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FAMILY ATTAINMENT NORMS AND EDUCATIONAL STRATIFICATION:

THE EFFECTS OF PARENTS' SCHOOL TRANSITIONS

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FAMILY ATTAINMENT NORMS AND EDUCATIONAL STRATIFICATION: THE EFFECTS OF PARENTS' SCHOOL TRANSITIONS

Abstract

This paper reports an analysis of the effects of parents' educational attainments on the attainments of their offspring, focusing on the effects of parents' school transitions. We test the hypothesis that whether offspring make a given school transition depends critically on whether their mothers and fathers have made that same transition. Using data for Taiwan and the United States, we show substantial effects of parents' transitions on offspring's transitions, even when overall levels of parents' schooling are controlled. We also examine variations in the effects of mother's and father's schooling on sons and daughters and interaction effects between parents' transitions and family size. In the United States, the effect of parents' transitions is large, pervasive and independent of the sex of parent, sex of offspring, and family resource constraints. In Taiwan this effect is mainly confined to the school attainments of fathers and its benefit goes mainly to sons. These results suggest that the presence or absence of the effects of whether parents make school transitions can provide concrete clues about variations in how educational stratification works.

1. INTRODUCTION

The most commonplace observation in the study of educational stratification and mobility is that how far an individual goes in school is strongly associated with how far his or her parents have gone in school. Although the reasons for this association are the subject of a rich field of investigation and the strength of the association varies across time and place, the positive correlation of parents' and offsprings' educational attainments is nearly universal. Whereas early studies of educational inequality focused on educational attainment as a *status*, typically measured by total years of schooling attained, (Duncan 1965; 1967; Blau and Duncan 1967; Hauser and Featherman 1976), more recent studies have assumed that schooling is a dynamic *process*. The process is conceived of and measured as a sequence of school transitions between levels of schooling, whether measured as years of school completed or enrollment in major organizational divisions of school systems (e.g., Duncan 1968; Mare 1980, 1981a; Shavit and Blossfeld 1993; Breen and Jonsson 2000). Viewing educational stratification in this way shows where in the schooling process social inequalities are greatest, allows comparisons of stratification across dissimilar school systems, allows more precise linkage of market and institutional changes to individual level probabilities of making school transitions, and provides estimates of the effects of family background characteristics on school continuation decisions that do not depend on the shape of the distribution of educational attainment (Mare, 1980; 1981a; 1981b; Shavit and Blossfeld 1993; Breen and Jonsson 2000).

The Effects of Parents' School Continuation Decisions. Given the usefulness of viewing the schooling of children as a series of discrete transitions in models of the intergenerational transmission of educational attainment, it is surprising that researchers have devoted little

attention to the conceptualization and measurement of parents' educational attainments. Typically, we measure mother's and father's schooling in the same way as offspring's schooling was measured in the earliest educational stratification studies, namely as highest grade of school completed, and estimate their linear effects on the log odds of school continuation. Although parsimonious, this specification does not incorporate other potentially important effects of parents' schooling, some of which correspond rather closely to scholarly and popular notions of the reasons behind the positive association of parents' and offsprings' schooling.

It is widely recognized that parents' aspirations for their offsprings' socioeconomic achievements are heavily conditioned by their own accomplishments. In many countries parents desire and expect that their children will grow up to achieve at least as high a standard of living as they themselves enjoy and that educational attainment is the primary avenue to socioeconomic success. In an era of secularly rising average levels of educational attainment, one criterion of successful parenthood is for children go at least as far in school as their parents. Moreover, theorists of educational inequality suggest that parents' educational attainments set a floor for the attainments of their offspring because individuals face psychic costs to downward intergenerational mobility (Boudon 1974; Breen and Goldthorpe 2000; Breen and Yaish [this volume]). Yet studies of educational stratification seldom explicitly incorporate this idea into the analysis of school transitions. One specification of this idea, straightforward to implement with the typical data used to study educational mobility, is that parents affect whether or not their offspring make a particular school transition not only through their own completed levels of educational attainment, but also through whether or not they themselves have made the school transition in question. This formulation recognizes a norm or, at the least, a statistical regularity

that offspring go at least as far as their parents in school and that, for the great majority of families, the educational attainments of parents is a floor under the attainments of offspring. This chapter develops the rationale for and presents empirical demonstration of this type of effect.[1]

Parental Socialization and Attainment Norms. A tendency for individuals to go at least as far in school as their parents raises the question of how this regularity develops. Individuals appear to behave *as if* one of their main goals is not to experience downward educational mobility and, given this assumption, it may be possible to derive predictions about trend and variation in educational stratification (Breen and Goldthorpe 2000). However, one may ask why they are driven by this particular function of their parents' attainments, rather than some other. A large literature on the social psychology of socioeconomic attainment points to the socializing influences of significant others, including parents, teachers, and peers on the aspirations and expectations of young persons regarding educational and occupational attainment (e.g., Kahl 1957; Sewell, Haller, and Portes 1969; Sewell and Hauser 1975). For the most part, studies of socialization influences focus on just the positive associations between the social environments provided by significant others and the aspirations of youths. These positive correlations, however, are necessary but not sufficient conditions for parents' attainments to set a floor on those of their offspring. For the latter nonlinear effects of parents' educational attainment to appear, additional mechanisms must be at work. One possibility is simply that parents (and possibly other influencers) can best shape the aspirations and aptitudes of young people for the part of the educational attainment process with which they have direct experience. Once young persons supercede their parents' attainment, parents have little direct experience to draw upon

and thus their influence subsides. Another possibility is that parents are motivated by their failures as well as successes. Sheridan (2001) suggests that parents who aspired to a particular education level but do not attain it make an extra effort to see that their children accomplish their unmet goals (relative to parents who obtain the same amount of education but did not aspire to go further). These are possible mechanisms that may underpin family attainment norms that give rise to nonlinear effects of parental educational attainment on the school continuation decisions of young persons. It is, however, beyond the scope of this chapter to adjudicate among alternative mechanisms.

Parent Transition Effects and Occupational "Inheritance." That parents' own school transitions may affect the school attainment of their offspring and thus be an important feature of intergenerational educational mobility is in keeping with standard approaches to the study of mobility on other dimensions of stratification, especially occupational mobility. Almost all studies of occupational mobility that treat occupations as a set of discrete locations recognize a strong tendency for offspring to "inherit" the occupational categories of their parents (e.g., Erikson and Goldthorpe 1992; Hout 1988; Hout and Hauser 1992) that goes beyond what would be expected on the basis of a strong positive association between scalar measures of parents' and offprings' occupational characteristics. This tendency is subject to a variety of interpretations, including direct inheritance of a job or the physical capital associated with a business; socialization and education in the norms, values, and knowledge of a field of work; or simply the aggregation of detailed occupations into broad categories, combined with the preponderance of short over long distance intergenerational mobility. Whatever the interpretation, however, the statistical analysis of intergenerational mobility almost always requires special attention to the

strong resemblance of parents' and offsprings' occupations. In addition to high intergenerational persistence within occupation categories, occupational mobility data also show a tendency for parents' occupational attainments to set a floor on the attainments of offspring. Societies that have undergone sectoral transformations of the labor force from farm to nonfarm, primary to secondary and tertiary, nonmanual to manual, and manufacturing to service, typically have substantial intergenerational structural mobility. In such transformations the lines between broad segments of the occupational structure, such as white collar vs. blue collar or nonagricultural vs. farm workers have often serve as differentially permeable barriers to mobility. For example, in the mid-Twentieth Century United States, sons of blue collar workers were much more likely to move into white collar occupations than were the sons of white collar workers to move into blue collar occupations. The less successful sons of white collar workers tended to move into relatively low status and poorly paid white collar occupations rather than into relatively high status and better paying blue collar positions (Blau and Duncan 1967). The approach to the study of educational stratification proposed in this chapter, then, echoes well-established themes in the analysis of occupational stratification and mobility.

If the members of families follow the rule that offspring must go at least as far in school as their parents, this suggests a number further questions about they implement this rule. How this rule is applied to families of varying size and gender composition, how it varies by the birth order and sex of children, and how the sometimes varying educational attainments of mother and father combine to set the expectations for offspring are all important empirical issues. The main goal of this chapter is to document the effects of whether or not parents achieve selected educational milestones on whether or not their offspring make those same school transitions; to

estimate the size of these effects; and to explore how these effects depend on characteristics of individual offspring and their families. Our empirical investigations focus on two societies, the United States and Taiwan, that have broadly similar educational systems, but also important cultural differences that may illuminate the ways that family effects on educational stratification come about.

2. ATTAINMENT NORMS AND THE EFFECTS OF PARENTS' EDUCATION

We explore the idea that parents affect their offspring's schooling through resources that are tied to whether they have completed specific levels of schooling as well as to their highest grade of school completed. That is, we conjecture that whether parents complete specific milestones in the schooling process affect whether their offspring achieve those same milestones. Although this hypothesis is simple, it leads to a set of subsidiary issues and hypotheses about the way that the effect of parental school transitions works. The issues that we consider in our empirical analyses include:

1. Is the specific nonlinear effect of parental schooling that we propose, in conjunction with the well established linear effect sufficient to account for the full association between parents' and offsprings' schooling? That is, are there other important nonlinearities in the effects of parental schooling? We address this question through statistical tests of alternative models of association.

2. A commonly observed pattern of the effects of mother's or father's years of school completed is that these effects decline systematically from the early to the later stages of the schooling process (Mare 1980; Shavit and Blossfeld 1993). This variation may be due to the effects of unmeasured heterogeneity or other specific mechanisms of social selection and exclusion that are most tightly tied to parental socioeconomic circumstances at the earliest stages of the schooling process. If in fact the effects of parents' school transitions on offspring's schooling are large, we ask whether these parental effects also decline over the schooling process or exhibit some other nonproportionality (interaction) with the discrete hazard of school attrition.

Although the transition-specific pattern of these effects may also reflect unmeasured heterogeneity, it may well be that parental transition effects are more stable across school transitions to the extent that a common norm governing the link between parents' and offspring schooling persists at all levels of schooling. We investigate this question empirically through comparisons among models for proportional (transition-invariant) and nonproportional (transition-dependent) effects of the measures of parental schooling.

3. If the school transitions that parents make establish a floor for the attainments of their children, does just one parent or do both parents have this effect and if, the school transitions of both parents affect offsprings' schooling, which parent has a stronger effect? Despite the high correlation of mother's and father's schooling, the educational attainments of both parents typically influence the attainment of their offspring (e.g., Mare 1980). It is an open question whether the same holds for parental school transitions.[2]

4. A further issue in characterizing the effects of parental educational attainment on the schooling of offspring is whether parental effects are similar for male and female children. If parents wish to establish a floor on the school attainment of their children, they may do so differentially between boys and girls if their ultimate socioeconomic and life style aspirations for their daughters differ from those of their sons. Levels of educational attainment and regimes of educational stratification in the contemporary United States are very similar for men and women (e.g., Mare 1995) and for this society sex differences in the effects of parents' school transitions may be small. In other societies and eras in which gender inequalities in educational attainment are large, the effects of parents' transitions may differ between boys and girls. These effects, moreover, may interact with whether it is mother's or father's school transitions that exert a

larger effect. Mother's educational attainment may set a floor under the attainments of a daughter whereas father's attainment may set a floor under the attainment of a son. Thomas (1994), for example, demonstrates same sex effects of parents' educational attainments on the health and nutritional status of their offspring.

