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ABSTRACT

A control factor for studies of high school peer influence on college aspiration was used. Previous estimates of high school peer influence on college aspirations have used peer similarity as an indicator of peer influence but have neglected to control for peers' initial similarity in aspirations at the beginning of their friendships. Longitudinal sociometric data on choices and aspirations were used to control for friends' initial similarity, and a correction factor for peer influence was computed. Two standard types of models were used: the "Wisconsin"-type recursive model of status attainment and a nonrecursive "reciprocal influence" model. The Wisconsin-type model used data from a 15-year followup study for 28 boys who chose new best friends between fall 1957 and spring 1958. The recursive-influence model followed 993 boys and 936 girls who had new best friends. Additional variables include: I.Q. and friend's I.Q.; grade point average; socioeconomic status; occupational aspiration, and educational aspiration of the child and the friend; parents' educational and occupational encouragement; and educational and occupational attainment. It was found that prior estimates of peer influence had been inflated by over 100 percent. High school peer influence on college aspirations had a weak effect. (SW)

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PEER INFLUENCE ON COLLEGE ASPIRATIONS WITH INITIAL ASPIRATIONS CONTROLLED*

by

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ABSTRACT

Previous estimates of high school peer influence on college aspirations have used peer similarity as an indicator of peer influence but have neglected to control for peers' initial similarity in aspirations at the beginning of their friendships. The present analysis employs such a control in both a "Wisconsin"-type recursive model of status attainment and a nonrecursive "reciprocal influence" model, and finds that prior estimates of peer influence have been inflated by over 100%. High school peer influence on college aspirations is a weak effect with a path coefficient between .1 and .2 in the models tested.

PEER INFLUENCE ON COLLEGE ASPIRATIONS WITH INITIAL ASPIRATIONS CONTROLLED

High school students' close friends influence their decisions as to whether or not to attend college (e.g., Campbell and Alexander, 1965; Duncan, Haller, and Portes, 1968; Kandel and Lesser, 1969; Hauser, 1972; Sewell and Hauser, 1972; Alexander and Eckland, 1975), and there have been numerous attempts to quantify the magnitude of this peer influence effect. The chief technique employed for this purpose has been path analysis, where the size of the peer influence effect has been represented by the coefficient of the direct path from best friend's college plans to respondent's college plans. Coefficients for this path have often exceeded .2, suggesting a fairly substantial effect[1] (see Hauser, 1972; Alexander and Eckland, 1975; Sewell and Hauser, 1975; Alexander, Eckland and Griffin, 1975; Hauser, Sewell and Alwin, 1976; and Alwin and Otto, 1977).

However, the effect of peer influence on college aspirations is smaller than these findings indicate because estimates have been inflated by the omission of a crucial control. These studies have, in effect, used peer similarity in aspirations as a measure of peer influence, attributing all peer similarity to peer influence, and failing to control for friends' initial similarity in aspirations at the time for friendship selection.[2] Since, however, peers self-select each other as friends on the basis of initially similar aspirations (Cohen, 1977; Kandel, 1978), their similar aspirations are due to both (1) initial similarity at the time of friendship selection and (2) peer influence following friendship formation. Without controls for initial similarity the portion of eventual similarity due to influence is overestimated.

This problem has been pointed out by Krauss (1964) and Duncan, Haller, and Portes (1968), and shown to be substantial by Cohen (1977) and Kandel (1978), but the magnitude of overestimation has never been adequately determined. Kandel (1978:436) concluded that standard models "overestimate by about 100% the influence of friends..." while Cohen (1977) concluded that there was no peer influence on college plans: so we are left with conflicting indications. Moreover, neither Cohen (1977) nor Kandel (1978) measured the overestimate directly by computing the overestimated value in the same manner as that used by prior investigators using conventional models. Their methods merely simulated and approximated a direct computation.

The present analysis goes beyond Cohen (1977) and Kandel (1978) to actually compute the degree of overestimation obtained by standard path analytic methods. First, peer influence on aspirations is computed conventionally without controlling for peers' initially similar aspirations. Next, the conventional models are modified to control for initial peer similarity, and peer influence is re-computed. The comparison of the conventional and corrected estimates shows the percentage of overestimation obtained through standard methods and provides a correction factor that can be applied to conventionally-obtained results to produce an estimate of peer influence on aspirations with initial similarity of aspirations controlled.

The computation of the correction factor for peer influence on aspirations is illustrated here on two prominent types of models: (1) the "Wisconsin" type of recursive model (see especially Sewell, Haller and Ohlendorf 1970, and Hauser, Sewell and Alwin, 1976), and (2) a "reciprocal influence" model, which improves upon the Wisconsin model's built-in assumption that friend's aspirations affect respondent's but not vice-versa (see Duncan, Haller and Portes, 1968:122 and following).

DATA

Controls for firends' initial similarity at the time of friendship selection are impossible with cross-sectional data; however, longitudinal measurement of sociometric choices and aspirations permits such a control. Previous longitudinal status-attainment studies measured status attainments long after aspirations, but their analyses of peer influence were cross-sectional: without longitudinal sociometric data they were unable to control for friends' prior similarity.

In contrast, the present data combine Coleman's (1961) Adolescent Society panel data with a 15-year follow-up study of early status-attainment to form a three-wave data-set. The first two waves consist of questionnaire responses, school data on I.Q. and grades, and sociometric data collected by Coleman (1961) in the fall of 1957 and again in the spring of 1958 on the total student bodies of ten Midwestern high schools. The students' parents were also interviewed during that school year. The third wave, carried out by Lloyd Temme and others (described by Marini, 1978) in 1973, re-interviewed 6,680 of Coleman's 8,148 original public school respondents.

The two-point panel sociometric data permit the effects of initial homophilic peer selection, measured at time 1, to be controlled while calculating peer influence as measured at time 2. When just new (spring, 1958) relationships are selected for analysis, each new friend's influence on spring, 1958 aspirations may be considered his total influence; since a respondent's fall, 1957 aspirations, which predated his new spring friend's influence, may be assumed free of and separate from his new friend's influence, they can be controlled without artifactually eliminating part of the friend's influence. Therefore, college aspirations just prior to selection can be controlled when peer influence is assessed:

Because the assumption that time 1 aspirations are unaffected by friend's aspirations requires that early aspirations be determined prior to friendship formation, this mode of analysis can be validly applied only to new friendships. Fortunately, with sociometric data for both fall 1957 and spring 1958, it is possible to tell which friendship choices were formed over the 1957-1958 school year. The analyses below focus on respondents with new friends. Both the recursive "Wisconsin" model and the reciprocal-influence model use "best friend's influence" to represent peer influence, and only respondents with new best friends at time 2 (spring, 1958) are selected for study. Since the Wisconsin type model incorporates attainment variables, its analysis utilizes data from the fifteen-year follow-up study. There were 2,485 "follow-up boys" who participated in all three waves; 728 of these chose new best friends between time 1 and time 2, and are used to analyze this model below (a parallel analysis cannot be performed on the "follow-up girls" since "occupational aspirations," a necessary variable, was not measured for girls).

