriage markets where blacks and whites are unusually integrated. Aside from this simple propinquity, however, college attendance is a form of structural assimilation which breaks down group barriers and attachments (Gordon 1964). Finally, research has shown that high-status blacks are less likely to identify strongly by race relative to lower-status blacks (Demo and Hughes 1990) and that intergroup tolerance increases with education (Davis 1982), suggesting that interracial openness might increase with education. I refer to this theory as the educational propensity theory.

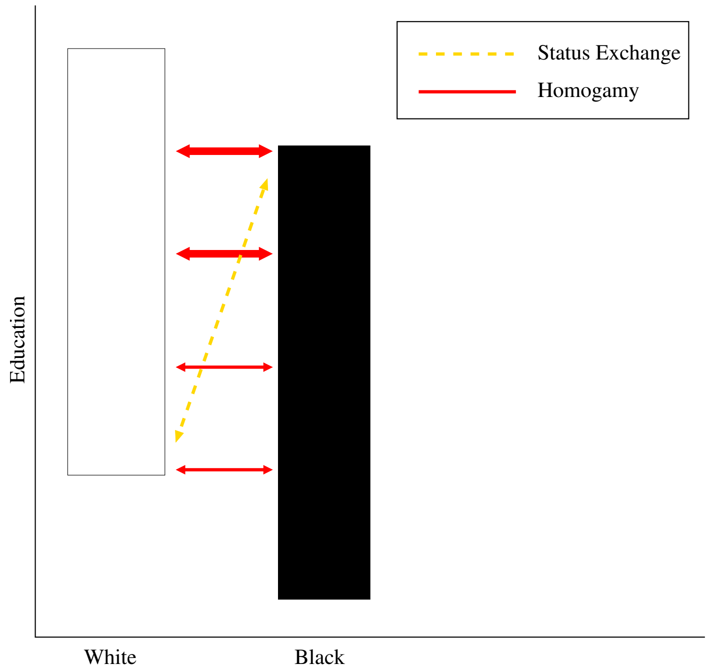
According to this theory, we would expect interracial unions to be more common in homogamous unions among the highly-educated than in other types of educational partnerings. The greater likelihood of interracial unions within such unions may itself explain the selectivity of blacks into interracial unions. Interestingly, educational propensity theory has a completely different expectation about the selectivity of whites than status exchange theory. According to educational propensity theory, whites should be positively selected into interracial marriages rather than negatively selected.

To my knowledge, there have been no empirical tests of educational propensity theory. The emphasis on status exchange within the interracial marriage literature partially explains this lack.

Scholars of American race relations in the Post Civil Rights Era have focused on the specific circumstances of lower-class blacks, particularly their isolation in urban central cities (Wilson 1978; Wilson 1987). The decline of a strict caste system of racial oppression has led to a bifurcation of the life-chances of blacks by class. Middle and upper class blacks have been allowed to join the American mainstream, while lower-class blacks have been further isolated, creating a super-stigmatized urban underclass. This isolation of lower-class blacks may seriously affect both their marriage opportunities with whites and their marriageability as perceived by whites. From this perspective, blacks may have differential access to the interracial marriage market depending on their level of education, and this access will likely increase with education. I refer to this as isolation theory. It assumes nothing about the particular educational partnering within interracial unions.

To my knowledge, only Kalmijn (1993) has linked this literature to interracial marriage. However, he argues that status exchange itself is indicative of such isolation. This assertion is not strictly true, because status exchange theory does not hold that lower-class blacks are explicitly isolated, but rather that lower-class blacks may be mechanically isolated because they have fewer opportunities to marry down in terms of education with whites than do upper-class blacks. Isolation theory and status exchange theory are entirely different theories which

Figure 2: Racial intermarriage patterns



generate different predictions about patterns of educational partnering within interracial marriages.

It is easy to conflate isolation theory with educational propensity theory. As I mentioned above, some scholars have noted the reduced racial endogamy among highly-educated blacks as evidence of the assimilative character of education. However, the two theories differ in two important respects. First, educational propensity theory argues that greater integration occurs in homogamous unions at the college level. Therefore the educational partnering of whites and blacks within interracial unions does matter. Second, if this assumption is relaxed, then educational propensity theory would still expect a similar ordering of preferences for interracial unions by education among whites. Isolation theory predicts no such ordering of preferences among whites. To distinguish between the two theories, one needs to consider the propensity to marry interracially by educational level for both blacks and whites.

Three of the potential theories which I have outlined thus far are shown stylistically in Figure 2. Isolation theory cannot be shown in this manner because it does not generate a prediction about educational partnering. The white bar is higher than the black bar to represent the higher mean level of education for whites. The solid straight lines between the two groups represent educational homogamy. Even though marriages are educationally homogamous, they select out the top and middle of the black bar and the middle and bottom of the white bar. This selection occurs mechanistically as a result of educational preferences *without consideration of race*. The upper arrows are thicker than the lower ones to indicate the hypothesized greater propensity to enter interracial unions among both blacks and whites at higher educational levels.

Status exchange is represented by the dashed diagonal line. According to this theory, marriages will not be homogamous but will flow in a particular direction. Status exchange occurs because individuals make a decision based *jointly* on race and education. Both educational homogamy and status exchange will positively select the black member of interracial marriages and negatively select the white member of interracial marriages. Educational propensity, on the other hand, will positively select both members of the union.

3 Models

In order to assess the theories outlined above, I develop several log-linear models which capture each theory's essential argument. Although previous researchers have used log-linear models to test some of these theories, none have compared the fit of models testing different theories in a consistent manner. Furthermore, these models have focused exclusively on status exchange theory. Here I develop a broad set of models which can be used to adjudicate between the theories in terms of explaining black selectivity into interracial unions.

The log-linear models are constructed from four-dimensional tables of husband's race (i), wife's race (j), husband's education (k), and wife's education (l). Within each cell are the counts of unions (F_{ijkl}) which correspond to each dimension. Race is coded as white (1) or black (2), and education is coded as four discrete categories: less than high school (1), high school degree (2), some college (3), college degree (4).