5. Although families may try to follow a norm that children go at least as far in school as their parents, these efforts may be constrained by parental resources. Insofar as families have limited cultural as well as economic resources that facilitate success in school, some families may not be able to achieve their goals for the attainments of their offspring. One way that resources may constrain educational attainment is through the number of children in the family. As is well known, educational attainment and school continuation probabilities are inversely associated with the size of an individual's sibship, presumably reflecting the resource scarcities experienced by larger families (e.g., Hauser and Featherman 1976; Mare 1980; Blake 1989). Although the effects of years of parents' schooling on offsprings' schooling do *not* vary with sibship size in the United States (Mare and Chen 1986), to the extent that the effects of parent school transitions indicate the results of a family strategy to set a floor on children's attainments, these effects may in fact be weaker in the resource-limited context of large families than in small families where these constraints are minimal.[3]

In addition to the effects discussed thus far, there are several other issues related to the effects of whether parents make school transitions on their offsprings schooling. These include whether the effects of parents' school transitions depend on the sex composition of a sibship or by birth order;[4] whether parents are more likely to require all of their children or only selected children to achieve their own schooling levels; and whether the tendency for parents to set a

floor under their children's schooling has strengthened or weakened over times. Although these issues are amenable to empirical investigation using variants of the models presented here, they are beyond the scope of this chapter. We return to these and other issues for future research at the conclusion of the chapter.

3. EDUCATIONAL STRATIFICATION IN TAIWAN AND THE UNITED STATES

We investigate these issues through a analysis of the effects of family background on educational attainment for two populations, Taiwan in 1989 and the United States in 1994, which may differ substantially in the ways in which families affect educational inequality, especially in their treatment of male and female children. Despite pervasive gender stratification in the United States, historical and contemporary differences in educational attainment between men and women are relatively small (Mare 1995). School enrollment rates, average levels of educational attainment, and the effects of parents' socioeconomic characteristics are similar for males and females. It remains an open question, however, whether the specific effects of family background emphasized in this chapter, the effects of whether a mother or father has made a specific school transition, may interact with the sexes of their children.

In contrast to the United States, Taiwan exhibits both a contemporary and historical regime of substantial gender inequality in educational attainment (Tsai 1998). In traditional Taiwanese families, parental aspirations for daughters' educational attainments are less ambitious than for sons and are much more likely to be oriented toward the marriage market than the market economy. When family resources are scarce, daughters are more likely than sons to be constrained in their educational attainment (Parish and Willis 1993). Although this regime of

gender stratification is expected to weaken with the emergence of "love" marriages, the secular trend toward affluence, and the urbanization of the population, its vestiges remain very apparent in the contemporary population (Tsai 1998). In view of these gender inequalities, we seek to learn whether the tendency of parents to set a floor on the educational attainments of their children done is interdependent with the different roles and statuses of men and women in Taiwanese families.

4. STATISTICAL MODELS

We analyze the effects of personal and family background characteristics, including mother's and father's educational attainment, size of sibship, and sex on the probability of making selected school transitions. Although we consider four transitions for both Taiwan and the U.S., we examine somewhat different transitions for the two countries, in recognition of their different distributions of educational attainment. For the U.S. we consider the following transitions:

1. Completes at least 9^{th} grade;
2. Completes at least 12^{th} grade given 9^{th} grade completion;
3. Completes at least 13^{th} grade given 12^{th} grade completion;
4. Completes at least 16^{th} grade given 13^{th} grade completion.

For Taiwan the transitions are:

1. Completes elementary school (6^{th} grade);
2. Completes junior high school (9^{th} grade) given elementary school completion;
3. Completes senior high school (12^{th} grade) given junior high school completion;

4. Completes at least some college (13th grade) given senior high school completion.

For both societies, these outcomes represent transitions between major institutional divisions of schooling.[5]

Our basic analyses of the effects of parental characteristics use a discrete time survival model that employs a logit transformation of the discrete probabilities of making transitions between successive levels of schooling and, for some regressors, allows for nonproportional effects. That is, we allow the effects of the independent variables to vary across school transitions. In such models the unit of analysis is the "person-decision," that is, the binary outcome of whether or not an individual makes a given transition given that s/he has made all transitions up to the one in question. This procedure is a general one for the analysis of event histories (e.g., Allison 1982; Kalbfleisch and Prentice 1980; Vermunt 1997) and has been extensively used to study educational attainment (e.g., Mare 1980, 1981; Shavit and Blossfeld 1993). In keeping with the prior literature on the analysis of school transitions, most of the regressors that we include in our schooling models are fixed across transitions for a given individual. An exception to this are the variables that denote whether or not an individual's mother and father have made the school transition in question, which are the variables of central interest to this study. Although parents' educational attainments are fixed covariates, the measures for whether they have made a given school transition are, by definition transition-dependent.

Let p_{it} be the probability that the ith individual makes the tth school transition ($i = 1, ..., I$; $t = 1, ..., T$); X_{ik} be the individual's value on the kth (fixed regressor) ($k = 1, ..., K$); M_{it} and F_{it} be dichotomous variables that denote whether or not the individual's mother and father have made

the tth transition; and α_t, β_k, γ^m, and γ^f be parameters to be estimated. Then the logit model for school transitions is:

$$\text{logit}(p_{it}|\, X_i, M_{it}, F_{it}) = \alpha_t + \Sigma_k \beta_k X_{ik} + \gamma^m M_{it} + \gamma^f F_{it}. \quad (1)$$

This model can be estimated by maximum likelihood using standard statistical software. Because some of our individual-level observations belong to the same families, our sample is clustered. We obtain maximum likelihood estimates of the individual-level models with Huber-White adjustments for clustering using Stata (StataCorp 2003).

5. DATA

We use two data sources in the present investigation, the 1989 Taiwan Women and Family Survey (TWAF)[6] and the 1994 General Social Survey. Both of these samples have national coverage, include information on the educational attainments of siblings, and contain enough information on individual educational attainment and sociodemographic and family background characteristics to permit the analysis of educational stratification.

The TWAF is a sample of 3803 women, aged 20-66 and includes reports about the educational attainments of these women, their full sibships, their husbands, and their husbands' sibships. From these data we construct a sample consisting of respondents, their siblings, their husbands and their husbands' siblings. We included all TWAF respondents who were aged 20-66 in 1989, the siblings of these respondents, the older siblings of respondents who were aged less than 20 in 1989, the respondents' husbands who were aged 20-79, the siblings of these husbands, the older siblings of husbands aged less than 20, and the younger siblings of husbands aged more than 79.[7] This provides a sample of 39,294 individuals. Although the TWAF is not a

representative sample of the male population, the husbands, brothers, and brothers-in-law of the respondents provide a large number of males for analysis. We believe that this sample is adequate for estimating the effects of family characteristics on the probability of progression through school in the adult male Taiwanese population and for drawing inferences about sex differences in these effects.

The GSS is a nationally representative sample of the 2992 persons in the United States aged 18 and over in 1994. In addition to the sociodemographic and attitudinal data that the GSS obtains annually, the 1994 survey obtained information on a randomly selected sibling of the GSS respondent.[8] First, for the individual-level analysis of the effects of parental educational attainment and parents' school transitions on offsprings' schooling, we selected all GSS respondents and their randomly selected sibling who were aged 20 to 80 in 1994. Respondents or siblings who have invalid or missing data on sex or educational attainment are excluded. The resulting sample included 4949 individuals and 16497 transition records.

6. GRADE PROGRESSION IN THE UNITED STATES AND TAIWAN

Table 1 shows patterns and intercohort trends in levels of educational attainment and school continuation rates from the TWAF and GSS data. Average levels of attainment and continuation rates have grown dramatically during the 20th century in both nations, although the United States is much further along in the spread of secondary and post-secondary education. In the United States, the increase in average levels of school completed has slowed in recent cohorts (Mare 1995), whereas Taiwan is still in a phase of rapid growth. In both societies, school attrition is substantial in the transition from high school completion to college attendance,

but in Taiwan substantial attrition remains at the secondary level as well.

The most striking difference between the two societies lies in the educational inequalities between men and women. Average levels of attainment in the United States have been similar for men and women born throughout the 20th Century. Among cohorts born early in the century the distributions of schooling differ between men and women in their dispersion but not their mean. In those cohorts women have higher transition rates early in the schooling process and lower rates at the college level, resulting in a more compressed distribution among women compared to men. Thus in these cohorts a larger fraction of women than men achieved at least some education but a smaller fraction achieved the highest levels of education. In the more recent cohorts, this pattern largely disappears. Among the most recent cohorts, gender stratification in educational attainment is largely invisible in these data and is only revealed when one examines attainment patterns in specific post-secondary and graduate fields of study (Mare 1995).

In Taiwan, in contrast, gender inequality in educational attainment has declined, but still remain far greater than can be observed in the United States at any time in the Twentieth Cenury. Women born in the first half of the century average almost three years of schooling less than their male counterparts, a gap that has been cut by about half in the most recent cohorts represented in the TWAF data. In the most recent cohorts, school continuation rates for women are similar to those of men at the elementary level, but still lag substantially at the secondary and post-secondary levels. These patterns imply that for the parents of TWAF respondents the differences in educational attainments of mothers and fathers are very large. Overall, the much greater inequality between men and women in educational attainment in Taiwan compared to the

United States suggests that more general patterns of educational stratification, including the effects of parents' socioeconomic characteristics and other aspects of family life may vary between male and female children in Taiwan in ways that we do not see in the United States.

7. THE EFFECT OF PARENTS' SCHOOLING ON THE SCHOOL TRANSITIONS OF SONS AND DAUGHTERS

The Effects of Parents' School Transitions

Before examining the effects of sex and family size on schooling, we consider first a set of models that include only the effects of mother's and father's schooling on offspring's schooling. These models show the basic form of the relationships between parents' and offsprings' schooling and the effects of parental school transitions net of the well known linear effects of parents' schooling on their sons' and daughters' odds of school progression. Table 2 summarizes the fit of these models which vary in whether they incorporate unrestricted discrete effects of mother's and father's schooling, linear effects, and effects of whether mother and father make the transition that is faced by their son or daughter.[9] The models also vary by whether these effects are proportional--that is, invariant across offsprings' school transitions--or nonproportional--that is, they depend on the school transition of interest.

Model 1.1 allows for nonproportional, unrestricted discrete effects of mother's and father's schooling. Inasmuch as all of the other models of mother's and father's schooling effects that we consider are nested within this unrestricted model, it is a useful baseline for comparison. It also shows whether the data are broadly consistent with the hypothesis that parents' schooling levels set floors under the attainments of their offspring. Figures 1a through

1d plot these unrestricted effects separately for mother's and father's schooling. These discrete effects show the general monotonic relationship between parents' and offsprings' schooling that is typically captured in the linear effects of parents' schooling. In addition, in many of these figures, the largest discrete contrast in the log odds of making a given school transition by a son or daughter is between those whose parents who have and have not made that transition themselves. For example, in the United States, the effects of mother's schooling are both a monotonically positive and also show distinct upward steps between the adjacent levels of mother's schooling that correspond to the offspring's school transition in question. For fathers, there is one exception to this pattern--at high school graduation where the effect of father's schooling is purely linear--but there is an unmistakable father's transition effect at the other three transitions. For Taiwan, the evidence for a parents' transition effect is weaker, although whether the mother or the father have attended college has an unusually large impact on the transition to college for their offspring. Whether the Taiwan data are consistent with the general hypothesis of parental transition effects requires more specific analyses. On balance, however, for both the United States and Taiwan we see enough evidence of transition effects in the data to motivate a more systematic investigation.