Since the "reciprocal-influence" model includes no attainment variables, its analysis can be based on the panel of students measured twice by Coleman, a larger subsample than those in the follow-up study.[3] Of the 3,302 boys and 3,691 girls in this panel, the 993 boys and 936 girls with new best friends at time 2 were selected for analysis.

This data-set includes a broad cross-section of youth from small-town and suburban schools, the major religious divisions (Protestant, Catholic and Jewish), and a wide range of socioeconomic statuses.[4] Of course, one must be cautious in generalizing the conclusions of the study to the groups that are absent or under-represented: black and Spanish-speaking students; students outside the Midwest; and those in central city and private schools.

MEASUREMENTS

Proper measurement of peer influence on aspirations requires not only a control for peers' initial similarity but for other variables as well. Fortunately, the status-attainment models to be tested already include the control variables determined appropriate by previous research.

Variables have been measured through use of school data on grade point average and I.Q., the questionnaire responses of students and their parents, and sociometric choices written onto the questionnaires. Exact wording for Coleman's (1961) items may be found in his Appendix. Descriptions of each variable used in the present study follow:

Best friend: This is the first name given[5] when Coleman (1961) asked boys, "Whay boys here in school do you go around with most often?" and asked girls what girls they went around with most often (cross-sex choices were excluded[6]). Coleman left open the number of friendships to be reported.

I.Q. and Friend's I.Q.: Most students took the Otis test or the California Test of Mental Maturity. All test scores were normed the same and pooled into one variable.

Grade Point Average: Averages were collected throughout the 1957-1958 academic year from school records, and are coded on a four-point scale.

Socio-economic Status: This variable is represented by the prestige of the major census category of father's occupation. Coleman neither coded more precise prestige scores nor obtained good information about income.

Respondent's College Aspriations: Asked whether or not they planned to go to college, respondents answered "yes," "undecided," or "no." This question was repeated in both fall and spring.

Respondent's Occupational Aspirations: Boys (but not girls) were asked in the fall interview what kind of work they planned to go into when they finished their schooling[7]. Responses were coded according to major census category. Since this question was not repeated, it was impossible to obtain corrected values for the magnitude of peer influence on occupational aspirations.

Friend's Socioeconomic Status, Friend's Educational Aspirations, Friend's Occupational Aspirations: Since respondent's questionnaire and school data were matched with his friend's, the friend's questionnaire variables are self-report data.

Parents' Occupational Encouragement: Parents were asked what kind of work they would like to see their sons (but not daughters) go into. Responses were coded by major census category.

Parents' Educational Encouragement: Asked whether they wanted their son or daughter to go to college, parents answered "yes," "undecided," or "no."

Educational Attainment: Respondents were asked in the fifteen-year follow-up study how much education they had completed, from some high school to professional or graduate work beyond college.

Occupational Attainment: Using data from the follow-up study, respondent's most recent occupation was scored using Temme's (1975) prestige index.

ANANLYSIS I: CORRECTION OF A RECURSIVE MODEL

Model I

Description of the Model. Model I, a recursive model similar to previous Wisconsin models is diagrammed in Figure 1a. Assumptions about the causal effects of I.Q., parents' S.E.S., and grade point average are those of Sewell Haller and Ohlendorf (1970), and are explained in their article[8]; one principle feature of this type of model is that the effects of the exogenous variables on aspirations and attainments are mediated by the influence of significant others. "Significant others' influence" is disaggregated into (1) peers' and (2) parents' influences on aspirations (similar to Hauser, Sewell, and Alwin, 1976)[9]; beyond this, both peers' parents' influence are further divided into (1) educational and (2) occupational influence (see Otto, 1978). Significant others' educational influences directly affect respondent's college (but not occupational) aspirations, while their occupational influences directly affect respondents occupational (but not college) asprications (see Figure 1a). As in previous Wisconsin models, it is assumed that there are no causal relations between the "significant other" variables (X_2 through X_5) or between the aspiration variables (X_6 and X_7).

Since peers are primarily models, not "definers" (see Picou and Carter, 1976:17), it is their levels of aspiration, not their levels of encouragement, that are included in the model and that influence respondent's college plans (p_{64}). Peers' levels of aspiration depend on respondents' background characteristics because respondents select their friends, and respondents with higher grades, I.Q., and socioeconomic status tend to select friends with higher aspiration levels.

Solution and Results. Since this model utilizes the attainment variables measured in the fifteen-year follow-up study, its parameters are estimated from the subsample of 728 follow-up boys with new best friends at time 2. Means, standard deviations, and Pearsonian correlation coefficients for all variables in the model are shown in Appendix I. All disturbances have been assumed independent of each other and a full information maximum likelihood solution for the model has been computed using the LISREL program. The standardized structural coefficients are presented in Table 1.

Many paths in this model correspond directly to identical paths in Sewell, Haller, and Ohlendorf's (1970, figure 2) version of the Wisconsin model; for these corresponding paths the Model I results are roughly similar to their results: the average difference in corresponding path coefficients between the two data sets is slightly under .09.[10] The standardized coefficient for peer influence on college aspirations, p_{64}, is .254, which falls into the range reported in previous studies of this sort. This establishes the typicality of the present data-set.

Model IA

Description of the Model. A corrected figure for peer influence on educational aspirations with friend's initial similarity controlled can be obtained by modifying Model I. Initial peer similarity may be controlled through the insertion of a new control variable, "early college aspirations," measured in the fall of 1957 (time 1), shortly before respondent selected his best friend. The insertion of this variable, X_0, modifies Model I into Model IA (see Figure 1b).

In Model I the effects of homophilic selection and peer influence were confounded to the extent that respondent's early aspirations and friend's aspirations were correlated due to homophilic selection ($r = .36$). Because of this correlation high levels of friend's aspirations, X_4, predicted back to high levels of respondent's early aspirations, X_0; these early aspirations in turn continued on to affect respondent's later aspirations, X_6, quite strongly. In short, besides the direct path from X_4 to X_6 there also operated an implicit indirect path between X_4 and X_6 which was mediated by X_0 and which was not included in the model. Therefore, part of the .254 value of P_{64} was actually not due to the direct effect of X_4 on X_6 at all but to this indirect path which existed because of homophilic selection. The addition of X_0 as a direct antecedent of X_6 in Model IA partials out the effect of respondent's selection of a friend with similar college aspirations. This spurious indirect effect is eliminated in Model IA when X_0 is controlled; it is effectually subtracted from the inflated .254 figure one obtains with X_0 uncontrolled.[11] Thus, in Model IA, p_{64}, the path from friend's to respondent's college aspirations, may be interpreted appropriately as an influence effect since the effects of respondent's homophilic choice have been removed from it.