The following variables are used to flag interracial marriages:

$$m_{ij} = \begin{cases} 1 & \text{if } i = 2 \text{ and } j = 1 \\ 0 & \text{else} \end{cases}$$

$$f_{ij} = \begin{cases} 1 & \text{if } i = 1 \text{ and } j = 2 \\ 0 & \text{else} \end{cases}$$

$$n_{ij} = \begin{cases} 1 & \text{if } f_{ij} = 1 \text{ or } m_{ij} = 1 \\ 0 & \text{else} \end{cases}$$

In simple terms, m_{ij} identifies black male/white female (BM/WF) interracial unions, f_{ij} identifies white male/black female (WM/BF) interracial unions, and n_{ij} identifies an interracial union of either type. I also define terms b and w which are the educational levels of the black and white spouse, respectively, in an interracial marriage.

Most of the models that follow are parameter-constrained fits of the fourth-order tables, F_{12kl} and F_{21kl}. In the equations that follow, I will assume that the parameters fit these two tables identically, so that there is gender symmetry in the parameters between BM/WF and WM/BF pairings. In the actual analysis, I test two different versions of each model, one which assumes this gender-symmetry, and one which allows the parameters to vary depending on whether the union involves a BM/WF or WM/BF pairing. Figure 3 shows graphically how each of the following models codes the gender-symmetric fourth-order table.

I begin with a simple model which assumes that there is no unique pattern to educational partnering within interracial unions. Formally, the model is:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} \quad (1)$$

This model assumes that there is nothing in particular to explain about interracial unions that is not explained by the general pattern of racial endogamy (λ_{ij}), educational partnering (λ_{kl}), and the different racial distributions of education (λ_{ik} and λ_{jl}). I refer to this model as the Independence (I) model. All of the subsequent models are nested within this model.

Educational Propensity I construct two models to test the educational propensity theory. This theory asserts that interracial unions will be particularly likely among those in highly-educated homogamous unions, particular at the college level.

First, I test a model which assumes different levels of educational homogamy in interracial unions depending on the level of education. Formally this model is:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \alpha_k(x_{kl})(n_{ij}) \quad (2)$$

where x_{kl} equals 1 when $k = l$ and 0 otherwise. The α_k parameters give the strength of homogamy at varying educational levels. According to theory, these parameters should be stronger at higher levels of education,

$$\alpha_4 > \alpha_3 > \alpha_2 > \alpha_1$$

Two-dimensional log-linear models are often summarized by local odds ratios which give the odds-ratio for every set of adjacent cells in the table. Each local odds ratio, θ_{ij}, is defined as:

$$\theta_{ij} = \frac{F_{ij}/F_{i(j+1)}}{F_{(i+1)j}/F_{(i+1)(j+1)}}$$

Figure 3: Different models of interracial educational partnering

Independence

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	0	0	0
HS	0	0	0	0
SC	0	0	0	0
C	0	0	0	0

White Hypergamy, Unbalanced

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	B	B	B
HS	A	0	B	B
SC	A	A	0	B
C	A	A	A	0

Differential Homogamy

Black Spouse	White Spouse LHS	HS	SC	C
LHS	A	0	0	0
HS	0	B	0	0
SC	0	0	C	0
C	0	0	0	D

Quasi White Hypergamy

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	0	0	0
HS	1	0	0	0
SC	1	1	0	0
C	1	1	1	0

College Corner

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	0	0	0
HS	0	0	0	0
SC	0	0	1	1
C	0	0	1	1

Generalized Penalty

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	1	2	3
HS	0	1	2	3
SC	0	1	2	3
C	0	1	2	3

Black Spouse	Black Spouse LHS	HS	SC	C
LHS	0	1	2	3
HS	1	2	3	4
SC	2	3	4	5
C	3	4	5	6

White Hypergamy, Balanced

Black Spouse	White Spouse LHS	HS	SC	C
LHS	0	-1	-1	-1
HS	1	0	-1	-1
SC	1	1	0	-1
C	1	1	1	0

Isolation

Black Spouse	White Spouse LHS	HS	SC	C
LHS	1	1	1	1
HS	1	1	1	1
SC	0	0	0	0
C	0	0	0	0

LHS=Less than high school; HS=high school graduate; SC=Some college, but no four-year degree; C=Four-year college degree or more

For a 4 x 4 table, there are nine local odds ratios. The models presented here can be summarized in a similar fashion. Rather than local odds ratios, I calculate the ratios of the local odds ratios for educational partnering in interracial unions compared to intraracial unions. These ratios of odds ratios, (Θ_{kl}), tell us how much bigger or smaller the local odds ratio is in interracial unions relative to intraracial unions. From the model outlined above, these ratios of the local odds ratios are:

$$\Theta_{kl} = \frac{\theta_{21kl}}{\theta_{11kl}} = \frac{\theta_{12kl}}{\theta_{11kl}} = \frac{\theta_{21kl}}{\theta_{22kl}} = \frac{\theta_{12kl}}{\theta_{22kl}} = \begin{pmatrix} e^{\alpha_1+\alpha_2} & 1/e^{\alpha_2} & 1 \\ 1/e^{\alpha_2} & e^{\alpha_2+\alpha_3} & 1/e^{\alpha_3} \\ 1 & 1/e^{\alpha_3} & e^{\alpha_3+\alpha_4} \end{pmatrix}$$

Depending on the values of the α parameters, this model will boost the local odds-ratio along parts of the diagonal and depress it elsewhere. I refer to this model as the Differential Homogamy (DH) model.

This model may be problematic because it does not assume any particular attraction among those who have attended college but not received a degree and those who have received a college degree. Since the theory focuses particularly on the college boundary, I test a second model which "blocks off" the college-educated corner of the table, as follows:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \beta(x_{kl})(n_{ij}) \qquad (3)$$

where x_{kl} equals 1 if k equals 3 or 4 and l equals 3 or 4. The expectation is that β will be positive.

This model produces the following Θ_{kl}:

$$\Theta_{kl} = \begin{pmatrix} 1 & 1 & 1 \\ 1 & e^{\beta} & 1 \\ 1 & 1 & 1 \end{pmatrix}$$

The only odds-ratio affected by this parameterization is the one marking the boundary between homogamous unions among those with and without a college education. I refer to this model as the College Corner (CC) model.