The statistics of relative fit in Table 2 suggest that both a linear and a parental transition component are necessary and sufficient to summarize the unrestricted effects of mother's and father's schooling.[10] By the BIC criterion, the only models that fit better that the unrestricted model for Taiwan are the three that allow for nonproportional linear effects of mother's and father's schooling on offspring's school transitions (1.6, 1.8, and 1.10). Among these three, the two that incorporate the effects of parents' transitions (1.8 and 1.10) fit better that the model that

omits the transition effects (1.6), and the model that allows for proportional (transition invariant) effects of parents' school transitions fits the best of all (1.10). This conclusion is broadly supported by the log likelihood comparisons as well, although the very large sample for Taiwan, as well as the clustered nature of the data makes the likelihood statistics difficult to interpret.

For the United States, many more models fit better than the unrestricted model than for Taiwan, but models that incorporate the effects of parents' school transitions on offsprings' transitions (1.4, 1.5, and 1.8-1.11) fit better by the BIC criterion than those that do not incorporate these effects (1.3, 1.6, and 1.7). Among the models that incorporate parental transition effects, those that specify those effects as proportional (1.4, 1.9, and 1.10) fit better than those that allow the transition effects to vary across offsprings' transitions (1.5, 1.8, and 1.11). These better fitting models vary in the specification of the linear effects of parental schooling. Although the evidence for nonproportional (varying over transitions) linear effects of parents' schooling is weak in these data, the model of nonproportional linear effects is consistent with both the Taiwan data and other studies for the United States (e.g., Mare 1980; Hout, Raftery, and Bell 1993).[11]

All of the parameters for model 1.10 are reported in Table 3 and those for the effects of fathers' school transitions are plotted in Figures 2a and 2b. For the United States and, to a lesser extent, for Taiwan as well, the effects of parental school transitions are substantial, even after the linear effects are taken into account. In the United States, averaged over all school transitions, if one's mother has made a given transition, the odds that one also makes that transition are about 65 percent higher than if one's mother did not make the transition. For fathers, the transition effect is about 85 percent. For Taiwan we also observe a substantial effect for fathers'

transitions, but the estimated effect of mothers is statistically insignificant, a result consistent with the patterns shown in Figure 1c and possibly with the relatively lower status of women in Taiwanese families (Tsai 1998).

One can see the size of the parental transition effects by comparing them to the linear effects of parental educational attainment. In the United States, each year of mother's schooling multiplies the odds of attending high school by about 38 percent, indicating that the effect of whether the mother has made a given transition is equivalent to somewhat less than the linear effect of two years of mother's schooling. For the odds of graduating from high school, each year of mother's schooling multiplies the odds by about 13 percent (1.378*.817), indicating that the effect of whether the mother has made a given transition equals approximately four years of mother's schooling. These order of magnitude calculations--which yield even larger effects for fathers--suggest that whether parents complete specific school transitions are major influences on the educational attainments of their sons and daughters.

Parents' Transitions and Gender Stratification

To see whether parents' educational attainment and specifically parents' school transitions affect sons and daughters differently, we incorporate sex and its interactions with parents schooling into model 1.10 of Table 2. Table 4 reports fit statistics for a variety of specifications of the sex effects relative to a model that allows unrestricted interactions of sex with each of the effects contained in model 1.10. The overall pattern of model fit differs dramatically between Taiwan and the United States. For the United States, by the BIC criterion, the best fitting model contains no sex effects at all (2.2). Using the informal likelihood ratio test criterion, the only significant sex effect is for the interaction with transition; that is, the

difference in the log odds of making school transitions between men and women may vary across school transitions. As suggested by Table 1, transition rates do vary between the sexes in cohorts born in the early part of the century, although not in more recent cohorts.

For Taiwan, in contrast to the United States, all models that incorporate sex effects improve fit over the model that does not (2.2). By the BIC criterion, model 2.4, which includes only a nonproportional effect of sex is the best fitting model, although the differences in fit among models 2.4-2.8 are small. By the informal likelihood ratio criterion, in contrast, virtually all of the sex effects are significant. Although the BIC statistic suggests that a simple model of transition-specific main effects of sex is appropriate for Taiwan, we nonetheless focus on the parameters of model 2.6, which also allows for proportional effects of the interactions of sex with parents' highest year of school completed and with whether parents' have completed the given school transition.[12] Table 5 reports the parameters of this model for Taiwan and the United States and Figures 3a-3d plot the predicted log odds from this model for Taiwan.

As implied by the fit statistics, the process of educational stratification is largely independent of sex in the United States, except for variation in the effects of sex across school transitions. In particular, compared to men, women are more likely to make the early school transitions and less likely to make the later transitions. There is, however, no evidence of sex differences in the effects of parents' schooling on offsprings' schooling.

In Taiwan, in contrast, women are disadvantaged at every school transition, although the effect is especially large at the transition into elementary school. Moreover, the effects of parents' schooling vary substantially with not only the sex of offspring but also the sex of parent. As shown above, whether or not a Taiwanese father has made a given school transition affects

his children's transitions much more strongly than whether or not the mother has made the transition. The estimates in Table 5 show that this effect is much larger for sons than for daughters. For a son, the odds of making a transition increase by about 80 percent if his father has made that transition but only by about 40 percent (.1.835*.779 - 1.0) for a daughter. Whether or not a mother has made a transition does not significantly affect either her son's or her daughter's odds of school continuation. Unlike for the United States, the linear effects of parents' schooling on their children's school progression also vary between men and women, but these differences are small. A year of mother's schooling raises a daughter's school continuation odds by about two percent more than a son's odds, whereas a year of father's schooling raises a daughter's odds by about two percent less than a son's odds. The much more important way that the intergenerational transmission of educational attainment differs between men and women is through the sex difference in how the floor effect of parental schooling occurs. Unlike the relatively gender neutral regime of educational stratification in the United States, in Taiwan it is fathers and not mothers who ensure that their offspring go at least as far as they do in school and they enforce this norm more rigidly for their sons than for their daughters.

Parents' Transitions and the Effects of Sibship Size

To see whether variations in sibship size constrain the effect of parents' school transitions on their children's schooling, we enhance model 2.6 with measures of number of siblings and their interactions with sex and parents' educational attainment. Table 6 presents fit statistics for these models. In the United States sibship size negatively effects school progression and, by the BIC criterion, a model that includes a simple linear effect fits the best.

In Taiwan, the data suggest a more complex pattern of sibling effects. First, a discrete rather than linear pattern of parameters improves the fit of the model, suggesting nonlinearity in the effect of sibship size (model 3.4 vs. 3.3). Second, although the effect of sibship size does not vary significantly between men and women (3.6 and 3.7 vs. 3.4), it does vary across school transitions (3.5) and with parents' educational attainment (3.8 - 3.10). Among the latter three models, the smallest BIC value for Taiwan is for model 3.9 in which the effects of parents' school transitions vary linearly with sibship size.[13] Table 7 shows the parameters of this model for Taiwan and the United States and Figures 4a and 4b show the key effects for Taiwan.

For the United States, the odds of school continuation decrease monotonically with sibship size, but no other sibship size effects are statistically significant. For Taiwan, in contrast, the odds of school continuation increase with sibship size to a maximum for sibships of size four and then subside. Of greater interest is the interaction between the effects of sibship size and whether or not parents have made given school transitions. As shown above, in Taiwan fathers' transitions but not those of mothers affect the school continuation of their children. Table 7 shows, however, that *for only children*, both parents' transitions have substantial positive effects on the odds that their children will make the corresponding school transitions. (For a male only child, if their mother made a transition, their odds of making that transition are nearly five times greater than if she did not; if their father made a transition their odds of making that transition are more than three times greater than if he did not.) The coefficients for the interaction between parents' transitions and the linear effect of sibship size indicate that this large effect changes as sibships grow, albeit at different rates for the mother's and father's effects and for sons and daughters. As illustrated in Figures 4a and 4b, whereas the effect of mother's school transitions

declines dramatically as the number children increases, the decline in the effect of father's transitions is much more modest. What decline does occur for fathers, moreover, is confined to their daughters. In short, sibship size is not an obstacle to sons achieving at least as much schooling as their fathers. Daughters, however, find it much harder to make the same transitions as their mothers and only have a large chance of doing so when they come from small families.

Our analyses show that whether or not parents make a given school transition has a large positive effect on the probabilities that their sons or daughters make that transition themselves. In this sense families do much to ensure that parents' educational attainment sets a floor on the attainments of offspring. The comparison between Taiwan and the United States illustrates the diverse ways that this floor effect can work. For the United States the effect of parents' transitions is pervasive and largely independent of the sex of the parent, the sex of the offspring, or family size. For Taiwan, the effect of parents' school transitions is interdependent with the regime of gender inequality in family life and educational attainment. The parent transition effect is a key mechanism through which fathers facilitate the educational attainments of their sons. Whether mother's can benefit their offspring or daughters can benefit from their parents' school transitions is much more contingent on family resources.

9. CONCLUSION

Although we have learned much about educational stratification from statistical models of the linear effect of parents' schooling on offsprings' school transitions, such models leave out an important part of the process. Parents do indeed try to have their children go at least as far in school as they do, which results in a clear nonlinear effect. This effect of parental schooling

greatly improves the fit of our models to standard data on the association between parents' and offsprings' schooling. More important, this effect appears to be sensitive to cultural differences in educational stratification in a particularly revealing way. Gender inequalities in levels of educational attainment are small in the United States and overall differences in the education distributions of men and women have disappeared. In other societies, such as Taiwan, inequalities in how girls and women are treated in the family and in ultimate educational attainment remain large. Whereas these societal differences do not affect the linear effects of parents' schooling on the school progression of their offspring, they do show up in how the two societies implement the norm that children match or surpass their parents attainment. In the United States, this is a large, pervasive effect that is independent of the sex of parent, sex of offspring, and family resource constraints. But in Taiwan this effect is mainly confined to the school attainments of fathers and its benefit goes mainly to sons. These results suggest that the presence or absence of the effects of whether parents make school transitions can provide concrete clues about important variations in how educational stratification works.