Selection is represented in Model IA by p_{40}. Respondent's early aspirations, X_0, are shown in Figure 1b to "cause" friend's plans. X_4. But this "cause" is not attributable to peer influence since recursive, Wisconsin models allow for one-way influence only, wherein friend influences respondent, and not for reciprocal influence wherein respondent influences his friend, too. Instead, early plans affect friend's plans much as socioeconomic status, I.Q., and grade-point average affect friend's plans: the higher these variables, the higher the likely college aspirations of the person chosen as best friend. In a Wisconsin model the Xa, Xc, X_1, and X_0 values of a respondent we'll call "Charles" have no effect on the college aspirations of his best friend, "George", but explain (in part) why "George" was chosen over "Sam", and why "George's" X_4 value appears in "Charles'"data-file instead of "Sam's" X_4 value. Since Wisconsin models are respondent centered, X_4 is considered a characteristic of the respondent; it varies with his choice of best friend, although it is considered fixed for a given friend. In short, the variance in X_4 that is accounted for by X_0 is attributable to selection. And the effects of respondent's homophilic selection of his best friend on his college aspirations may be assessed from the indirect path between X_0 and X_6 that is mediated by X_4: the higher respondent's early college aspirations (X_0), the higher the aspiration of the chosen best friend (X_4) and, in turn, the more upward the friend's pull on respondent's later aspirations (X_6).[12]

Two other paths new to Model IA require some explanation. The first of these, the direct path p_{60} between respondent's early and late aspirations, is a stability coefficient; it represents the tendency of respondent's college aspirations to remain stable independently of whether best friend reinforces and stabilizes them through peer pressure or exerts pressure on respondent to change. The second, p_{02}, represents parents' influence on early college aspirations as distinguished from p_{62}, parents' effect on later college aspirations with their effect on early aspirations controlled. The variable X_2 represents current parental encouragement for purposes of interpreting p_{62} and parents' early encouragement for purposes of interpreting p_{02}.[13]

One more feature of Model IA should be noted. Respondent's early college aspirations, X_0, do not depend on friend's influence since the friend has not yet been selected at time 1.[14]

Solution and Results. To solve Model IA all disturbances are again assumed independent of each other, recursivity is assumed, and the maximum likelihood solution is obtained through LISREL. The path coefficients are found in Table 2 above the slashes. All are (within rounding error) the same as in Model I except for those paths leading up to X_0, X_4, and X_6.[15]

It is those paths explaining X_6, later college aspirations, that are of central concern to this paper. First of all, college aspirations were quite stable between fall and spring (p_{60} = .600). This stability suggests that during the interval between time 1 and 2, the forces for (non-uniform)[16] change in these aspirations were relatively ineffective. The small .075 path between parents' educational encouragement and later plans shows that the level of parental encouragement did little to transform time 1 plans (parents' impact came earlier as shown by the .363 value of p_{02}). And, most importantly, peer influence, represented by p_{64}, is only .120, which constitutes a rather small force for the modification of earlier plans.[17]

The new value of p_{64} implies a correction factor of 53% and an original overestimate in Model I of over 100%. Peer influence on aspirations is seen to be a small effect.[18]

One caveat in accepting these results at face value is that the disturbances of X_0 and X_6 could be autocorrelated rather than independent as assumed since X_0 and X_6 measure the same variable at different time points. If so, the violation of orthogonality assumptions could call into question the results obtained (see Blalock, 1969:83; Heise, 1970:21; Williams, 1972:119; Chase-Dunn, 1975:727, note 8). In order to guard against this possibility, the coefficients for Model IA have been recomputed by LISREL without the assumption that these two disturbances are uncorrelated. When the correlation between them, rho, is treated as a free parameter, Model IA remains identified; the solution so obtained is shown in Table 2 below the slashes.

In this new solution all coefficients are identical to those obtained with rho assumed to be zero except for the paths leading up to X_6, which are as follows. Path p_{60}, the stability coefficient for college aspirations, now equals .956, reflecting tremendous stability in college plans; and grades and parents have virtually no direct influence on later college aspirations (though their indirect effects via early aspirations are strengthened by the powerful .956 path between early and late aspirations). Although these path differ from the case where rho is assumed zero,[19] peer influence on college plans remains much as before, with p_{64} = .116. The implied correction factor remains at 53% based on an original Model I overestimate greater than 100%.

ANALYSIS II: CORRECTION OF A "RECIPROCAL INFLUENCE" MODEL

Model II

Description of the Model. Despite the preponderance of recursive models in the status-attainment literature (see above), there is considerable merit in the argument that each respondent and his best friend mutually influence each other's aspirations and that an accurate model of peer influence on aspirations must include reciprocal causation between respondent's and friend's aspirations (see Duncan, Haller and Portes, 1968: 122). This analysis, therefore, corrects a model of reciprocal peer influence in the same way as the Wisconsin model was corrected above. Model II (Duncan, Haller and Portes' Model I), shown in Figure 2a, provides an uncorrected peer influence value to serve as a standard of comparison for assessing the degree to which peer influence on college aspirations is overestimated by reciprocal influence models which include no control for mutual selection on the basis of common aspirations.

In this model each student's aspirations are assumed to depend on his own I.Q. and S.E.S., his friend's aspirations, and his friend's S.E.S. Peer influence on aspirations, represented by p_{24} and p_{42}, is depicted as mutual and instantaneous. The correlation between disturbances is not assumed to be zero.

Solution and Results. Since no attainment variables from the follow-up study are included in this model, the panel, not the follow-up sample, was used as the basis for analyzing Model II. The analyses that follow utilize data from the 993 panel boys and 936 panel girls who chose new friends between time 1 and time 2. (Means, standard deviations, and Pearson correlations for these subsamples are found in Appendix 2.) Model II is just-identified. Its maximum likelihood solution has been computed by LISREL and the path coefficients appear in Table 3, column 1.

Although the mathematics and logic of Models II and IIA are symmetric, note that the corresponding pairs of path coefficients for respondent and friend need not be equal: respondent's influence on friend's aspirations (p_{42}) does not equal friend's influence on respondent's aspirations (p_{24}).

Instead of using the symmetrizing method of Duncan, Haller and Portes (1968:128-129 and Table 1, P. 121) to correct this, the figures for p_{24} and p_{42} have been simply averaged in order to summarize in one number the magnitude of peer influence on college aspirations.

The resulting averages are .410 for boys and .411 for girls. These uncorrected figures, if taken at face value, would imply a substantial peer influence effect.

Model IIA

Description of the Model. As in the recursive case (Model I), the raw peer influence figures obtained from Model II can be corrected for peers' initial similarity. In a reciprocal choice model, both respondent's and friend's initial aspirations may be introduced as control variables. This modification transforms Model II into Model IIA, shown in Figure 2b, which, in contrast to Model II, controls for peers' initial levels of aspiration shortly before the time of mutual selection, and thus for homophilic choice based on common aspirations.

Since Model IIA is a reciprocal influence model, respondent's aspirations are assumed to affect best friend's aspirations through peer influence,[7] not simply through selection as in Model IA: hence, both p_{24} and p_{42} are considered peer influence paths. Since peer influence is assumed to take place only after the relationship has begun, later plans are influenced only by friend's aspirations after friendship formation, not by his/her aspirations before friendship formation: hence, paths p_{23} and p_{41} are omitted. For the same reason respondents' and friends' early aspirations are directly affected only by their background variables, but not by friend's influence. Likewise, since friendship selection has occurred after early aspirations were determined, respondent's and friend's background S.E.S. are assumed to affect each other's later aspirations directly (p_{2f} and p_{4c}) but not to affect each other's early aspirations directly ($p_{1f} = p_{3c} = 0$) (These assumptions are only valid for respondents with <u>new best friends</u>; as in Model IA, the model is only correctly specified for subsamples of respondents with new friends.)