Classic Exchange According to classic exchange theory, interracial unions can be divided into three types based on the educational partnering of spouses: (1) those unions where the black member has more education than the white member (white hypergamy), (2) those unions where the black and white member have the same level of education (homogamy), (3) those unions where the black member has less education than the white member (white hypogamy).[2] Relative to the general pattern of educational partnering (λ_{kl}), classic exchange theory predicts that white hypergamy will be most common, followed by homogamy, and then by white hypogamy. For example, a white man married to a black women would be more likely than a white man married to a white women to be in a hypergamous union relative to a homogamous union. Similarly, the same man would be less likely than a white man married to a white women to be in a hypogamous relative to a homogamous union.

This ordering can be expressed with the following model:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \gamma(x_{kl})(n_{ij}) \quad (4)$$

When $m_{ij} = 1$, x_{kl} equals 1 if $j > l$, equals -1 if $j < l$, and equals 0 if $j = l$. When $f_{ij} = 1$, x_{kl} equals 1 if $j < l$, equals -1 if $j > l$, and equals 0 if $j = l$. The expectation is that γ will be positive.

This model produces the following Θ_{kl}:

$$\Theta_{kl} = \begin{pmatrix} 1 & 1/e^{\gamma} & 1 \\ e^{\gamma} & 1 & 1/e^{\gamma} \\ 1 & e^{\gamma} & 1 \end{pmatrix}$$

The local odds ratios which are affected indicate the boundary between white hypergamy and homogamy and between white hypogamy and homogamy. I refer to this model as the White Hypergamy, Balanced (WH-B) model because the expectation is that γ will be positive indicating net white hypergamy within interracial unions. The term "Balanced" refers to the fact that the disincentive to white hypogamy is constrained to be identical to the incentive toward white hypergamy.

I also fit a less constrained model which does not assume that the incentives and disincentives balance. This model is as follows:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \nu(x_{kl})(n_{ij}) + \tau(y_{kl})(n_{ij}) \quad (5)$$

When $m_{ij} = 1$, x_{kl} equals 1 if $j > l$ and 0 otherwise, and y_{kl} equals 1 if $j < l$ and zero otherwise. When $f_{ij} = 1$, these assignments are reversed. The expectation is that ν will be positive and τ will be negative.

[2]There is no gender focus in the terms hypergamy and hypogamy as I use them here. Rather, I am referring to upward and downward marriage in terms of education from the viewpoint of the white person in an intermarriage, regardless of gender.

This model produces the following Θ_{kl}:

$$\Theta_{kl} = \begin{pmatrix} 1/e^{\tau+\nu} & e^{\tau} & 1 \\ e^{\nu} & 1/e^{\tau+\nu} & e^{\tau} \\ 1 & e^{\nu} & 1/e^{\tau+\nu} \end{pmatrix}$$

This model is asymmetric, and thus the diagonal elements are affected. Other than that, it is similar to the balanced model above. It is easy to show that if $\nu = -\tau$, the odds ratios simplify to those for the WH-B model. I refer to this model as White Hypergamy, Unbalanced (WH-U).

After initial tests of these two models, I discovered that another model was warranted. This model is similar to the White Hypergamy, Unbalanced model, but it assumes that $\tau = 0$, as follows:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \kappa(x_{kl})(n_{ij}) \tag{6}$$

When $m_{ij} = 1$, x_{kl} equals 1 if $j > l$ and 0 otherwise. When $f_{ij} = 1$, x_{kl} equals 1 if $j < l$ and 0 otherwise.

This model produces the following Θ_{kl}:

$$\Theta_{kl} = \begin{pmatrix} 1/e^{\kappa} & 1 & 1 \\ e^{\kappa} & 1/e^{\kappa} & 1 \\ 1 & e^{\kappa} & 1/e^{\kappa} \end{pmatrix}$$

In this model, the important boundary is between homogamy and white hypergamy. There is no disincentive to white hypogamy relative to homogamy. Although this model fits the data reasonably well, it is theoretically troubling and cannot be considered strictly status exchange because there is no particular disincentive to white hypogamy. I refer to it as the Quasi White Hypergamy (QWH) model to reflect this ambiguity.

Restriction Models I now present two models which do not fit the fourth order table itself, but rather fit constrained models of the third order table involving husband's race, wife's race, and husband's education and the third order table involving husband's race, wife's race, and wife's education. Both of these models make arguments about restrictions or barriers to blacks in marriage, so I refer to them as "Restriction" models.

The first model is the model proposed by Kang Fu (2001). As I noted above, this model is really a reformulation of classic exchange theory. Kang Fu argues that exchange implies that blackness is universally accepted as a lower status than whiteness. Because they possess a racial characteristic which is less valued, blacks are less able than whites to acquire high status spouses on other characteristics such as education, regardless of the race of this spouse. Rather than examining the joint characteristics of spouses in interracial unions, we only need to examine how black and white spouses do comparatively in acquiring highly educated spouses. Formally, the model is:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \phi(k + l)(x_{ij}) + \rho(w)(n_{ij}) \quad (7)$$

Where x_{ij} equals 1 when $i = 1$ and $j = 1$ (black endogamy). I refer to this model as the Generalized Penalty (GP) model because it treats blackness as a universal penalty.

Since this model does not consider the education of both spouses in an interracial marriage, the $\Theta_{kl} = 1$ in all cases. The relevant odds ratios are the ones outlined above. Specifically,

$$\frac{F_{22k(l+1)}/F_{22kl}}{F_{12k(l+1)}/F_{12kl}} = \frac{F_{22(k+1)l}/F_{22kl}}{F_{21(k+1)l}/F_{21kl}} = e^{\phi}$$

The first ratio is the odds of black men marrying black women of one higher educational category relative to that same odds for white men marrying black women. The second ratio just switches the gender combinations.

$$\frac{F_{21k(l+1)}/F_{21kl}}{F_{11k(l+1)}/F_{11kl}} = \frac{F_{12(k+1)l}/F_{12kl}}{F_{11(k+1)l}/F_{11kl}} = e^{\rho}$$

The first ratio is the odds of black men marrying white women of one higher educational category relative to that same odds for white men marrying white men. The second ratio reverses the gender combinations.