This nonlinear effect of parents' school transitions is straightforward to estimate with the typical data that we use to study educational stratification and, in the future, should be estimated in a wide variety of nations. More work is also needed on how this effect comes about and its implications. It remains to investigate whether parents set a floor under the attainments of all of their children or are more concerned that selected children achieve this goal. Our results suggest that in Taiwan, this goal is more important for sons than daughters, but there are other bases of intrafamily educational stratification than sex, such as birth order, academic ability, and other characteristics of children. Additionally, there are several other issues related to the effects of

whether parents make school transitions on their offsprings schooling. These include whether the effects of parents' school transitions depend on the sex composition of a sibship; whether the effects vary by birth order; whether in multiple child families parents are more likely to require every child to achieve the parents' schooling level or to require that *at least one* child achieve the parents' schooling level; and whether the tendency for parents to set a floor under their children's schooling has strengthened or weakened over successive cohorts of children and parents. A further issue is whether parents' educational attainment is a "hard" floor for offspring's schooling--that is, the probability that offspring fall below their parents' level of schooling is not significantly different from zero -- or simply has the sort of stochastic effect investigated in the present analysis. Finally, future research should also examine the role that the parent transition effect has played in secular educational growth. Incorporating parental transition effects into models of intercohort trends in educational growth may provide a more complete demographic explanation of changes in levels of educational attainment and grade progression and provide a better basis for forecasting the direction and momentum of educational change.

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FOOTNOTES

1. Earlier evidence for parent transition effects on offspring's school transitions is reported by Mare (1995) and, in an earlier, unpublished version of this paper by Mare and Chang (1998). More recent empirical investigations of this idea are provided by Need and De Jong (2001); Davies, Heinesen, and Holm (2002); and Breen and Yaish (this volume).

2. An interesting family of hypotheses that is not considered here is whether it is the maximum, the minimum, or some other function of the schooling of the two parents that exerts the biggest effect on offsprings' schooling.

3. These arguments assume that number of siblings is predetermined with respect to parents' decisions to invest in children. Although this assumption is common in most sociological investigations of these relationships, it is not maintained in many economic analyses of the family, which assume that parental investments in children are made jointly with decisions about how many children to have (Becker 1991).

4. Our preliminary analyses suggest that for both Taiwan and the United States, the effects of the sex composition on school continuation probabilities are negligible. Beyond the number of siblings, neither the main effect of sex composition, nor the interaction of sex composition and sex of individual child, nor the interaction of sex composition and whether or not mother or father has made a school transition has a significant effect on school continuation.

5. The transitions for Taiwan are the same as those used by Tsai and Chiu (1993) in their analysis of educational stratification in Taiwan.

6. The Taiwan Women and Family Survey was collected by William L. Parish, Ching-Hsi Chang, Ying-chuan Liu, and Ching-lung Tsay with the support of the National Institute of Child Health and Development (Grant Number: RO1 HD23322-01); the National Science Council, Republic of China; and the Ministry of the Interior, Republic of China. We are grateful to William Parish and staff of NORC for making the data available to us.

7. The TWAF survey ascertained whether respondents' siblings are older or younger than the respondents, but not their exact ages. Likewise, the survey ascertained whether husbands' siblings are older or younger than the husbands, but not their exact ages.

8. In a supplementary telephone interview with the randomly selected sibling, the Survey of American Families, obtained much more extensive information from the sibling. This information, however, is not used in the analyses reported in this chapter.

9. Models also include dummy variables for whether or not data are missing on mother's and father's schooling and, when higher way interactions involving parents schooling are included in the model, analogous interactions with these missing data indicators.

10. The log likelihood and BIC comparisons in Table 3 and elsewhere in this chapter are informal. Whereas likelihood ratio tests assume simple random samples, these samples are clustered by sibship. Although we have adjusted the standard errors of coefficient estimates for clustering, we have not adjusted the likelihood and BIC statistics.

11. The superior fit of model 1.9 for the United States by the BIC criterion is misleading

because the relative fits of the models are influenced by the presence or absence of parameters for missing data on parents' schooling. Because some parental schooling effects are nonproportional in models 1.10 and 1.11 it is necessary to include nonproportional effects of these missing data indicators, which are largely insignificant. Because model 1.9 includes only proportional effects of parents' schooling, the missing data effects are specified as proportional. The contrasts among these models are almost entirely due to the absence of nonproportional missing data effects in model 1.9.

12. The superior fit of model 2.4 compared to models 2.5-2.7 is an artifact of restrictions on the insignificant effects of missing data indicators in 2.4 which must be included in the other models. When those indicators are included in 2.4, the BIC statistic is no longer clearly favorable relative to 2.5 - 2.7 (see model 2.8). The BIC statistics for 2.5 - 2.7 suggest that a sex interaction with either one but not both parental schooling indicators yields the best fitting model. However, because the there may be important differences between interactions with mother's and father's schooling in Taiwan, we focus on model 2.6, which includes all of the parameters of potential interest.

13. Variants of models 3.5 - 3.10 that include nonlinear terms for sibship size interactions with sex, transition, and parents' schooling do not improve the fit over these linear specifications.

Table 1. Indicators of Educational Trends for Taiwan and the United States

	Taiwan Year of Birth				United States Year of Birth			
	1923-67	1923-45	1946-55	1956-67	1915-74	1915-34	1935-54	1955-74
Males								
Mean Years Attended	9.20	7.74	10.24	11.40	13.26	11.97	13.55	13.51
S.D. (Years Attended)	4.26	4.45	3.78	2.84	3.00	3.41	3.17	2.44
Transition 1*	0.938	0.875	0.993	1.000	0.944	0.847	0.942	0.986
Transition 2	0.599	0.451	0.657	0.901	0.882	0.806	0.899	0.892
Transition 3	0.756	0.726	0.793	0.722	0.588	0.430	0.616	0.612
Transition 4	0.457	0.476	0.474	0.385	0.561	0.634	0.616	0.490
# Observations	3502	1668	1378	456	2408	419	1003	986
Females								
Mean Years Attended	7.53	4.45	7.99	10.05	13.22	12.05	13.47	13.55
S.D. (Years Attended)	4.41	4.04	3.99	3.28	2.69	2.93	2.69	2.40
Transition 1	0.844	0.610	0.922	0.983	0.959	0.874	0.972	0.988
Transition 2	0.511	0.252	0.437	0.758	0.882	0.830	0.903	0.885
Transition 3	0.697	0.593	0.757	0.679	0.579	0.403	0.582	0.646
Transition 4	0.306	0.241	0.385	0.259	0.505	0.503	0.525	0.488
# Observations	3801	1188	1434	1179	2655	517	1061	1077

*Transitions for Taiwan are: (1) attends 6+, (2) attends 9+ given attends 6+, (3) attends 12+ given attends 9+, (4) attends 14+ given attends 12+.
Transitions for United States are: (1) attends 9+, (2) attends 12+ given attends 9+, (3) attends 13+ given attends 12+, (4) attends 16+ given attends 13+.
For further discussion see text.

Sources: 1989 Taiwan Women and Family Survey and 1994 General Social Survey

Table 2. Fit of Models of Mother's and Father's Schooling Effects

Model	Parameterization of Parents' Schooling Effects				*df*	Taiwan			United States		
	Discrete Effects	Linear Effects	Parent Transition Effects	Missing Data Effects		Log Likelihood	G**2 vs. 1.1	BIC	Log Likelihood	G**2 vs. 1.1	BIC
1.1	Varying	No	No	Varying	0	-52286	0	0	-6274	0	0
1.2	No	No	No	No	40	-58737	12902	12451	-6951	1355	966
1.3	Constant	No	No	Constant	30	-53411	2250	1914	-6385	223	-68
1.4	Constant	No	Constant	Constant	28	-52834	1096	784	-6321	95	-177
1.5	Constant	No	Varying	Varying	16	-52598	623	450	-6285	23	-132
1.6	No	Varying	No	Varying	24	-52393	213	-53	-6339	131	-103
1.7	No	Constant	No	Constant	36	-53448	2324	1919	-6404	261	-89
1.8	No	Varying	Varying	Varying	16	-52323	73	-100	-6286	25	-130
1.9	No	Constant	Constant	Constant	34	-52984	1396	1014	-6327	106	-224
1.10	No	Varying	Constant	Varying	22	-52338	103	-139	-6295	43	-171
1.11	No	Constant	Varying	Varying	22	-52668	763	521	-6296	44	-170

Table 3. Effects of Mother's and Father's Schooling on Odds of Making School Transitions

	Taiwan		United States	
Variable	exp(β)	|z(β)|	exp(β)	|z(β)|
(Tr1)				
Tr2	0.143	41.5	1.956	0.9
Tr3	0.281	22.7	0.334	1.5
Tr4	0.077	38.7	1.241	0.9
Mother's Schooling (Linear)	1.250	5.7	1.378	3.8
MS x Tr2	0.961	1.1	0.817	2.4
MS x Tr3	0.892	2.9	0.793	2.8
MS x Tr4	0.845	4.2	0.758	3.3
Father's Schooling (Linear)	1.250	12.0	1.132	1.5
FS x Tr2	0.941	-3.4	0.951	0.6
FS x Tr3	0.878	-7.0	0.982	0.2
FS x Tr4	0.850	-8.4	0.899	1.3
Mother Made Transition	1.235	1.3	1.648	5.1
Father Made Transition	1.508	6.1	1.859	5.9
Log Likelihood	-52338		-6295	
N	104540		16497	

Note: Effects are based on Model 1.10 in Table 2. Models also include indicators for missing data on mother's and father's schooling and for interactions between missing data indicators and categorical variables for transition.

Table 4. Fit of Models Of Sex Interactions With Mother's and Father's Schooling Effects

Model	Parameterization of Sex Effects					*df*	Taiwan			United States		
	Main Effect of Sex	Interaction with Transition	Interaction with Linear Effects	Interaction with Parent Transitions	Interaction with Missing Data Effects		Log Likelihood	G**2 vs. 2.1	BIC	Log Likelihood	G**2 vs. 2.1	BIC
2.1	Yes	Yes	Yes	Yes	Yes	0	-51328	0	0	-6281	0	0
2.2 (1.10)	No	No	No	No	No	22	-52338	2020	1765	-6295	28	-186
2.3	Yes	No	No	No	No	21	-51453	249	6	-6295	27	-177
2.4	Yes	Yes	No	No	No	18	-51364	70	-138	-6289	16	-159
2.5	Yes	Yes	No	Yes	Yes	14	-51351	44	-117	-6287	13	-123
2.6	Yes	Yes	Yes	Yes	Yes	12	-51347	37	-102	-6286	11	-106
2.7	Yes	Yes	Yes	No	Yes	14	-51351	46	-116	-6287	11	-125
2.8	Yes	Yes	No	No	Yes	16	-51361	66	-119	-6288	13	-142

Table 5. Effects of Mother's and Father's Schooling and Sex
On Odds of Making School Transitions

	Taiwan		United States	
Variable	exp(β)	|z(β)|	exp(β)	|z(β)|
	Model 2.6		Model 2.6	
(Tr1)				
Tr2	0.108	38.6	3.289	2.5
Tr3	0.181	25.8	0.687	3.0
Tr4	0.053	39.5	21.206	2.9
Mother's Schooling (Linear)	1.249	5.4	1.351	3.5
MS x Tr2	0.960	1.0	0.814	2.5
MS x Tr3	0.890	2.9	0.789	2.9
MS x Tr4	0.847	4.0	0.754	3.3
Father's Schooling (Linear)	1.273	12.3	1.138	1.5
FS x Tr2	0.937	3.5	0.952	0.6
FS x Tr3	0.871	7.2	0.983	0.2
FS x Tr4	0.845	8.5	0.901	1.3
Mother Made Transition	1.146	0.7	1.896	2.3
Father Made Transition	1.835	6.4	2.048	2.3
Female (vs. Male)	0.388	22.4	1.093	0.2
Fem. x Tr2	1.405	6.8	0.719	1.6
Fem. x Tr3	1.910	10.7	0.636	2.1
Fem. x Tr4	1.402	4.9	0.501	2.9
Fem. x Mother's Schooling (Linear)	1.017	2.1	1.045	1.3
Fem. x Father's Schooling (Linear)	0.986	2.1	0.988	0.4
Fem. x Mother Made Transition	1.068	0.4	0.914	0.5
Fem. x Father Made Transition	0.779	2.7	0.937	0.3
Log Likelihood	-51347		-6286	
N	104540		16497	

Note: Models also include indicators for missing data on mother's and father's schooling and for interactions between missing data indicators and transition and sex.