<u>Soultion and Results</u>. Model IIA is identified if rho = 0; since the model is symmetric this means both that the disturbances of Y_1 and Y_2 are uncorrelated and that the disturbances of Y_3 and Y_4 are uncorrelated. As in the recursive case (Model IA), let us first assume that rho is zero and solve with LISREL. Path coefficients are shown in Table 3, column 2.

Background variables' effects on time 1 aspirations are consistently stronger than their effects on time 2 aspirations as estimated in Model II. This difference is probably a consequence of the Model IIA assumption that early aspirations <u>precede</u> peer influence: therefore, the background variables were not competing with peer influence to explain variance in time 1 aspirations. Background factors' effects on later aspirations in Model IIA are net of their effects on early aspirations, so it is not surprising that most of their effect on aspirations is early, and that virtually none occurs later. The effect of early aspirations on later aspirations is strong, with p_{21} and p_{43} in the .6 - .7 area. The correlation between the disturbances of Y_2 and Y_4 is an acceptable -.242 for boys and -.243 for girls (see Duncan, Haller and Portes, 1968).

The magnitude of peer influence, represented by the average of p_{24} and p_{42}, is .137 for boys and .151 for girls, much lower than in Model II. The correction factors are 67 and 63 percent for boys and girls, respectively, revealing over-estimates of over 100% in reciprocal choice models when initial homophily is left uncontrolled.

As in the recursive case, the assumption that rho = 0 could be invalid due to autocorrelation; again, it seems advisable to relax this assumption and solve a second time to see if the results hold up. Model IIA differs from Model IA in that when the assumption that rho = 0 is relaxed, two other correlations must be assumed zero in order to identify the model: (a) the correlation between the disturbances of Y_1 and Y_4, and (b) the correlation between the disturbances of Y_2 and Y_3. But this new set of assumptions improves on the questionable assumption that rho = 0: since rho refers to autocorrelations between the same variable at two points in time, it is expected to be positive in value in direct contradiction to the assumption that fixes it at zero. At least under the new set of assumptions there are no theoretical expectations that non-zero values will occur for the correlations that have been fixed at zero.

With the new assumptions in force and rho treated as a free parameter, Model IIA is once again solved through LISREL. The resulting path coefficients appear in Table 3, column 3.[20]

Coefficients for the paths leading up to Y_1 and Y_3 are just as before. However, some of the effects of background factors on time 2 aspirations come out somewhat larger, falling in the .1 - .2 range. The effect of early plans on later plans now ranges between .296 and .794 depending on the value of rho.[21] The average peer influence value is .167 for boys and .185 for girls, figures nearly as low as those obtained when rho was assumed to be zero. The correction factors for boys and girls are 62% and 58% respectively. These correction factors for the reciprocal choice model are not very different from those for the recursive model, although both the uncorrected and corrected influence levels are a bit higher in the reciprocal influence model.

DISCUSSION

The purpose of this paper has been quite limited and specific, namely to compute a correction factor for peer influence on aspirations once initial aspirations have been controlled. The analysis illustrates how two standard types of models can be modified to add this control, assuming the availability of longitudinal sociometric data. It also shows on a fairly representative and not atypical data-set how such a correction procedure might come out numerically, i.e., how great in magnitude that correction factor might be. All the correction factors fall between 53% and 67%: this holds true across different models. These figures can be kept in mind for assessing the likely overestimates obtained whenever conventional models are used.

This is not to say that the correction factor is invariant from sample to sample; we can only learn its degree of invariance from repeated computation of this correction on different data.[22] The correction factors obtained should vary according to the specific model employed; however, varying the model did not cause the magnitude of the correction factor to vary much in the present data.

To the extent that present measures of (1) the uncorrected magnitude of peer influence, and (2) the correction factors are typical, some tentative conclusions may be advanced about the magnitude of peer influence on college plans. Despite different types of models (recursive and non-recursive), peer influence fell into the .1 - .2 range. This stamps it as a decidedly smaller effect than most past research has indicated, since most uncorrected figures have fallen into the .2 - .3 range (and did also in Model I of <u>this</u> study). It should be recognized that there is no single effect of "peer influence"; there are only "peer influence on college aspirations," "peer influence on occupational aspirations," "peer influence of drug use " and so on. Peers may be quite influential in some areas of life but not others. Cohen (1977) and Kandel (1978) have reported in part the range of this variation, and in both of these studies college aspirations came out as one of the weakest areas of peer influence. Peer influence may be strong in many areas of life, but this study indicates that peer influence on college aspirations is quite a weak effect.

Since peer effects on college aspirations were not eliminated by the addition of a control for initial homophily, peer influence on college aspirations should not be dropped from future status-attainment models. Since, however, most status-attainment models will be solved without the availability of longitudinal sociometric data, and since the computation of peer influence correction factors is cumbersome, it is unlikely that corrected peer influence values can be routinely obtained. Perhaps the best strategy will be to compute standard, uncorrected values of peer influence and then simply apply the correction factor obtained from this study or similar replications of it to obtain corrected values.

The introduction of a correction factor or the inclusion of a control for initial homophilic selection will definitely improve models of the type analyzed here. However, this analysis purports to be one step toward the ideal of correct modeling, not the completion of the journey. Future status-attainment studies should incorporate types of peer influence ignored in past research. The emphasis on "best friend" influence has slighted cross-sex influence, which could be quite important (see Otto, 1977), and the influence of respondents' total interpersonal environments or networks. Furthermore, the emphasis on current friends and their influence ignores repondents' history of friendship. Are the lasting effects of past friends' influence more substantial than the effects of current friends? Is there a key age at which peers are most influential? The present study has operationalized peer influence as current best friend's influence only to utilize the most prominent status-attainment models to illustrate the correction factor; this does not constitute approval of their narrow construction of the peer influence concept.

Besides the need to improve their measurement of peer influence, status-attainment models need additional refinements as well. For example, occupational and educational encouragement and aspirations should be kept separate but at the same time related in some way. A detailed discussion of suggested changes in status-attainment models would go beyond the scope of this paper. However, many more refinements are probably needed before these models may be considered "correctly specified" and the estimates obtained from them considered definitive.