The final model is intended to reflect the exclusion of lower-class blacks from the interracial marriage market. According to isolation theory, interracial marriage only becomes an option for blacks who have "made it." The model does not require any knowledge of the joint characteristics of the interracial couple. It only examines the educational characteristics of the black individual in interracial marriages. Mechanically, this model simply blocks off the lower status black groups of both sexes in interracial marriages.

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \omega(x_b)(n_{ij}) \quad (8)$$

where x_b equals 1 if b is 1 or 2, and equals zero otherwise. The expectation is that ω will be negative. I refer to this model as the Isolation (ISO) model.

Like the GP model, $\Theta_{kl} = 1$ for all values of k and l. The important odds ratios in this model is the of odds of racial exogamy for blacks who have never attended college relative to those same odds for those who have, like so:

Table 1: Sample Size of Data Sets

	Racially Endogamous		Racially Exogamous	
Dataset	WM/WF	BM/BF	BM/WF	WM/BF
1980 Census	452154	40445	1390	324
1990 Census	411867	31653	1913	675
2000 Census	286297	25952	3124	1018

$$\frac{F_{21(1/2)l}/F_{22(1/2)l}}{F_{21(3/4)l}/F_{22(3/4)l}} = \frac{F_{12k(1/2)}/F_{22k(1/2)}}{F_{12k(3/4)}/F_{22k(3/4)}} = e^{\omega}$$

4 Data

In order to test these models, I use data from the 1980, 1990, and 2000 censuses. The data here are derived from the 5% samples of each Census, using the Integrated Public Use Microdata Sample (Ruggles and Sobek 1997). At the time of this writing, only the beta sample is available for the 2000 IPUMS 5% sample, meaning that the results could change when the final results become available.

I restrict the sample to married unions of native-born individuals where the husband was 25-35 years of age. I restrict to the native-born population because the foreign-born population may have faced very different marriage markets when they were younger and may not be affected by the American racial hierarchy in the same manner as the native-born population. The age restriction is a common method of dealing with prevalence data on marriages. I would prefer data on new marriages, so that the models truly measure patterns of union formation. The census data are prevalence measures of existing unions and may be affected by union attrition or by patterns which prevailed in the past. By focusing on younger couples, I can reduce the effect of such attrition and capture unions which were recently formed and thus reflect current patterns.

Table 1 shows the sample size of each dataset (where the unit is a marriage), by the four racial combinations analyzed here. The sample is quite large for racially endogamous couples, because racial endogamy is quite strong. Among racially exogamous couples, BM/WF pairings outnumber WM/BF pairings by three to one in the 1990 and 2000 census. This disparity is even greater in the 1980 census, where it is slightly greater than four to one. This disparity is well known. None of the models I am putting forward here address the disparity as it is not the focus of this research.

There has been a clear decline in racial endogamy from 1980 to 2000. The odds ratio in 1980 was 40,606. This figure declined to 10,097 in 1990, and 2,336 in 2000. Racial endogamy is steadily declining although it is still quite dramatic.

The results reported in Table 1 and used in the analysis for 1990 and 2000 are weighted counts. In these years, the Census Bureau used a stratified sampling technique of the long-form responses to construct the 5% sample, meaning that weights must be used to accurately generalize to the United States population (IPUMS 2003). Previous studies of this type have generally not used weighted samples, although the rationale for doing so seems unclear. An analysis with the unweighted counts (not shown here) produce similar results, the only major difference being that the 2000 isolation model fits significantly better.

The models in this chapter are all fit as log-linear models which are a form of generalized linear models used for counts. Log-linear models assume an underlying Poisson distribution to the error term. Frequently, this assumption is problematic because the data suffer from overdispersion, meaning that the variance in the actual data is larger than the variance predicted under the Poisson distribution. Overdispersion leads to deflated standard errors and inaccurate likelihood measures, although it generally does not greatly effect the actual parameter estimates themselves.

Overdispersion can sometimes be difficult to detect, partially because it can be conflated with poor model fit. The models used here fit well by measures such as BIC (see below) but appear to suffer from overdispersion according to the common rule of thumb that the Pearson χ^2 statistic should be roughly equal to the degrees of freedom. I use a technique derived from McCullagh and Nelder (1989) in the analysis below. I model the overdispersion with a single parameter σ which inflates the expected variance from the Poisson model by a constant term, $var(y) = \sigma^2\mu$. A simple estimate of σ^2 would be the ratio of the Pearson χ^2 to the degrees of freedom in a model more complex than any of the ones under consideration. For this more complex model, I fit the log-linear model which saturates every table except λ_{ijkl}. This model is not preferred to the models used here by BIC and is also not preferred on theoretical grounds, but does provide an estimate of overdispersion in a nearly saturated model. The standard errors of all parameter values are then inflated by σ. It should be noted that this leads to conservative inferences regarding the parameters, because it assumes that σ is not equal to one (Lindsey 1999).

The key aspect of the analysis that follows is the comparison of competing models. A common method for comparing log-linear models is the likelihood ratio test (LRT) which examines the difference in the likelihood ratio chi-squared statistic, G^2, between nested models.

Given two models, n and u, where n is nested within u, the value of $G_n^2 - G_u^2$ is asymptotically distributed (assuming the model is correct) as a χ^2 with degrees of freedom equal to $df_n - df_u$.

Some of the models used here are nested, while others are not. Each model has a gender-symmetric (GS) version and a gender-asymmetric (GA) version. The GA version of each model is nested within the GS version. Similarly, each model outlined above is nested within the Independence model. None of the other models are nested within each other. Comparing non-nested models is problematic using the likelihood ratio test.