Table 6. Fit of Models Of Sibship Size Interactions With Mother's and Father's Schooling and Sex Effects

Model	Parameterization of Sibling Effects						*df*	Taiwan			United States		
	Main Effect	Interaction w. Transition	Interaction w. Sex	Interaction w. Linear Effects	Interaction w. Parent Transitions	Interaction w. Missing Data		Log Likelihood	G**2 vs. 3.1	BIC	Log Likelihood	G**2 vs. 3.1	BIC
3.1	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	0	-51057	0	0	-6091	0	0
3.2 (2.6)	No	No	No	No	No	No	218	-51347	580	-1939	-6286	391	-1726
3.3	Linear	No	No	No	No	No	217	-51248	382	-2126	-6250	319	-1788
3.4	Discrete	No	No	No	No	No	211	-51210	287	-2152	-6240	299	-1750
3.5	Discrete	Linear	No	No	No	No	208	-51171	228	-2176	-6233	285	-1735
3.6	Discrete	Linear	Yes	No	No	No	207	-51170	228	-2165	-6233	285	-1726
3.7	Discrete	Linear	Yes	No	No	Linear	206	-51168	222	-2159	-6232	282	-1718
3.8	Discrete	Linear	No	Linear	No	Linear	204	-51140	167	-2191	-6224	267	-1714
3.9	Discrete	Linear	No	No	Linear	Linear	204	-51135	157	-2201	-6231	280	-1701
3.10	Discrete	Linear	No	Linear	Linear	Linear	202	-51126	139	-2195	-6221	261	-1701

Table 7. Effects of Mother's and Father's Schooling, Sex, and Number of Siblings On Odds of Making School Transitions

	Taiwan		United States	
Variable	exp(β)	|z(β)|	exp(β)	|z(β)|
(Tr1)				
Tr2	0.188	13.6	2.100	0.9
Tr3	0.198	11.8	0.864	1.8
Tr4	0.051	20.0	0.876	0.2
Mother's Schooling (Linear)	1.262	5.7	1.322	3.2
MS x Tr2	0.944	1.5	0.816	2.4
MS x Tr3	0.877	3.3	0.800	2.6
MS x Tr4	0.834	4.3	0.765	3.1
Father's Schooling (Linear)	1.281	12.5	1.116	1.3
FS x Tr2	0.930	4.0	0.955	0.5
FS x Tr3	0.863	7.6	0.995	0.1
FS x Tr4	0.837	8.8	0.914	1.1
Mother Made Transition	4.948	3.2	1.888	3.7
Father Made Transition	3.152	6.2	2.120	4.1
Female (vs. Male)	0.387	22.4	1.045	0.1
Fem. x Tr2	1.419	6.9	0.715	1.6
Fem. x Tr3	1.912	10.7	0.627	2.1
Fem. x Tr4	1.397	4.9	0.492	3.0
Fem. x Mother's Schooling (Linear)	1.017	2.0	1.048	1.4
Fem. x Father's Schooling (Linear)	0.986	2.0	0.989	0.3
Fem. x Mother Made Transition	1.125	0.6	0.926	0.4
Fem. x Father Made Transition	0.783	2.6	0.918	0.5
(0 Sibs)				
1 Sib	0.930	0.5	0.719	2.2
2 Sibs	1.131	0.9	0.504	5.4
3 Sibs	1.170	1.1	0.411	6.2
4 Sibs	1.218	1.3	0.376	4.6
5 Sibs	1.145	0.8	0.389	0.2
6+ Sibs	1.022	0.1	0.285	2.5
Sibs x Tr2	0.894	4.9	1.011	0.2
Sibs x Tr3	0.979	0.8	1.094	1.7
Sibs x Tr4	1.007	0.3	1.109	1.8
Sibs x Mother Made Transition	0.723	3.2	0.973	0.8
Sibs x Father Made Transition	0.889	3.1	0.974	0.7
Log Likelihood	-51135		-6231	
N	104540		16497	

Note: Models also include indicators for missing data on mother's and father's schooling and for interactions between missing data indicators and transition, sex and number of siblings.

