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ABSTRACT

A causal model was developed to study teacher, student, and educational expectations. The substantive issue concerns the impact of teachers' expectations on students' expectations. The subjects, 6,032 high school students, were drawn from a major Canadian city in 1959. Variables include social origins, intellectual ability, program, academic achievement, teachers' expectations, and educational ambition. The model, a system of cause-effect relationships, is presented in block-recursive form. That is, the relationships among the blocks are recursive but reciprocal causation is possible within blocks. The parameters of the model were estimated via path analyses, a generalization of multiple regression to systems of causally related variables. Results of this study include three major findings: a) Students affect teachers much more than they are affected by the expectations teachers hold. b) The effect of teachers' expectations on student is negative. c) In general, teachers' expectations are irrelevant for girls, with the exception of the fourth year of high school, while, for boys, an early influence from students to teachers increase from year to year and the effects of teachers' expectations increased dramatically in the fourth year. A 51-item bibliography, tables, and figures are included. (MJM)

STUDENTS, TEACHERS, AND EDUCATIONAL EXPECTATIONS: RECIPROCAL EFFECTS AT THREE POINTS IN TIME.*

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The educational expectations of adolescents have received a good deal of attention over the past fifteen years. (See Kuvlesky and Reynolds, 1970.) Particular attention has been paid to the effects of social origins and intelligence on educational goals (for example, Sewell et al., 1957; Sewell and Shah, 1967), and to the effects of significant others' expectations as intervening variables. For the most part interest has centered on the effects of the expectations of parents (for example, Sewell and Shah, 1968; Kandel and Lesser, 1969) and peers (for example, McDill and Coleman, 1965; Duncan et al., 1968). As this suggests, reference group theory has provided a major theoretical orientation in the search for variables intervening between social origins and intelligence on the one hand, and the student's educational expectations on the other.

Oddly enough the influence of teachers as significant others is considered only occasionally. This appears somewhat paradoxical given that teachers are ideally situated to hold out expectations for the student's further education, and to serve as models in this respect. Moreover, they are obligated to some extent to do so. The importance of teachers as significant others for the student in the development of educational expectations is the focus of the research reported here.

While some thought has been given to how teachers might act as role models for upwardly mobile youth (Brookover, 1953; Gross, 1953; Brookover and Gottlieb, 1964) actual investigations are not common (Boocock, 1966:6). The following are among the more visible of these.

1. Dole (1964) and Breton and MacDonald (1967) show the proportion of students reporting teacher influence among that from other referents, and Herriott (1963) reports small seventeenth-order partials using analogous data.

2. Ellis and Lane (1963) found students, especially low SES students, reported teachers to be the most important non-family influence in the development of expectations.

3. Sewell et al. (1969) and Sewell et al. (1970) used student reports of parent, peer, and teacher expectations to create a "significant others influence" variable in their comprehensive status attainment model, but thereby obscured the effects of teachers. See, however, Sewell (1971: 798-800) in which he makes reference to later unpublished analyses in which this variable was decomposed, and which showed teachers to have a moderate influence at best.

4. Williams (1972) used analogous student report data in an attempt to get at the relative effects of parents, teachers, and peers. These data suggest that teachers have a moderate influence, variable between sexes and over time.

* Three individuals and one institution contributed materially to the completion of this project. David Nolle and Edward Aim of OISE were instrumental in both the initiation and completion of the work. The Department of Sociology in Education at OISE provided support. Steve Hunka, University of Alberta, was kind enough to make the ERS computer facilities available and so facilitated the final computations.

In addition to pointing up the restricted nature of our understanding of teacher influence in this respect, these investigations are illustrative of three problematic characteristics of the literature on educational expectations. First, the fairly general use of student report data, with the necessary assumption that the reports of significant others' expectations are not contaminated by the students own expectations. Second, the assumption that the socialization process in question is characterized by asymmetrical relationships, with the direction of influence from socializing agent to the student. Third, the reliance on cross-sectional data in making inferences about the process by which the observed variability in educational expectations is generated.