Raftery (1995) has criticized the likelihood ratio test and similar tests because they tend to support more complexity in very large samples, even if there is little grounds for the more complex model. He suggests a more parsimonious technique, based on Bayesian logic, which uses the Bayesian Information Criterion (BIC). BIC is an approximation of a transformed Bayes factor. It is calculated as follows:

$$BIC = G^2 - DF \log n \tag{9}$$

Lower BIC indicates a better fit. BIC is implicitly compared to the saturated model and values below zero indicate a preference for the current model relative to the saturated model. Two models can also be compared directly with BIC, where the model with a smaller BIC is preferred. BIC is less likely to prefer more complex models than LRT, particularly in large samples. The main advantage of BIC for my purposes is that it can be used to compare models which are non-nested as well as models which are nested.

For comparisons between nested models, I use both the LRT and BIC. For comparisons between non-nested models, however, I rely solely on the BIC statistic.

Overdispersion can make model comparison using both LRT and BIC problematic. Therefore, I adjust these techniques by the method suggested in both Raftery (1996) and Fitzmaurice (1997). Before calculating the relevant statistic, I scale G^2 by $(1/\sigma^2)$. Since this scaling reduces G^2, it leads to greater preference for parsimonious models by both LRT and BIC. Overall, the important results are highly consistent if σ is assumed to be one. The best models are still generally the best models and strong parameters are still strong parameters.

5 Analysis

5.1 Model Fit

Table 2 shows the goodness of fit of each model for the three censuses. On the right-hand side, p-values are presented from the LRT comparing each gender-symmetric version of the model with the gender-asymmetric version.

P-values comparing the Independence model (I) in each decade to the other models by a LRT test are not explicitly shown in the table, but in every case except one (2000 CC), the more complex models are preferred to I. The more parsimonious BIC statistic also prefers every complex model except the 1980 and 2000 DH model, the 1990 and 2000 WH-U model, and the 2000 CC to I. Clearly, there is something distinct about interracial unions. Each of the models captures some aspect of this distinctiveness, although the extent to which they accurately characterize it differs considerably.

In 1980, gender-asymmetric models were preferred in every case by LRT except for the DH and WH-U models, but for none of the models by BIC. This 1980 result is very different from the 1990 and 2000 results, which prefer gender-asymmetry in only a handful of cases. I will turn to the reasons for this discrepancy below. Only the GA version of the QWH and the WH-U models were preferred in Census 2000 by LRT, and only the QWH model alone in Census 1990. None of the GA models were preferred by BIC.

The educational propensity models generally fit the least well of all the models, although the CC model fits quite well in 1990. The DH model was preferred by BIC to the Independence model in 1990 only, and then by only a small margin and it consistently has the lowest BIC score among the more complex models.[3] In all three censuses, the CC model is preferred to the DH model. the CC model also outperforms the classic exchange models in 1990. In general, the CC model seems to be a better parameterization of educational propensity than the DH model, although both models must be viewed skeptically compared to the other models fit here.

The classic exchange models fit decently in all three censuses but the goodness of fit varies considerably by version and year. The WH-B model fits somewhat better than the WH-U model in 1990 and 2000, but the two models are virtually tied in 1980. The QWH model also fits quite well and is preferred to the WH-B model in 1980 and 2000 and fits almost as well in 1990, suggesting that the WH-B model may be concealing some complexity. In fact, the QWH model is the best-fitting model overall in 2000. As I noted earlier, both WH-U and QWH seem to fit better if they are gender-asymmetric, suggesting that the patterns of classic exchange differ by the gender pairing.

Although both educational propensity and classic exchange models fit reasonably well, they generally do not fit nearly as well as the two restriction models. In 1980 and 1990, GP and ISO fit much better than any of the other models. In 2000, they are outperformed by

[3]The gender-symmetric DH model outperforms a couple of other GS models in 1990 (WH-U and QWH), but each of these models has a GA version which is preferred.

Table 2: Fit of different interracial union formation models

Model	Gender Symmetric DF	Gender Symmetric G^2	Gender Symmetric BIC	Gender Asymmetric DF	Gender Asymmetric G^2	Gender Asymmetric BIC	*LRT*
1980							
Independence	39	537.2	-225.0				
Differential Homogamy	35	457.0	-215.3	31	442.5	-170.6	0.101
College Corner	38	487.5	-238.4	37	473.8	-232.6	0.007
White Hypergamy, Balanced	38	506.3	-228.3	37	498.9	-219.2	0.047
White Hypergamy, Unbalanced	37	480.1	-229.2	35	472.8	-206.9	0.144
Quasi White Hypergamy	38	481.3	-241.7	37	473.9	-232.5	0.047
Generalized Penalty	37	414.3	-264.3	35	384.4	-254	$< .001$
Isolation	38	422.1	-273.2	37	399.9	-272.0	0.001
1990							
Independence	39	284.9	-313.4				
Differential Homogamy	35	204.9	-315.8	31	196.4	-269.6	0.214
College Corner	38	214	-348.7	37	213.5	-336.0	0.557
White Hypergamy, Balanced	38	245.4	-327.3	37	243.3	-315.7	0.232
White Hypergamy, Unbalanced	37	243.3	-315.7	35	236.7	-294.2	0.104
Quasi White Hypergamy	38	249.4	-324.5	37	243.4	-315.6	0.043
Generalized Penalty	37	186.4	-354.4	35	180.5	-332.5	0.132
Isolation	38	168.0	-379.9	37	164.6	-369.3	0.124
2000							
Independence	39	308.1	-353.0				
Differential Homogamy	35	247.6	-330.0	31	236.0	-284.6	0.257
College Corner	38	306.7	-341.0	37	306.7	-328.3	0.947
White Hypergamy, Balanced	38	230.7	-375.8	37	227.2	-364.7	0.207
White Hypergamy, Unbalanced	37	214.7	-370.4	35	198.9	-352.3	0.027
Quasi White Hypergamy	38	219.1	-381.1	37	204.6	-375.0	0.010
Generalized Penalty	37	244.3	-356.9	35	236.6	-335.0	0.176
Isolation	38	261.3	-361.7	37	261.2	-349.1	0.858

The LRT value is the p-value for the gender-asymmetric model over the gender-symmetric model. All BIC values and the LRT test have been adjusted to account for overdispersion as described in the text. The overdispersion parameters were estimated as: $\sigma^2_{1980} = 1.88$; $\sigma^2_{1990} = 1.47$; $\sigma^2_{2000} = 2.19$. The G^2 values in the table are not adjusted.

the classic exchange models, but still fit quite well. Of the two models ISO is preferred to GP in every census, and is the preferred model overall in 1980 and 1990.