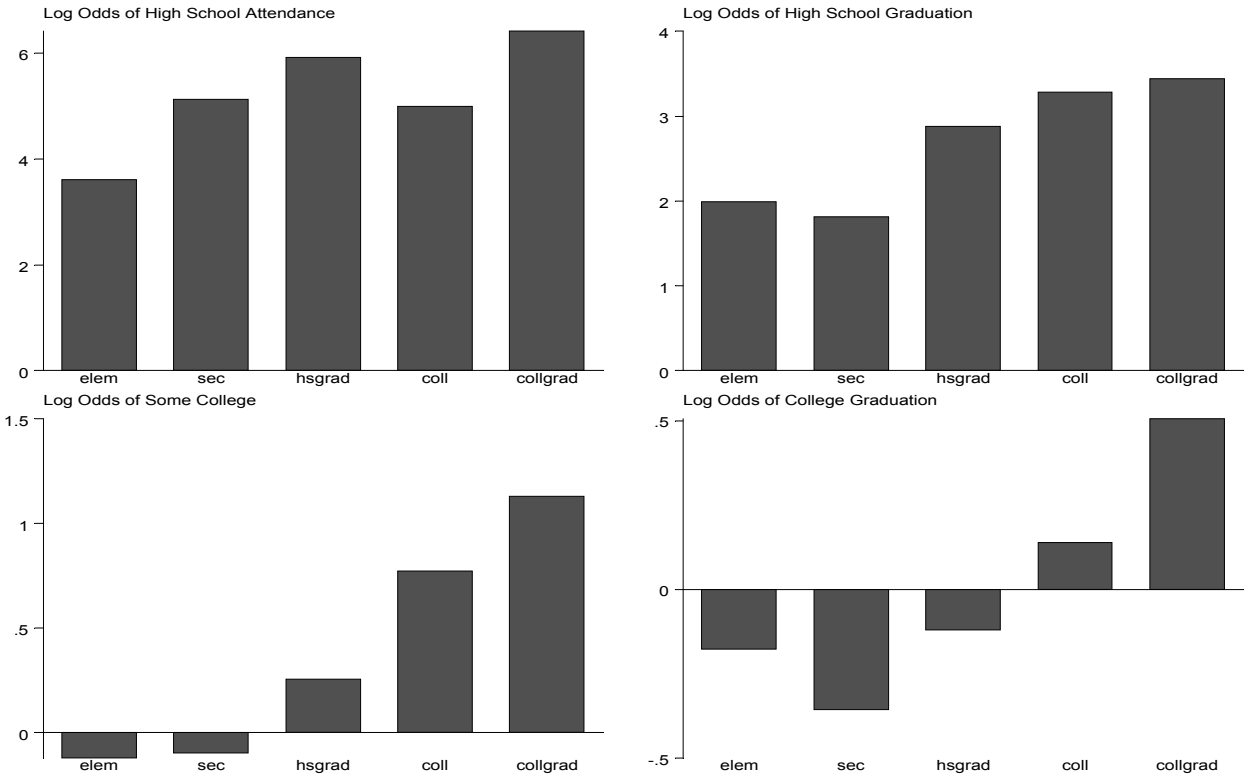


Fig. 1a. Effects of Mother's Schooling -- United States

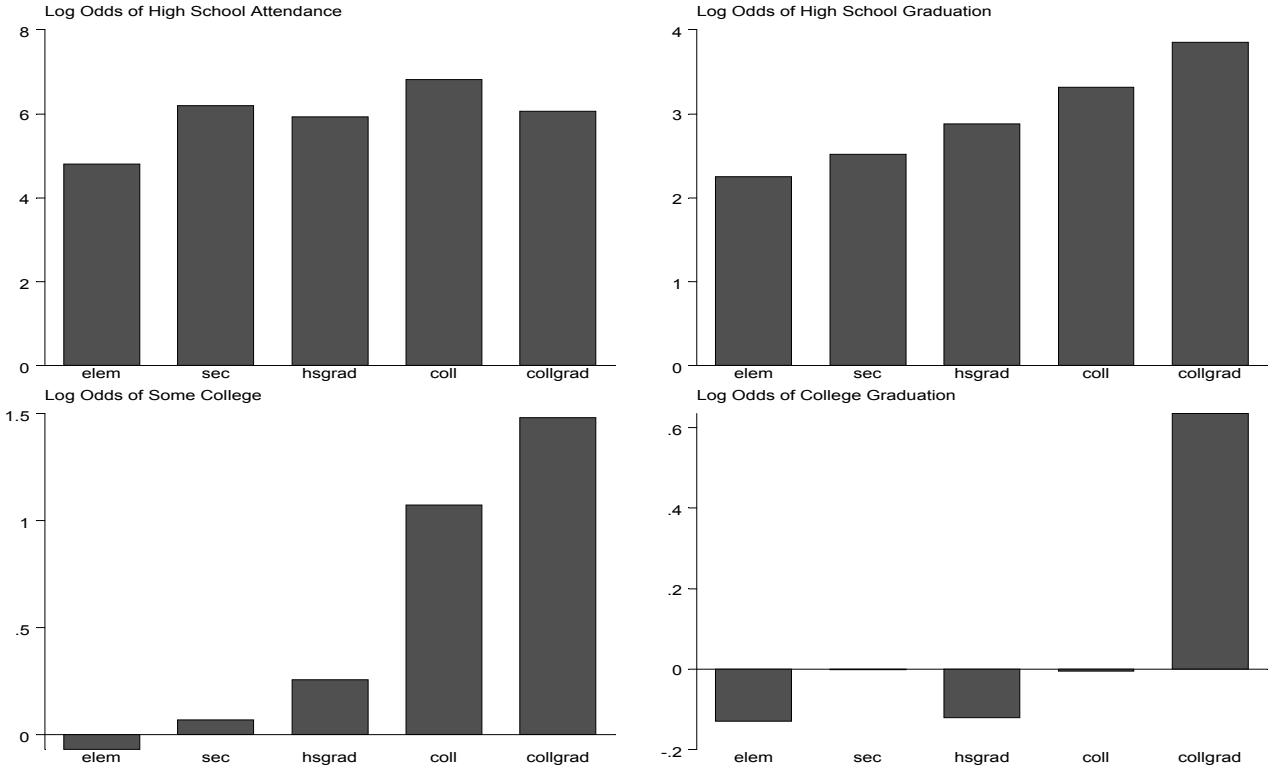


Fig. 1b. Effects of Father's Schooling -- United States

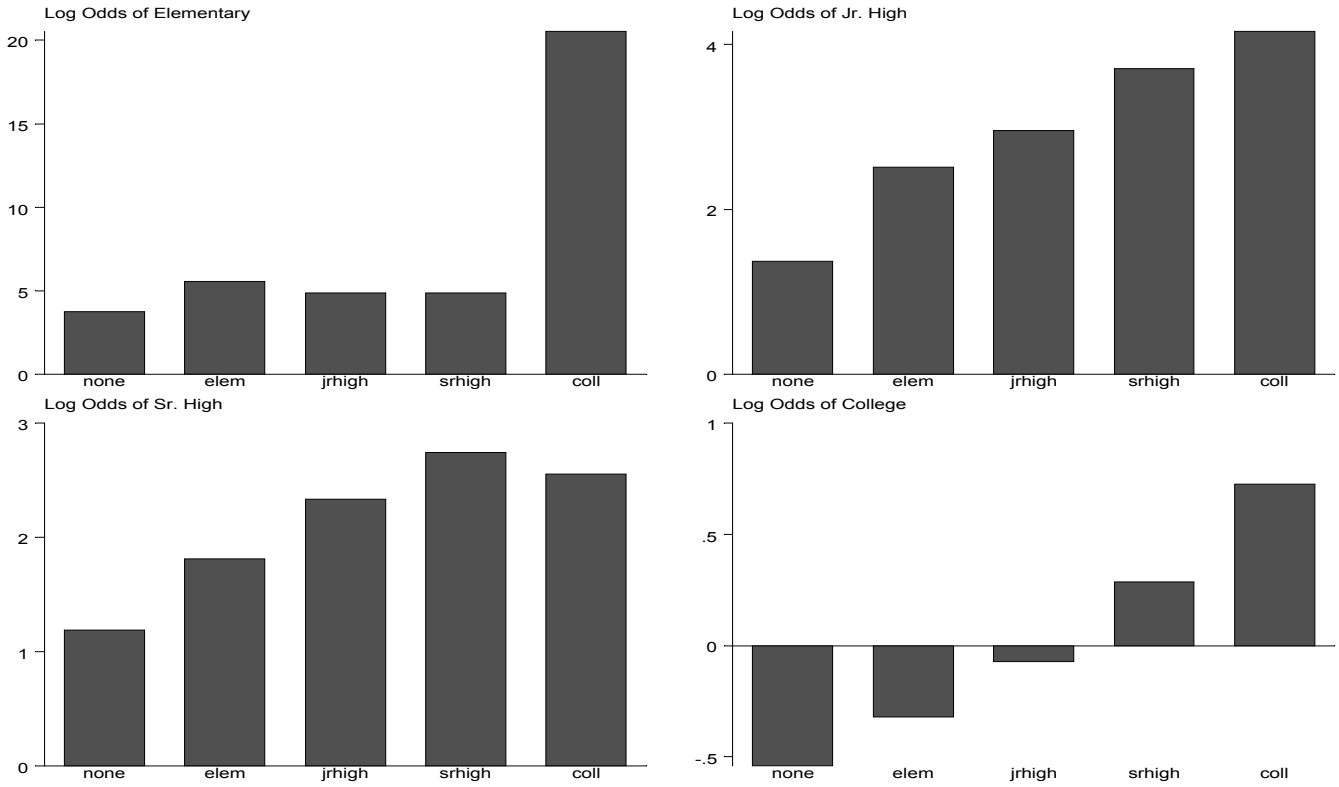


Fig. 1c. Effects of Mother's Schooling -- Taiwan

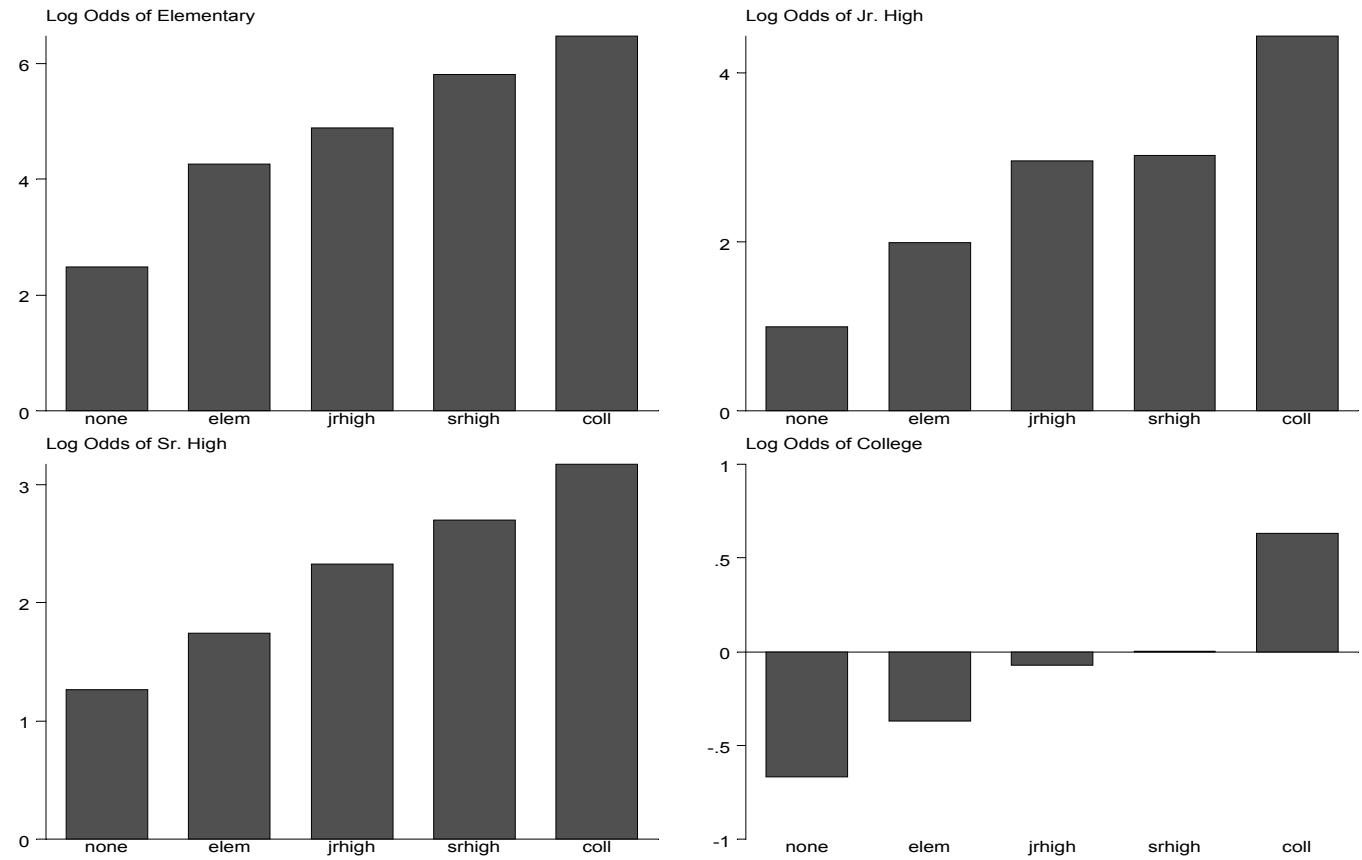


Fig. 1d. Effects of Father's Schooling -- Taiwan

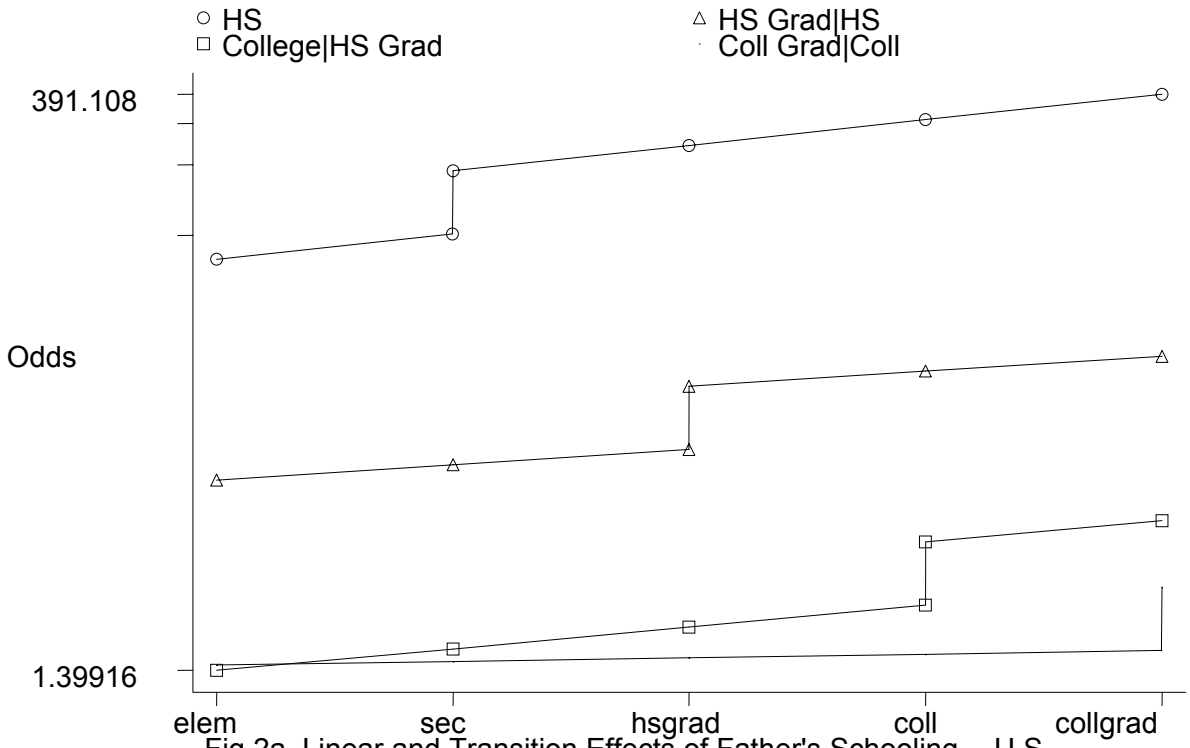


Fig 2a. Linear and Transition Effects of Father's Schooling -- U.S.