FOOTNOTES

1. In other studies (e.g., Sewell, Haller, and Portes, 1969; Sewell, Haller and Ohlendorf, 1970; Woelfel and Haller, 1971; Sewell and Hauser, 1975) peer influences were combined with parents' and teachers' influences into indices of "significant other" influence; path coefficients between significant other indices and college plans have generally ranged between .4 and .6.
2. A few studies (e.g., Duncan, Haller and Portes, 1968; Sewell and Hauser, 1972; Williams, 1972; Picou and Carter, 1976) have partially controlled for initial homophilic selection through a technique (see Duncan, Haller and Portes, 1968:136; Karweit, 1976:1) which controls for assortative friendship pairing based on exogenous background variables correlated with aspirations (e.g., I.Q.; parental occupation, income, and education); however, assortative friendship pairing on the basis of initially similar educational and/or occupational aspirations cannot be fully controlled through this technique (see Duncan, Haller and Portes, 1968:135-136).
3. There was some case loss through panel attrition. Of 8,879 students interviewed in the fall of 1957, 8,223 were re-studied the next spring to form Coleman's panel; of 4,212 public school boys originally interviewed, 3,671 were in the panel, and 3,176 were in the follow-up study. A check for selective panel attrition reveals that later waves (compared to wave 1) slightly underrepresent students with lowest college aspirations, but are unbiased in I.Q., in parents' socioeconomic status, and in the importance with which peers were regarded; it is important that the most peer-oriented were not lost through attrition.

The matching of respondents and friends also involved case loss because some respondents did not provide sociometric data, some made no choices, and some chose friends for whom questionnaire data were unavailable: 6,993 of the 7,522 public school panel members and 2,485 of the 3,176 boys in the follow-up were successfully matched with their first-choice friends' questionnaire data. These rates of case loss compare favorably to that reported by Duncan, Haller, and Portes (1968: 120).

4. The one Catholic parochialschool was dropped from all analyses since it was not included in the follow-up study; thus, no central city schools were included. Since peer influence should be abundant in suburban schools, the lack of central city data does not seem critical to the study of peer influence.

5. As in previous research "first-named friend" is a proxy for "best friend"; this procedure seems appropriate here because one purpose of this research is to replicate prior studies.

6. It is likely that high school students influence and are influenced by opposite-sexed friends (see, for example, Otto, 1977); that separate phenomenon cannot be studied here.

7. In Models I and IA, the assumed time sequence would be more consistent if respondent's occupational aspirations in the spring (time 2) were available. The time 1 measure must be used as a proxy for the missing time 2 measure. Fortunately, results dependent on this assumption are not central to the paper's argument.

8. Most recent status-attainment studies omit the effects of school socioeconomic context. Campbell and Alexander (1965) found that the socioeconomic composition of the student body did not affect college plans directly, but only through the influence of close friends and close friends' S.E.S. And Hauser (1971), Duncan, Featherman and Duncan (1972), Jencks and Brown (1975), and Alwin and Otto (1977) have all shown that between-school peer context effects are small.

9. Teachers' encouragement is omitted; teachers' influence on aspirations has been found weak by Herriott (1963), Hauser (1972), Williams (1975), Sewell and Hauser (1975), and Alexander and Eckland (1975).

10. Since the two studies used different measures with different metrics to measure the same variables, between-sample comparisons of metric coefficients would not be meaningful.

11. The Model IA value of p_{64} is mathematically obtained by removing (through subtraction) from X_4 the part of X_4 that was actually an effect of X_0 (likewise for the effects of X_1 and X_2 on X_4), and then using the remainder of X_4 (the residual) rather than the whole of X_4 as a regressor of X_6.

12. Since Model IA is recursive, it does not allow for reciprocal selections: there is no "selection" arrow leading back from friend to respondent. Nevertheless, friend's selection of respondent has implicitly been taken into account in order to remove all selection effects from the corrected estimate of peer influence (p_{64}). The estimation procedure for computing p_{64} uses as its input r_{40}, which represents the homophily of friends and respondents prior to peer influence regardless of who has selected whom. As described in the text, this homophilic selection effect is removed from the model's estimate of p_{64}. (If friend's choice of respondent were confounded

with influence in p_{64}, the p_{64} value obtained would continue to overestimate influence somewhat, and would yield a conservative correction factor smaller than the true correction factor.)

13. The interpretation of X_2 as a proxy for early parental encouragement is also dictated by the temporal sequence of measurement. Since parents were interviewed throughout the 1957-1958 school year, many may have been interviewed after X_0 was measured, and it would make no sense for X_2 to cause a variable that predated it. X_2 seems like a reasonable proxy for early encouragement; however, it would be preferable to have an earlier measure of parental encouragement to avoid the need to interpret X_2 as a proxy. Fortunately, the accuracy of path p_{20} is not crucial for establishing the main point of the paper.

14. Since an <u>old</u> friend would have influenced X_0 as well as X_6, Model IA is only correctly specified for respondents with a <u>new</u> best friend at time 2.

15. The ordinary least squares results are remarkably similar to the LISREL results for both Model I and Model IA.

16. If everyone in the sample changed by a constant amount this stability coefficient would still be high.

17. The value of this coefficient tells how many standard deviation units X_6 could be expected to change if X_4 changed by one standard deviation unit while X_0, X_1, and X_2 were held constant. It differs from the uncorrected peer influence coefficient for the following reason. In Model I, a one standard deviation increment of X_4 predicted to a .254 standard deviation increment in X_6 not only because X_4 affected X_6, but because the increment in X_4 <u>implied a simultaneous increment in X_0</u>, which <u>also</u> affected X_6. In contrast, the .120 unit increment in X_6 is expected when X_4 is incremented one standard deviation, but X_0 is <u>held constant</u> rather than permitted to assume its new expected value (this is what happens when X_0 is controlled).

18. Although peer influence is small, significant other influence is substantial due to the impact of parents. Parents' indirect effect on later plans, given by the indirect path $p_{20} \cdot p_{60} = (.363) \cdot (.600) = .218$, supplements their small direct effect on later plans ($p_{62} = .078$) to total $.218 + .078 = .296$.

19. The maximum likelihood estimate of rho is -.242, a negative autocorrelation.

20. A comparison of observed and implied correlations reveals all differences under .05, which suggests a good fit between model and data. The correlation between the disturbances of X_2 and X_4 is acceptable at -.179 for boys and -.171 for girls.

21. The symmetry of these effects, i.e. background factors and early aspirations on later aspirations, is now seen not only as a consequence of the model's logical and mathematical symmetry, but also as a direct consequence of the assumed equality of the two rho values; with that assumption relaxed, the earlier symmetry of these path coefficients has disappeared. Maximum likelihood estimates of the rho values range between -.09 and .23, and can be positive on one side of the model while negative on the opposite side; the path coefficients dependent on the rho value fluctuate accordingly.

22. Since as aquaintance grows, homophily becomes a stronger factor in friendship choice (Newcomb, 1961; Cohen, 1977), selection may figure more prominently in the similarity of new friends than of old friends; correspondingly, the correction factor may be smaller for old friends than for new. The correction factor for old friends could not be computed in this data set, but could be computed for older friends with a longer time interval between the repeated sociometric measures.

There was no evidence, however, that the new friendships were atypically weak in influence. Since corrected influence figures could not be computed for old friends, the uncorrected influence figures were used to compare "new friends" to "all friends." In the recursive case the metric O.L.S. influence coefficients for these two subsamples differed by less than .01 (.279 vs. .271). In the reciprocal influence case, standardized coefficients could be compared because corresponding standard deviations for the two subsamples were virtually identical; combining boys and girls, new friends' influence averaged .411 compared to .381 for all friends. If old friends exerted more influence than new, it would have shown up in these coefficients.