Although the data presented in Table 2 are complex, they generally point to five models as the best-fitting candidates. The GP and ISO models fit well for all censuses, and are clearly the best models in 1980 and 1990. Of the classic exchange models, QWH fits the best in general, but WH-B is also a candidate because it outperforms QWH in 1990. Finally, the CC model fits reasonably well in 1980 and 1990, although its poor showing in 2000 makes it something of a darkhorse.

Table 2 tells us nothing about the actual parameter values. It is important to determine if the parameters are consistent with expectation. Furthermore, some of the inconsistencies in the fitting may be better understood by examining the actual parameters. I will now move to an examination of these parameters.

5.1.1 Model Parameters

The parameters of each model are shown in Tables 3, 4, and 5, for 1980, 1990, and 2000, respectively. I will address the parameters of each model in turn rather than by decade.

I expected the differential homogamy parameters to increase across the educational range. In the gender-symmetric case, this pattern holds only for the 1980 census. In that particular instance, it only truly holds for the BM/WF parameters. The WM/BF parameters in 1980 have no order whatsoever and are statistically indistinguishable from zero. In all three censuses, the parameters fail to follow this pattern for the WM/BF pairings, and in general there is little relationship between the BM/WF and WM/BF parameters. The BM/WF parameters are generally as expected for 1990, although $\alpha_1 > \alpha_2$, and in 2000, the BM/WF parameters do not hold to a pattern any more than the WM/BF parameters. The only parameter which is consistently strong and stable is α_2 which suggests an important division between high school graduation/college attendance. Overall, the parameters for these models do not fit in the order expected or any other consistent ordering and are often not statistically distinguishable from zero. This model is not a good characterization of the data.

The College Corner model appears to be a far better model of educational propensity than the Differential Homogamy model. In 1980 and 1990, the parameter is large and statistically significant, suggesting that interracial unions are much more common among couples who are both college-educated. In 1990, the size is consistent across both gender combinations, while it is only noticeable for BM/WF pairings in the 1980 data. In 2000, however, the parameters for both pairings are statistically indistinguishable from zero. Although this model fits better than DH, its absolute failure in the 2000 data means it should be viewed with some caution.

Table 3: Important variables from models, 1980

Parameter	GS	GA BM/WF	GA WM/BF
Differential homogamy (α)			
Less than high school	-0.551	-0.656	0.038
	(0.1419)***	(0.1575)***	(0.325)
High school	-0.413	-0.468	-0.134
	(0.0863)***	(0.0951)***	(0.2035)
Some college	0.075	0.099	-0.020
	(0.1148)	(0.127)	(0.2687)
College	0.104	0.207	-0.081
	(0.119)	(0.1398)	(0.2279)
College Corner (β)	0.388	0.496	0.017
	(0.0735)***	(0.0823)***	(0.1579)
White Hypergamy, Balanced (γ)	0.196	0.243	-0.003
	(0.0484)***	(0.054)***	(0.1117)
White Hypergamy, Unbalanced			
White upward mobility (ν)	0.431	0.490	0.087
	(0.078)***	(0.0847)***	(0.2086)
White downward mobility (τ)	0.068	0.062	0.070
	(0.0838)	(0.096)	(0.1725)
Quasi White Hypergamy (κ)	0.408	0.47	0.060
	(0.0726)***	(0.0787)***	(0.1973)
Generalized Penalty			
Black spouse's education, BS vs. WS (ϕ)	-0.284	-0.346	-0.013
	(0.0427)***	(0.0474)***	(0.0998)
White spouse's education, BS vs. WS (ρ)	0.002	-0.017	0.018
	(0.0439)	(0.0945)	(0.0492)
Isolation (ω)	-0.533	-0.649	-0.057
	(0.0676)***	(0.0754)***	(0.1533)

† $p < .1$;* $p < .05$; ** $p < .01$; *** $p < .001$

Standard errors shown in parenthesis. All standard errors have been corrected for overdispersion, $\sigma = 1.37$.

GS refers to the gender-symmetric model, while GA refers to the gender-asymmetric model.

Table 4: Important variables from models, 1990

Parameter	GS	GA	
		BM/WF	WM/BF
Differential homogamy (α)			
Less than high school	-0.219	-0.357	0.194
	(0.1452)	(0.1725)*	(0.2688)
High school	-0.339	-0.381	-0.193
	(0.0671)***	(0.0764)***	(0.1395)
Some college	0.186	0.150	0.286
	(0.0637)**	(0.0747)*	(0.122)*
College	0.149	0.211	0.071
	(0.0815)†	(0.1008)*	(0.1414)
College Corner (β)	0.344	0.362	0.297
	(0.0491)***	(0.058)***	(0.0943)**
White Hypergamy, Balanced (γ)	0.181	0.206	0.111
	(0.0349)***	(0.0407)***	(0.0682)
White Hypergamy, Unbalanced			
White upward mobility (ν)	0.236	0.311	0.035
	(0.0576)***	(0.0672)***	(0.112)
White downward mobility (τ)	-0.122	-0.095	-0.197
	(0.0603)*	(0.0694)	(0.1225)
Quasi White Hypergamy (κ)	0.274	0.342	0.092
	(0.0546)***	(0.0635)***	(0.1072)
Generalized Penalty			
Black spouse's education, BS vs. WS (ϕ)	-0.261	-0.303	-0.149
	(0.0338)***	(0.0398)***	(0.0662)*
White spouse's education, BS vs. WS (ρ)	-0.060	-0.022	-0.072
	(0.032)†	(0.0608)	(0.0378)†
Isolation (ω)	-0.442	-0.487	-0.307
	(0.1067)***	(0.058)***	(0.1003)**

† $p < .1$;* $p < .05$; ** $p < .01$; *** $p < .001$

Standard errors shown in parenthesis. All standard errors have been corrected for overdispersion, $\sigma = 1.21$.