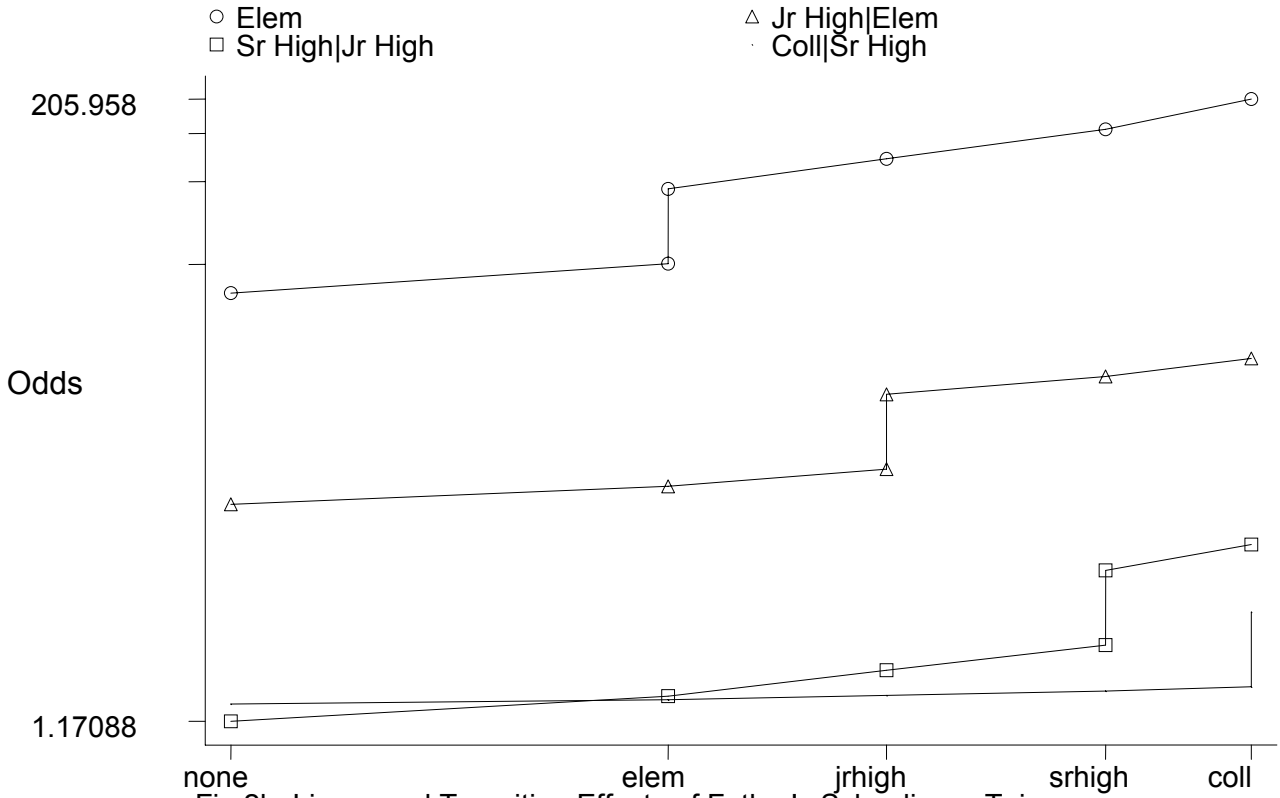


Fig 2b. Linear and Transition Effects of Father's Schooling -- Taiwan

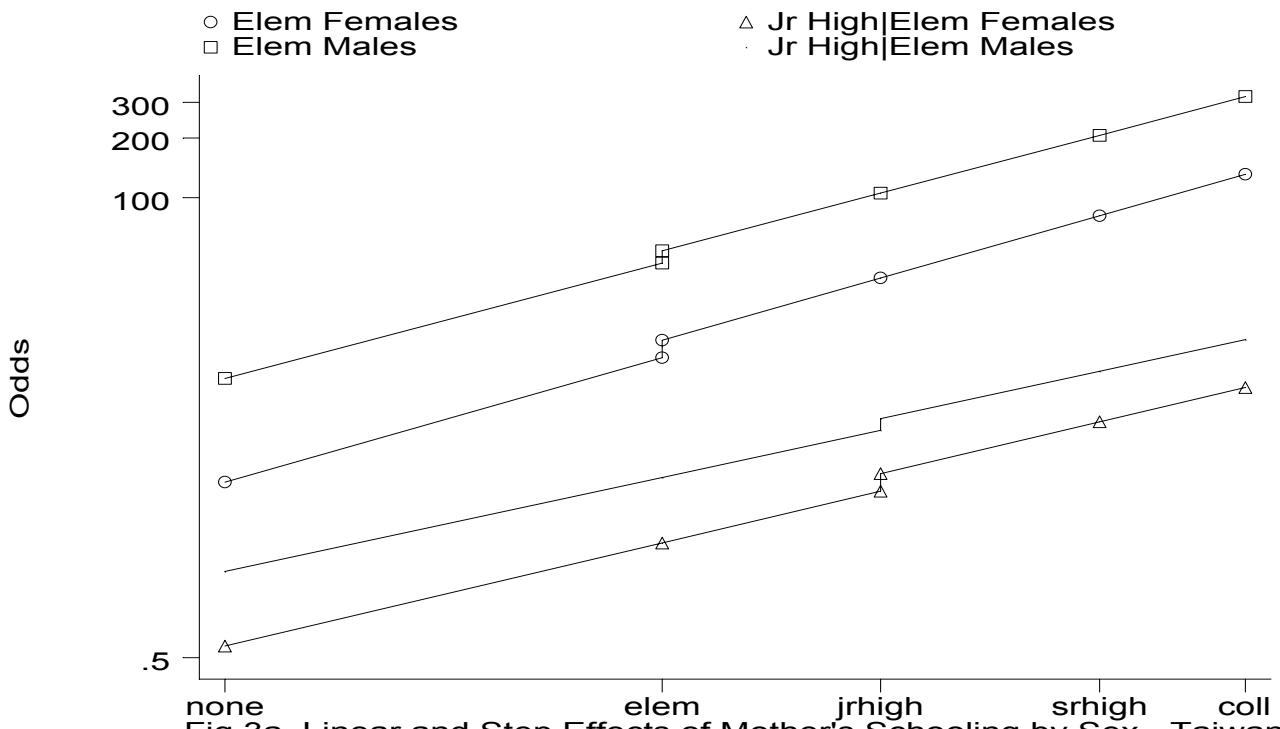


Fig 3a. Linear and Step Effects of Mother's Schooling by Sex - Taiwan

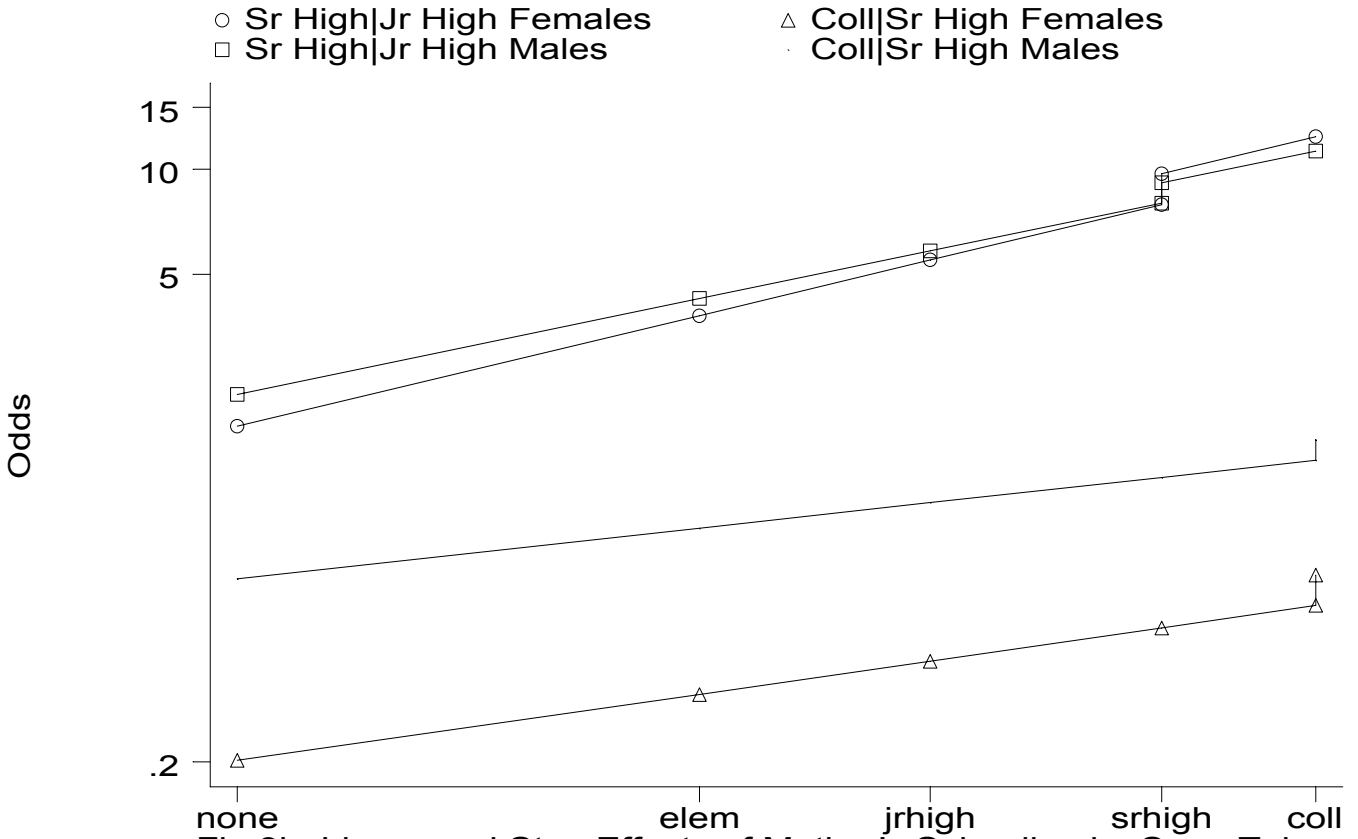


Fig 3b. Linear and Step Effects of Mother's Schooling by Sex - Taiwan

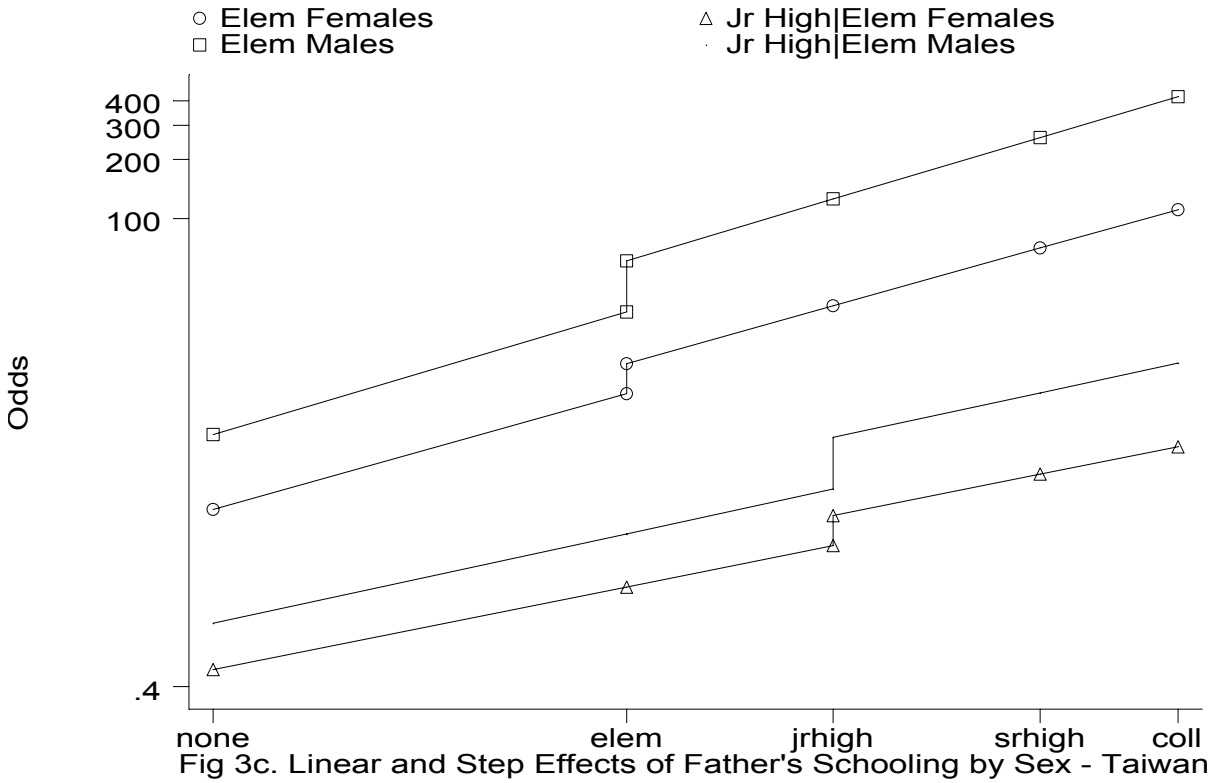