That these are problematic characteristics is illustrated by the following. Hauser (1971:124) demonstrates the probable consequences of contamination in student report data for an understanding of the magnitude of parental influence, and suggests the need for caution in using this type of data. On the second point, Haller (1967) provides evidence that students act to socialize teachers' speech patterns, and Duncan et al. (1968) show a reciprocal influence between students and their peers in terms of educational expectations. Finally, data presented by McDill and Coleman (1965) and by Williams (1972) suggest that the effects of significant others may change over time relative to other variables and to each other.

These considerations play an important part in shaping the causal model developed here to answer the main substantive question, that of the impact of teachers' expectations on the student's expectations.

The Model

The model developed here centers around the idea of a reciprocal influence relationship between teachers and students with respect to educational expectations. That is, the expectations students hold for their further education affect, and are affected by, the expectations teachers hold for them. This reciprocal relationship appears at three points within the model, each corresponding to a different grade level; years one, two, and four of high school.

The model was elaborated around this basic framework through the introduction of variables with established effects in this process. Reference to the literature cited above will document the theoretical and/or empirical basis for most of the causal relationships indicated in Figures 1 and 2. See "Variables" in the text for an explanation of the variables shown. This system of cause-effect relationships is presented in block-recursive form. (See Blalock, 1969:71-74.) That is, the relationships among the blocks are recursive but reciprocal causation is possible within blocks. Each block contains one reciprocal cause-effect relationship, that between teacher and student expectations, the variables in Block 1 are causes of those in Block 2, and those in Blocks 1 and 2 are causes of those in Block 3. Note, however, a single exception discussed below. Block 1 corresponds to the first year of high school, Block 2 to the second, and Block 3 to the fourth year.

Certain aspects of the model call for further comment. First, intellectual ability and social origins are shown as unmeasured variables X_Q and X_S, each with three indicators. In this sense the underlying theoretical construct is a cause of each of its indicators. This is a causal representation of factor analysis; see Blalock (1968:20), Duncan et al. (1968:129), Werts et al. (1971).

Second, three other unmeasured variables (X_C, X_B, and X_A) are included within the model and each has three indicators. Their particular structure results from a modification of a previous model in the light of the data. Originally and unmeasured "perceptions of significant others' expectations" variable was proposed using the student's report of his parents' and peers' expectations as indicators. This was considered as conceptually distinct from the student's report of his own expectations which were involved in the reciprocal influence relationship with teachers' expectations. Such a conceptual distinction was not supported by the data in that the variables correlated so highly as to be empirically indistinguishable. As a result, the student's reports of his parents', peers', and own expectations were taken to be indicators of an underlying construct "educational ambition". This might be thought of as a psychological support-motivation complex providing varying degrees of impetus toward post-secondary education. The reciprocal relationship between "educational ambition" and teachers' expectations at each of three points in time becomes, then, the major issue of the investigation.

Third, the anticipated effects on expectations of tracking students into two major programs of study led to the inclusion of <u>program</u> (X_{18}, X_{12}, and X_6) as a variable. This, for the reason that one program -- the "vocational" program -- was typically a four year terminal program. The other -- the "general" program -- provided for entry to some forms of post-secondary education after four years, or for entry to a fifth year of high school, the university entrance year.

A fourth matter concerns an exception to the general pattern of causation shown in Figures 1 and 2. If we were to allow for every possible cause-effect relationship possible under the terms of the model, unique estimates of the parameters would not be possible because the model would be under-identified. One way to overcome this problem is to assume that at least one potential cause of either of the variables in the reciprocal relationship in each block has a negligible effect. The most appealing assumption, and the one made here, is that teachers do not take the student's social origins into account in determining their expectations for him. That is, we assume that socioeconomic origins has no direct effect on teachers' expectations, in other words that $p_{16S} = p_{10S} = p_{4S} = 0$. Sewell (1971:800) notes support for this assumption, but there is some suggestion in Williams (1972) that these effects, though small, may be present and differ by sex, at least insofar as the students' reports of their teachers' expectations are concerned.

One final point: there is considerable precedent and some evidence that males and females should be treated separately as far as educational ambition is concerned. First, because educational ambition may have a

different meaning for each sex (Turner, 1964), and second, because of the likelihood of interaction effects between sex and other causes of variability in ambition (Sewell, 1971:804). In view of this, the basic model described above was quantified separately with data on each sex, as shown in Figures 1 and 2.