GS refers to the gender-symmetric model, while GA refers to the gender-asymmetric model.

Table 5: Important variables from models, 2000

Parameter	GS	GA BM/WF	GA WM/BF
Differential homogamy (α)			
Less than high school	-0.241	-0.183	-0.462
	(0.1847)	(0.2046)	(0.4345)
High school	-0.245	-0.290	-0.087
	(0.0676)***	(0.077)***	(0.1412)
Some college	0.091	0.075	0.147
	(0.0603)	(0.0696)	(0.1215)
College	-0.205	-0.311	0.016
	(0.0763)**	(0.0954)**	(0.132)
College Corner (β)	0.038	0.036	0.043
	(0.0477)	(0.0562)	(0.0943)
White Hypergamy, Balanced (γ)	0.204	0.229	0.128
	(0.0343)***	(0.0396)***	(0.0696)†
White Hypergamy, Unbalanced			
White upward mobility (ν)	0.330	0.428	0.089
	(0.0572)***	(0.0671)***	(0.108)
White downward mobility (τ)	-0.08	-0.048	-0.18
	(0.0569)	(0.0637)	(0.1291)
Quasi White Hypergamy (κ)	0.356	0.445	0.134
	(0.0542)***	(0.0633)***	(0.1038)
Generalized Penalty			
Black spouse's education, BS vs. WS (ϕ)	-0.153	-0.173	-0.091
	(0.0336)***	(0.0397)***	(0.0673)
White spouse's education, BS vs. WS (ρ)	-0.151	-0.052	-0.184
	(0.0309)***	(0.0617)	(0.0358)***
Isolation (ω)	-0.229	-0.234	-0.212
	(0.0498)***	(0.0576)***	(0.1049)*

† $p < .1$;* $p < .05$; ** $p < .01$; *** $p < .001$

Standard errors shown in parenthesis. All standard errors have been corrected for overdispersion, $\sigma = 1.48$.

GS refers to the gender-symmetric model, while GA refers to the gender-asymmetric model.

I will address the various classic exchange models collectively. The WH-B model fits reasonably well in 1990 and 2000, but an analysis of the parameters from the WH-U model reveals that the WH-B model is seriously flawed. The parameters from the WH-U model are not balanced at all and, in all three censuses, the parameter for white downward mobility (τ) is negligible and statistically indistinguishable from zero and parameter has the wrong valence for all three model types in 1980. The WH-B model fit better than the WH-U model not because of a balance in the parameters, but because τ is an unnecessary parameter.

It was this result which initially prompted me to use the QWH model which sets $\tau = 0$. This model generally fits better than the WH-B and WH-U models. The parameter values, however, reveal a marked difference between the gender pairings. In 1980 the WM/BF parameter is essentially zero, while in 1990 and 2000, the parameter appears to be negative. So, the expectations of this model are only met for WM/BF pairings.

Overall, these results cast doubt on classic exchange theory. Although setting τ equal to zero improves model fit, this parameterization is inconsistent with classic exchange theory. According to classic exchange theory, there should be a strong disincentive for whites to enter educationally hypogamous interracial unions because they would be marrying down in terms of both race and education. Yet, the data suggest that there is no special disincentive toward white hypogamy relative to homogamy.

The overall fit of the Generalized Penalty model is quite good, but the actual parameter values reveal a less convincing story. The ϕ parameter compares the education of black spouses married to blacks relative to black spouses married to whites. The ρ parameter compares the education of white spouses married to blacks relative to white spouses married to whites. I expect both of these parameter to be negative, indicating that blacks marry lower in terms of education when they compete with whites for "high-value" spouses. All the parameter estimates are in the correct direction except one (ρ, WM/BF 1980), but only the ϕ parameter for BM/WF marriages is consistently strong across all three censuses. There is little evidence that ρ is not zero for BM/WF pairings. The results are highly inconsistent for WM/BF pairings. There is no support for either parameter in 1980. There is mild support for the BM/WF pairings in 1990. The GS parameters look quite reasonable in the 2000 Census where both parameters are around -0.15 and statistically significant. However, the GA parameters reveal opposite patterns for the 2000 parameters by gender pairings. In 2000, the BM/WF ϕ parameter is strong while the ρ parameter is weak and statistically indistinguishable from zero. For the WM/BF pairing, on the other hand, the ϕ parameter is weak while the ρ parameter is strong.

Although, GP fits well overall, only one of the parameters, ϕ for BM/WF pairings is convincing. In comparison to white women who marry black men, black women who marry black men acquire spouses with less education. This is not true when comparing black men and white men who marry black women. There also appears to be no competition among blacks and whites in terms of their spouse's education when they both marry whites. This discrepancy is inconsistent with the notion that being black is a universal penalty on the marriage market. Thus, we must be suspicious of the GP model.

The isolation model fits well across all three censuses and its parameter is consistent across all three censuses. The only discrepancy in the ISO model is that the parameter appears to be zero for WM/BF pairings in 1980. It should be noted that none of the models fit well for the WM/BF pairing in 1980. In 1990 and 2000, however, the parameters are fairly consistent across both gender pairings. Overall, the consistency of the parameters in the ISO model, and it's superior fit in 1980 and 1990 make it the clear front-runner of the models analyzed here. It also offers a very clear and straightforward argument to explain black selectivity into interracial marriages: lower-class blacks are excluded from the interracial marriage market.

On the surface, this account may seem similar to educational propensity theory, particularly the CC model. The key difference between the models is that the the CC model assumes that the increase is only applicable to blacks who marry college-educated whites. That is, the CC model assumes that it is something about the college experience which makes both blacks and whites more conducive to interracial unions. The ISO model on the other hand assumes that such educational homogamy is not required. Blacks who have a college education are simply more likely to marry interracially, whether or not they marry homogamously. Many will, of course, marry homogamously because the general strength of homogamy is quite strong.