REFERENCES

Alexander, K., and B. Eckland
1975 Contextual effects in the high school attainment process. American Sociological Review 40(June):402-416.

Alexander, Karl, Bruce Eckland and Larry Griffin
1975 The Wisconsin model of socioeconomic achievement: a replication. American Journal of Sociology 81(September):324-342.

Alexander, Karl and Edward McDill
1976 Selection and allocation within schools: some causes and consequences of curriculum placement. American Sociological Review 41(December):963-980.

Alwin, Duane and Luther Otto
1977 High school context effects on aspirations. Sociology of Education 50(October):259-273.

Blalock, Hubert M., Jr.
1969 Theory Construction. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Campbell, Ernest Q., and C. Norman Alexander
1965 Structural effects and interpersonal relationships. American Journal of Sociology 71(November):284-289.

Chase-Dunn, Christopher
1975 The effects of international economic dependence on development and inequality: A cross-national study. American Sociological Review 40(December):720-738.

Cohen, Jere M.
1977 Sources of peer group homogenity. Sociology of Education 30(October):227-241.

Coleman, J.S.
1961 The Adolescent Society. New York:Free Press.

Duncan, Otis Dudley, David L. Featherman and Beverly Duncan
1972 Socioeconomic Background and Achievement. New York: Seminar Press.

Duncan, Otis Dudley, Archibald O. Haller and Adejandro Portes
1968 Peer influences on aspirations: a reinterpretation. American Journal of Sociology 74(September):119-137.

Hauser, R.M.
1971 Socioeconomic Background and Educational Performance. The Arnold M. and Caroline Rose Monograph Series. American Sociological Association.

1972 Disaggregating a social-psychological model of educational attainment. Social Science Research 1:159-188.

Hauser, R.M., W.H. Sewell, and Duane Alwin
1976 High school effects on achievement. Pp. 309-341 in W.H. Sewell, R.M. Hauser, and David Featherman, Schooling and Achievement in American Societ,. New York:Academic Press.

Heise, David R.
1970 Causal inference from panel data. Pp. 3-27 in Edgar F. Borgatta (Ed.), Sociological Methodology 1970. San Francisco: Jossey-Bass, Inc.

Herriott, R.E.
1963 Some determinants of educational aspiration. Harvard Educational Review 33:157-177.

Jencks, Christopher and Marsha Brown
1975 The effects of high schools on their students. Harvard Educational Review 45(August):273-324.

Kandel, Denise B.
1978 Homophily, selection, and socialization in adolescent friendships. American Journal of Sociology 84(September):427-436.

Kandel, D. and G.S. Lesser
1969 Educational plans of adolescents. American Sociological Review 34:213-223.

Karweit, Nancy
1976 School Influences on Student Interaction Patterns. Report No. 220, The Johns Hopkins University Center for Social Organization of Schools

Krauss, Irving
1964 Sources of educational aspirations among working-class youths. American Sociological Review 29(December):867-879.

Marini, Margaret M.
1978 Transition to adulthood. American Sociological Review 43(August): 483-507.

Newcomb, Theodore
1961 The Acquaintance Process. New York:Holt, Rinehart, and Winston.

Otto, Luther
1977 Girl friends as significant others: Their influence on young men's career aspirations and achievements. Sociometry 40(September): 287-293.

1978 Significant-others' Occupational Influence in the Educational and Occupational Attainment Process. Presented at the Annual Meeting of the American Sociological Association.

Picou, J.S., and T.M. Carter
1976 Significant-other influence and aspirations. Sociology of Education 49(January):12-22.

Sewell, William H., Archibald O. Haller, and George W. Ohlendorf
1970 The educational and early occupational status attainment process: Replication and revision. American Sociological Review 35(December):1014-1027.

Sewell, William H., Archibald O. Haller, and Alejandro Portes
1969 The educational and early occupational attainment process. American Sociological Review 34(February):82-92.

Sewell, W.H. and R.M. Hauser
1972 Causes and consequences of higher education: Models of the status attainment process. Journal of Agricultural Economics 54(December):851-861.

1975 Education, Occupation, and Earnings: Achievement in the Early Career. New York:Academic Press.

Temme, Lloyd
1975 Occupation: Meaning and Measurement. Washington, D.C.: Bureau for Social Science Research.

Williams, T.H.
1972 Educational aspirations: Longitudinal evidence on their development in Canadian youth. Sociology of Education (Spring):107-133.

1975 Educational ambition: teachers and students. Sociology of Education 48(Fall):432-456.

Woelfel, Joseph, and Archibald O. Haller
1971 Significant others, the self-reflexive act and the attitude formation process. American Sociological Review 36(February): 74-87.