Quantification of the Model

A. Data

The subjects in question were drawn from the more than 16,000 students beginning high school in a major Canadian city in 1959. The 6032 (3161 males and 2871 females) who completed the first four years of high school in minimum time were selected from among these. Repeated measures in these students and their teachers were available for the first, second, and fourth years.

B. Variables

See MacEachern (1960), Brehaut (1964), and D'Oyley (1964) for details on the measuring instruments used. Brief descriptions of the variables used here follow.

(a) Social Origins (X_S) This unmeasured variable was indexed by three conventional indicators of socioeconomic status: (i) the student's report of his father's occupation (X_{21}) ordered into eight categories based on Blishen (1967); (ii) the student's report of his father's education (X_{20}) and his mother's education (X_{19}), each a five point scale ranging from "no secondary school" to "university degree".

(b) Intellectual Ability (X_Q) This, the second of the unmeasured exogenous variables was also indexed by three variables: (i) the CAAT I, a verbal reasoning test (X_{24}); (ii) the CAAT II, a mathematical reasoning test (X_{23}); (iii) the CAAT III, a nonverbal reasoning test (X_{22}). These are standardized tests (D'Oyley, 1964).

(c) Program (X_{18}, X_{12}, X_6) The variable is a dichotomy, "vocational/general" program.

(d) Academic Achievement (X_{17}, X_{11}, X_5) In each of the three panels the measure was the student's grade point average.

(e) Teachers' Expectations (X_{16}, X_{10}, X_4) In each case teachers within a school were asked to rate each student's chances of completing the fifth year of high school -- the university entrance year -- on a five point scale. They were asked to give a rating which would represent their combined judgements and, furthermore, to rate students in both programs of study on the same basis. These ratings were assumed to be indicators of the teachers' expectations for the student's post-secondary education.

(f) Educational Ambition (X_C, X_B, X_A) At each point in time this unmeasured variable was indexed by the student's report of his parents', peers', and his own expectations; respectively, X_{15}, X_{14}, X_{13}; X_9, X_8, X_7; and X_3, X_2, X_1. All were originally ordered on a seven point scale ranging from "leave school for a job" to "attend university". In the interest of producing ordinal scales each was subsequently reduced to a trichotomy with the following categories; "no plans for post-secondary education", "plans for a non-university education", and "plans to attend university".

C. Method

The parameters of the model were estimated via path analysis, a generalization of multiple regression to systems of causally related variables. Wright (1934), Wright (1954), Duncan (1966), Land (1969), Heise (1969), and Blalock (1971) are basic references. The particular estimation

procedures used here to deal with the added complications of unmeasured variables and reciprocal causation follow those outlined in Duncan et al. (1968) or are minor extensions thereof. In this context see also Wright (1960a), Land (1970), Hauser and Goldberger (1971), and Blalock (1971).

D. Issues in Measurement and Estimation

A variety of measurement and estimation problems stem from the nature of the model, from characteristics of these data, and from the estimation procedures used. A number of these have been considered elsewhere in connection with a similar model and related data (Williams, 1972); specifically, parametric statistics and ordinal measurement, the effects of differential non-response, panel mortality and backward selection, interpretation via standardized and/or unstandardized path coefficients, autocorrelated errors, and the confounding of differential measurement error and societal level change with individual level change.

Consider the data themselves. The use of parametric statistics with measures that are largely ordinal seems not to constitute a major problem (Labovitz, 1967; Labovitz, 1970; Boyle, 1970) but the matter of differential non-response over time is in need of comment. Table 1 shows how a very respectable response rate in the first two years of the study drops sharply in the final year. The influence of this on the effect estimates in the final panel is not clear, and may even be negligible as a function of the statistics used (Hauser, 1971:39). Nevertheless, the potential for bias cannot be ignored. Note too that the combination of student attrition over time and a panel design necessitates the backward selection of subjects, and hence restricts the generality of the interpretations to those students who complete high school in minimum time.

The use of lagged endogenous variables within the model poses a more fundamental problem, a function of the probable violation of the assumption about the independence of disturbance terms. Blalock (1969), Heise (1970), and Miller (1971) discuss this point and cite the econometric literature on autocorrelated disturbances in time series data where the matter is treated at length. The effect of having both lagged endogenous variables and autocorrelated disturbances is to bias the estimates of model parameters (Johnson, 1963:215) such that the assignment of a precise quantitative meaning to each path coefficient would not be justified.