One might object that the assumption of educational homogamy for the educational propensity models is too drastic. An alternative model would simply assume that the odds of interracial marriage increase for both whites and blacks as education increases. According to this scenario, the ISO model is an incomplete model. We should have a similar parameter for whites. Formally, this model would be:

$$log(F_{ijkl}) = \lambda + \lambda_i + \lambda_j + \lambda_k + \lambda_l + \lambda_{ij} + \lambda_{ik} + \lambda_{jl} + \lambda_{kl} + \omega(x_b)(n_{ij}) + \delta(x_w)(n_{ij}) \quad (10)$$

where x_w equals 1 if w is 1 or 2, and equals zero otherwise. The expectation is that both ω and δ will be negative indicating that the odds of interracial marriage decline among blacks and whites with less than a college education.

Results from this model are shown in Table 6. The table shows the BIC for this new model and the ISO model and the LRT p-value for preferring this new model over the ISO

Table 6: Comparison of isolation model to another educational propensity model

	BIC		LRT	δ
	Ed. Prop.	Isolation		
Census 1980	-263.0	-273.2	0.087	-0.13 (0.08)†
Census 1990	-367.3	-379.9	0.549	-0.03 (0.05)
Census 2000	-359.0	-361.7	0.002	0.17 (0.05)**

BIC and LRT are adjusted for overdispersion. See previous tables for overdispersion parameters.

model. The estimated δ parameter is also shown.

There is little support for this model. It is only supported by LRT in Census 2000, and it is not supported by BIC for any Census. Furthermore, the parameter value for Census 2000 is in the wrong direction, indicating that the odds of interracial marriage declines among college-educated whites. Overall, this parameter is completely inconsistent across the three censuses. The ISO model is not an incomplete educational propensity model. Only the educational characteristics of blacks matter when considering the odds of interracial marriages.

5.1.2 Fitting Only BM/WF

The general finding from the preceding tables has been that most of the models fit the WM/BF pairing poorly. Although the GS models are generally preferred by both LRT and BIC, they are preferred simply because separate parameters for the WM/BF pairing were generally zero. The possibility remains that the best fit is not gender symmetric but a model which only fits the BM/WF table. According to such a model, BM/WF pairings have a distinct dynamic of educational partnering, but the educational partnering in BF/WM pairings is no different than the educational partnering within in intraracial unions.

Table 7 shows the BIC statistic for the five preferred models (CC, WH-B, QWH, GP, ISO) based on three different subtypes: gender-symmetry, gender-asymmetry, and only fitting the BM/WF table. In 1980, only fitting the BM/WF table is preferable for all models, owing to the lack of any significant parameters among WM/BF pairings in 1980. The 1990 and 2000 results differ however. For the 1990 and 2000 censuses, only fitting the BM/WF table is preferable to other model types only for the WH-B and QWH models. In 1980 and 2000, the QWH model is preferred to the WH-B model, and in 1990 the two models are in a statistical tie (-328.02 vs -327.90). Overall, the QWH model which fits only BM/WF table seems to be the best parameterization of the classic exchange model.

Table 7: Comparison between gender symmetry and BM/WF only models

Models	BM/WF	GS	GA
1980			
College Corner	**-245.69**	-238.40	-232.59
White Hypergamy, Balanced	**-230.25**	-228.34	-219.18
Quasi White Hypergamy	**-245.54**	-241.67	-232.52
Generalized Penalty	**-280.07**	-264.29	-254.00
Isolation	**-284.93**	-273.21	-271.96
1990			
College Corner	-339.08	**-348.66**	-336
White Hypergamy, Balanced	**-328.03**	-327.28	-315.7
Quasi White Hypergamy	**-327.91**	-324.53	-315.63
Generalized Penalty	-349.72	**-354.42**	-332.46
Isolation	-372.7	**-379.94**	-369.3
2000			
College Corner	-340.77	**-340.98**	-328.32
White Hypergamy, Balanced	**-382.58**	-375.75	-364.68
Quasi White Hypergamy	**-386.05**	-381.06	-375.03
Generalized Penalty	-332.12	**-356.88**	-335.02
Isolation	-357.58	**-361.75**	-349.11

BIC and LRT are adjusted for overdispersion. See previous tables for overdispersion parameters.

We are left then with four models which produce reasonable fits to the data: a gender-symmetric college corner model, a QWH model only fit to BM/WF pairings, a gender-symmetric generalized penalty model, and a gender-symmetric isolation model.

On close inspection, however, only the isolation model seems to stand up well to scrutiny. The CC model fits very poorly in 2000, and never fits as well as the ISO model in general. The GP model performs almost as well as the ISO model in all three censuses, but only one of its key parameters produces consistent results, and this parameter only for BM/WF pairings.

The QWH model fits well in 2000 and adequately in 1990 making it the only serious competitor to the isolation model. However, for theoretical reasons I prefer the isolation model. By making the model one-sided, the heart of classic exchange theory is eviscerated. If interracial unions truly consist of exchanges, then we should expect white downward mobility to be particularly rare. This is not the case. There is no preferencing of homogamy relative to white hypogamy above and beyond that found in other types of marriages. Classic exchange is not the correct characterization of the data. If isolation is the correct characterization of the data, then this pattern will look very similar to the upward white mobility of classic exchange, because the two theories share most of their coding in common. The fact that the data do not show a strong distaste for downward white mobility leads me to believe that isolation is a better model at the theoretical as well as the empirical level.

6 Conclusions

Although we have known for some time that blacks who enter interracial marriages are a highly select group, competing theories have existed to explain this selectivity. By developing a set of comparable log-linear models, I have been able to adjudicate between competing explanations for this selectivity. The overall results do not support the dominant status exchange theory, but rather a theory dominant in the broader field of race and ethnic studies but which has yet to be applied to the interracial marriage literature. Blacks in interracial marriages are a highly select group because lower class blacks are excluded from the interracial marriage market.

Ultimately, the models used here are only descriptive. They can tell us the best characterization of the data, but they cannot reveal the underlying mechanics behind this characterization. Why are lower-class blacks less likely to enter an interracial union? I have argued that this is not due to education's role as a form of structural assimilation, because the same relationship does not hold true for whites. Rather, I have suggested that the difference is due to the hypersegregation of lower-class blacks. The relationship might also reflect a decision made by whites about the attractiveness of spouses which jointly considers their race and class background. We need to consider new methods to address the mechanisms of this exclusion.

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