Fig 3c. Linear and Step Effects of Father's Schooling by Sex - Taiwan

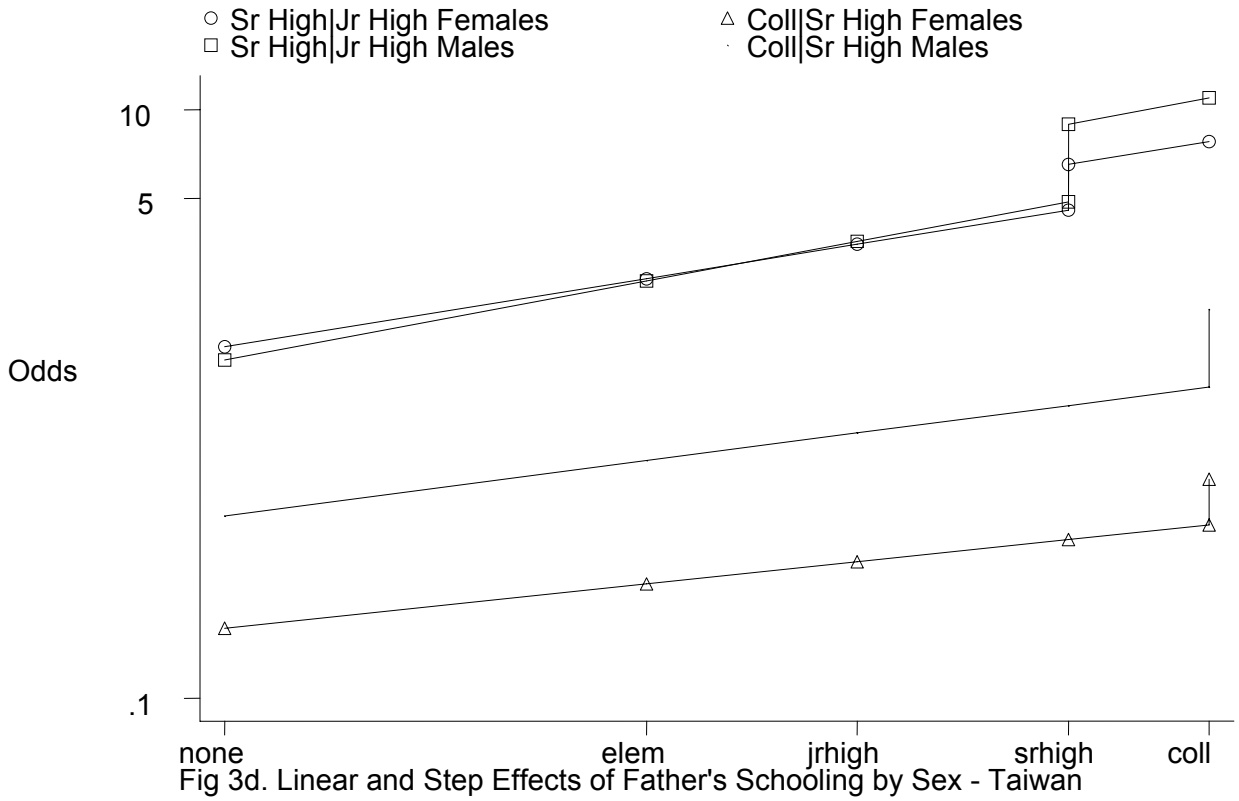


Fig 3d. Linear and Step Effects of Father's Schooling by Sex - Taiwan

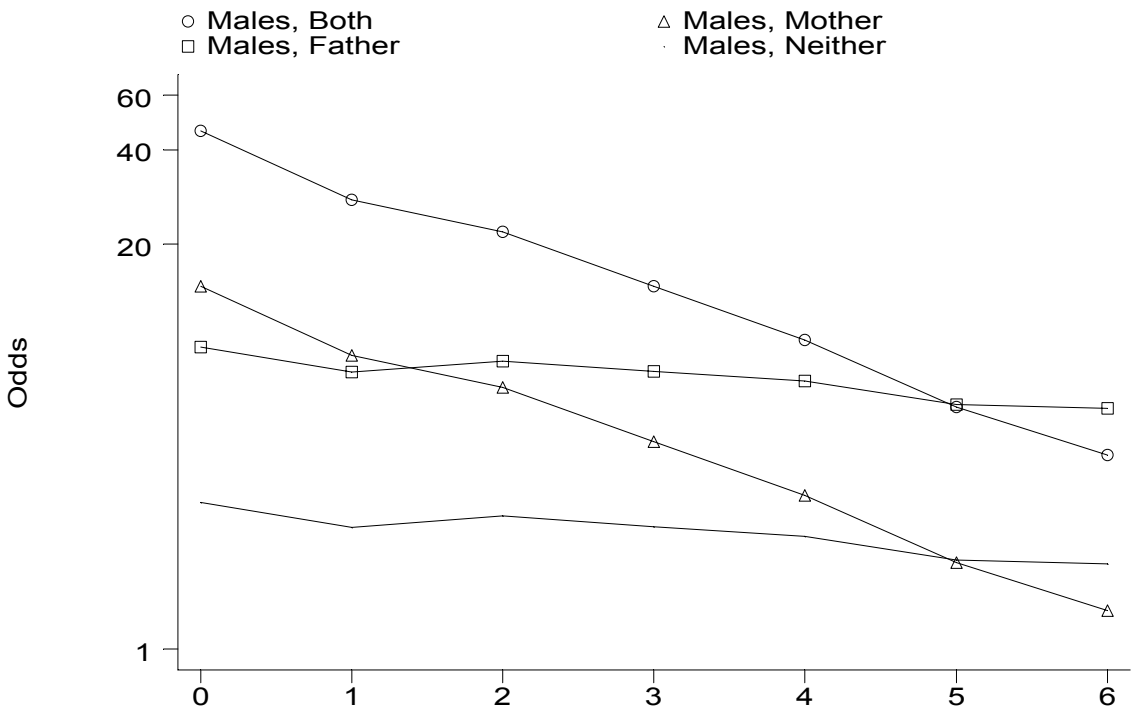


Fig 4a. Effects of Sibship Size by Parent Transitions -- Taiwan

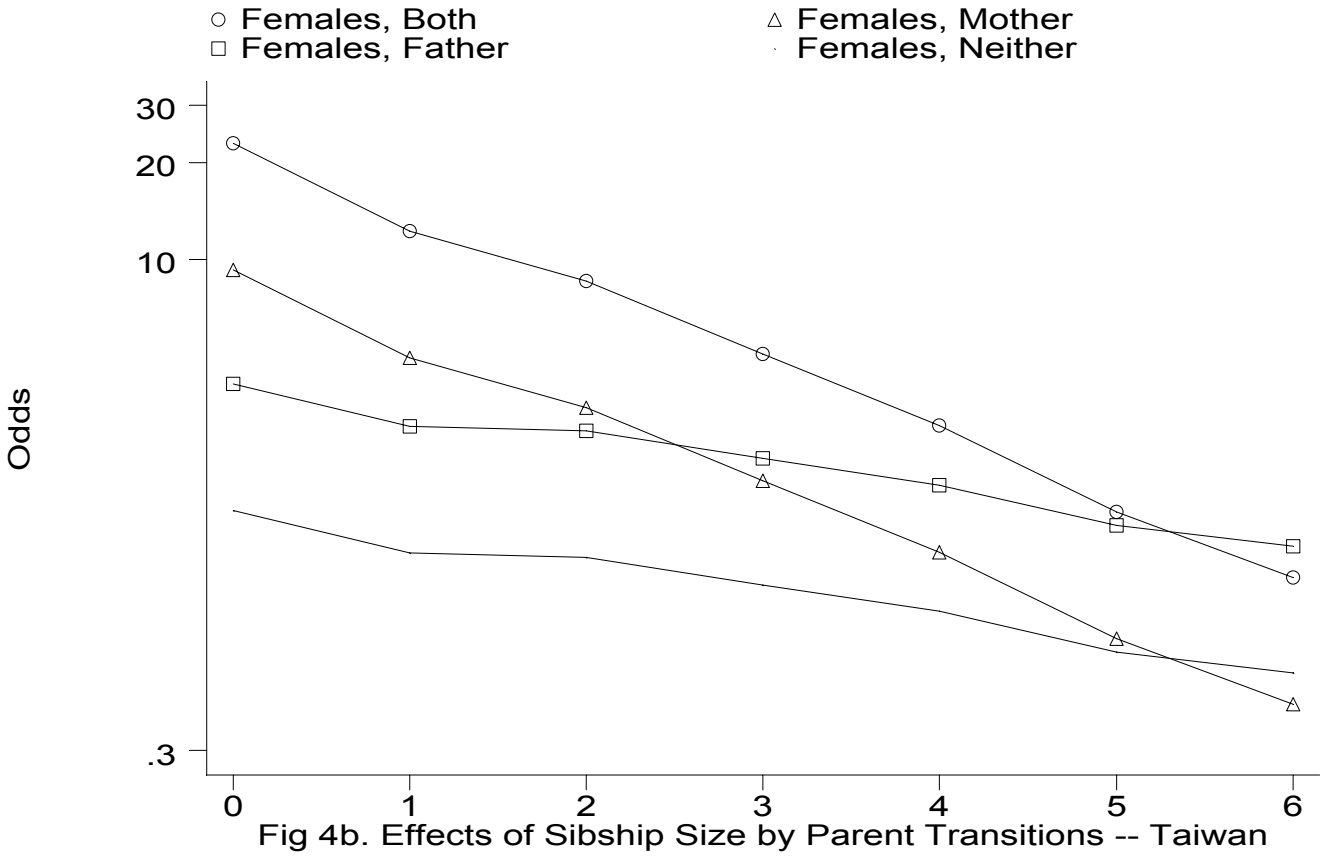


Fig 4b. Effects of Sibship Size by Parent Transitions -- Taiwan