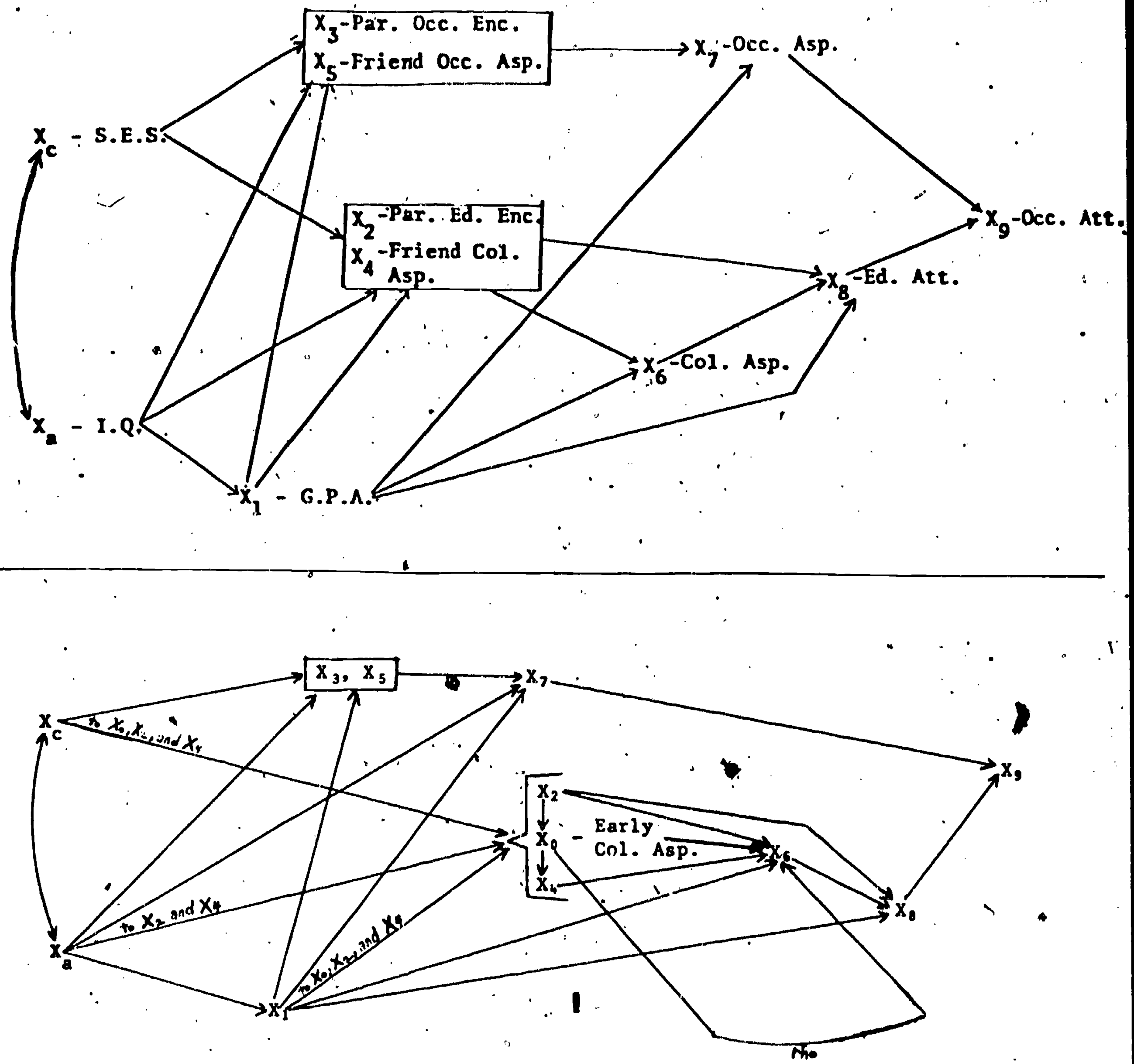

Figure 1: (a) Model I - A recursive "Wisconsin" model of early status attainment; (b) Model IA - A modified version of Model I. Variables: X_a = I.Q.; X_c = Parents' socioeoncomic status; X_0 = Respondent's early college aspirations (time 1); X_1 = Grade point average; X_2 = Parents' educational encouragement; X_3 = Parents' occupational encouragement; X_4 = Friend's college aspirations (time 2); X_5 = Friend's occupational aspirations; X_6 = Respondent's college aspirations (time 2); X_7 = Respondent's occupational aspirations; X_8 = Educational attainment; X_9 = Occupational attainment. Rho is the correlation between the X_0 and X_6 disturbances.

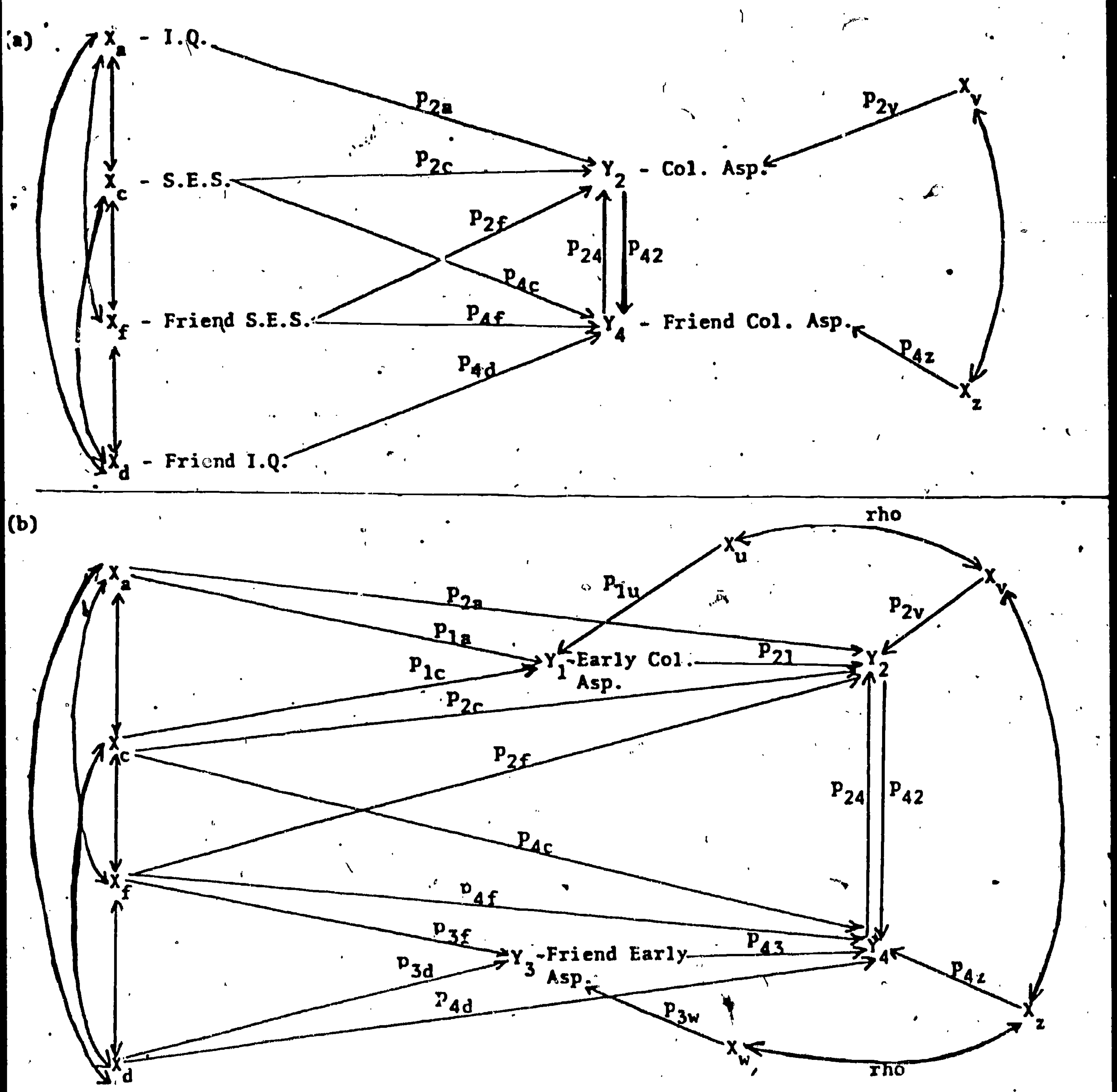

Figure 2: (a) Model II - A reciprocal influence model (Duncan, Haller and Portes Model I); (b) Model IIA - A modified version of Model II. Variables: X_a = I.Q., X_c = Parents' socioeconomic status; X_d = Friend's I.Q.; X_f = Friend's parents' socioeconomic status; Y_1 = Early college aspirations (time 1); Y_2 = College aspirations (time 2); Y_3 = Friend's early college aspirations (time 1); Y_4 = Friend's college aspirations (time 2). Rho refers to an autocorrelation between the disturbances of the same variable measured at both time 1 and 2.

Table 1. Model I Path Coefficients

Dependent Variables	SES (X_c)	I.Q. (X_a)	G.P.A. (X_1)	Parents' Educa. Encour. (X_2)	Parents' Occupa. Encour. (X_3)	Friend's College Aspir. (X_4)	Friend's Occupa. Aspir. (X_5)	College Aspir. (X_6)	Occupa-tional Aspir. (X_7)	Educa-tional Attain. (X_8)
						Independent Variables				
G.P.A. (X_1)		.545								
Parents' Educational Encouragement (X_2)	.179	.187	.113							
Parents' Occupational Encouragement (X_3)	.123	.076	.063							
Friend's College Aspirations (X_4)	.125	.085	.168							
Friend's Occupational Aspirations (X_5)	.105	.021	.146							
College Aspirations (X_6)			.310	.297		.254				
Occupational Aspirations (X_7)			.195		.059		.277			
Educational Attainment (X_8)			.360	.107		.094		.353		
Occupational Attainment (X_9)									.090	.640

Table 2. Model IA Path Coefficients (estimates with rho = 0 before the slash and estimates with rho free below the slas

Dependent Variables	SES (X_c)	I.Q. (X_a)	G.P.A. (X_1)	Parents' Educa. Encour. (X_2)	Parents' Occupa. Encour. (X_3)	Friend's College Aspir. (X_4)	Friend's Occupa. Aspir. (X_5)	Early College Aspir. (X_0)	College Aspir. (X_6)	Occupa. tional Aspir. (X_7)	Educa- tional Attain (X_8)
					Independent Variables						
G.P.A. (X_1)		.545/ .545									
Parents' Educational Encouragement (X_2)	.179/ .179	.187/ .187	.113/ .113								
Parents' Occupational Encouragement (X_3)	.123/ .123	.076/ .076	.063/ .063								
Friend's College Aspirations (X_4)	.058/ .058	.041/ .041	.088/ .088					.291/ .291			
Friend's Occupational Aspirations (X_5)	.106/ .106	.022/ .022	.145/ .145								
Early College Aspirations (X_0)	.179/ .179		.275/ .275	.363/ .363							
College Aspirations (X_6)			.153/ .044	.078/ -.063		.120/ .116		.600/ .956			
Occupational Aspirations (X_7)			.195/ .195		.059/ .059		.277/ .277				
Educational Attainment (X_8)			.361/ .361	.106/ .106		.094/ .094			.352/ .352		
Occupational Attainment (X_9)										.091/ .091	.640/ .640

Table 3. Model II and Model IIA Path Coefficients (Boys' coefficients before the slash, girls' coefficients after the slash)

	Model II	Model IIA: Solution with rho = 0	Model IIA: Solution with rho free
p_{1a} - I.Q. to Early Aspirations	---	.275/.258	.275/.258
p_{1c} - S.E.S. to Early Aspirations	---	.241/.248	.241/.248
p_{3d} - Friend I.Q. to Friend Early Aspirations	---	.286/.263	.286/.263
p_{3f} - Friend S.E.S. to Friend Early Aspirations	---	.280/.270	.280/.270
p_{2a} - I.Q. to Time 2 Aspirations	.205/.214	.099/.100	.183/.098
p_{2c} - S.E.S. to Time 2 Aspirations	.236/.229	.088/.082	.163/.085
p_{2f} - Friend S.E.S. to Time 2 Aspirations	-.052/.054	-.017/.032	.049/.031
p_{4c} - S.E.S. to Friend Time 2 Aspirations	-.017/-.01[illegible]	-.005/.011	.007/-.030
p_{4d} - Friend I.Q. to Friend Time 2 Aspirations	.237/.202	.090/.072	.052/.138
p_{4f} - Friend S.E.S. to Friend Time 2 Aspirations	.226/.149	.069/.039	.034/.107
p_{21} - Early Aspirations to Time 2 Aspirations	---	.614/.645	.296/.638
p_{24} - Friend Time 2 Aspirations to Time 2 Aspirations	.516/.355	.183/.153	.28[illegible]/.155
p_{42} - Time 2 Aspirations to Friend Time 2 Aspirations	.364/.534	.090/.148	.048/.214
p_{43} - Friend Early Aspirations to Friend Time 2 Aspirations	---	.664/.697	.794/.424

Appendix 1. Means, Standard Deviations and Pearsonian Correlation Coefficients for all Boys in the Follow-up Study with New Friends

	X_c	X_a	X_1	X_3	X_5	X_2	X_4	X_0	X_6	X_7	X_8	X_9
Parents' Socio-Economic Status (X_c)	1.000											
I.Q. (X_a)	.231	1.000										
G.P.A. (X_1)	.233	.546	1.000									
Parents' Occupational Encouragement (X_3)	.155	.140	.134	1.000								
Friend's Occupational Aspirations (X_5)	.145	.126	.182	.083	1.000							
Parents' Educational Encouragement (X_2)	.249	.290	.257	.380	.248	1.000						
Friend's College Plans (T_2)(X_4)	.184	.206	.243	.077	.551	.201	1.000					
Respondent's College Plans (T_1)(X_0)	.334	.356	.410	.212	.279	.478	.360	1.000				
Respondent's College Plans (T_2)(X_6)	.335	.377	.448	.198	.370	.428	.389	.744	1.000			
Respondent's Occupational Aspirations (X_7)	.183	.279	.253	.109	.317	.292	.258	.518	.470	1.000		
Respondent's Educational Attainment (X_8)	.331	.438	.569	.139	.304	.369	.340	.530	.596	.392	1.000	
Respondent's Occupational Attainment (X_9)	.280	.421	.424	.211	.233	.283	.268	.430	.451	.341	.675	1.000
Mean	4.55	105.0	2.02	2.52	1.64	2.72	1.20	1.27	1.17	1.60	6.27	479.7
Standard Deviation	2.25	12.40	0.75	0.80	0.98	0.59	0.88	0.83	0.88	0.99	1.22	141.5

Appendix 2. Means, Standard Deviation and Pearsonian Correlation Coefficients for Panel Members with New Friends (figures for boys before the slash and for girls after the slash)

	X_a	X_c	X_f	X_d	Y_2	Y_4	Y_1	Y_3
IQ (X_a)	1.000							
Socioeconomic Status (X_c)	.208/.233	1.000						
Friend's Socioeconomic Status (X_f)	.127/.184	.257/.273	1.000					
Friend's I.Q. (X_d)	.210/.250	.103/.142	.221/.210	1.000				
Educational Aspirations (T2) (Y_2)	.374/.382	.346/.376	.213/.273	.253/.222	1.000			
Friend's Educational Aspirations (T2) (Y_4)	.198/.264	.205/.266	.354/.334	.376/.347	.399/.445	1.000		
Educational Aspirations (T1) (Y_1)	.360/.341	.333/.343	.212/.232	.213/.195	.741/.772	.364/.374	1.000	
Friend's Educational Aspirations (T1) (Y_3)	.224/.242	.229/.287	.373/.348	.382/.338	.415/.404	.761/.792	.397/.348	1.000
Mean	104.7/104.6	4.49/4.29	4.46/4.27	104.5/105.3	1.15/1.06	1.20/1.08	1.27/1.12	1.23/1.13
Standard Deviation	12.34/11.99	2.23/2.22	2.20/2.18	12.71/11.31	0.88/0.90	0.88/0.89	0.84/0.90	0.87/0.91

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