Another source of bias resides in the estimation techniques used in connection with the unmeasured variables. These involved somewhat arbitrary averaging procedures where more than one estimate of a relationship was possible. For example, with the three indicators of the unmeasured variable X_C there are two estimates of p_{C15}, p_{C14}, p_{C13}, and similarly for the indicators of X_Q, X_S, X_B, and X_A. Estimation of the correlations between measured and unmeasured variables involved similar averaging procedures with as many as twelve estimates in some cases. Hauser and Goldberger (1971) show that more complex estimating procedures utilize the data more efficiently and can produce estimates that lie outside the range of those produced, and averaged, here. But as these authors note (Hauser and Goldberger, 1971:84) the greater effort may not always be warranted unless the variables are measured with considerable precision.

In the first instance, the estimates of model parameters made were path coefficients, the standardized effect parameters. This, because in systems incorporating unmeasured variables, working with the variables in standard

form allows of a simpler algebraic treatment (Wright, 1960b; Duncan, 1971:138). However, there are a number of arguments pointing to the restricted usefulness of path coefficients compared with the unstandardized path regressions (Tukey, 1954; Turner and Stevens, 1959; Blalock, 1967). These arguments are particularly important here not only because of the broader issue of generalization to other populations with differing variances, but also because the particular sample variances used here in standardizing the variables may differ between panels within sexes, and between sexes within panels. And, in fact, they do in a number of cases. That is, because the path coefficients are a function of the standard deviations of the two variables involved, and because these differ between panels and/or sexes in some cases, comparisons between sexes and panels are more properly made using the unstandardized path regressions. (See Bohrnstedt, 1969). Table 3 presents these path regressions. In the interpretation of the system path coefficients and path regressions are considered complementary concepts as Wright (1960b) suggests.

Some further problems arise in this context if one wishes to interpret differences in analogous path regressions between panels as individual level change. First, because the research design does not allow one to separate the effects due to cultural change, or at least the possibility of these effects, from those due to individual level change (Schaie, 1971). Second, because it is difficult to separate the effects of variable measurement error from change, and because this is likely to be large in relation to change (Coleman, 1968; Blalock, 1969).

On the surface it seems that the meaning of the research reported here is qualified out of existence. However, it also seems that an explicit statement of assumptions met and unmet does not necessarily invalidate one's interpretations any more than a failure to consider them validates such conclusions. Clearly, one must hold some strong reservations about the quantitative accuracy of the effect parameters shown. Nevertheless, it does seem defensible to assign a qualitative meaning to the path coefficients and path regressions (Heise, 1970:26).

E. Results

Table 1 presents the correlations among the observed variables, the basic data from which the model parameters were estimated. All variables were standardized to a mean of zero and a standard deviation of one prior to computing the correlations, each of which is based on all cases for which values were present for both variables. Thus, each correlation is based on a slightly different number of cases. Table 1 also indicates the non-response rate for each variable.

Table 1

Table 2 presents the path coefficients (standardized effect parameters) that characterize the models for males and females. Those path coefficients relating to the indicators of the unmeasured variables and their residuals are not shown in the table but can be seen in Figures 1 and 2.

Table 2

Table 3 contains the path regressions (unstandardized effect parameters) for each model and is the analogue of Table 2.

Table 3

Figures 1 and 2 show the basic model by sex in block-recursive form. The only effects shown are those within blocks, and these are path coefficients taken from Table 2. The combined information in Tables 1 and 2 and Figures 1 and 2 specifies the models completely, and forms the basis for the discussion which follows.

Figures 1 and 2

Discussion

The results shown above provide four basic types of information: (i) the relative effects of variables within blocks; (ii) changes in the magnitudes of these effects over time; (iii) broader patterns of effects that may suggest underlying social processes not explicit in the model; and (iv) sex differences in all of these. Note that the interpretation of the results in these terms must utilize both standardized and unstandardized effect parameters in the ways discussed above, and should assign only a qualitative meaning to these parameters.

Consider first the major relationship of interest, the hypothesized mutual influence relationship in which teachers' expectations for the student affect, and are affected by, the student's own educational ambition. Figure 1, the model for males, shows two things clearly: the effect of students on teachers is positive and greater than the negative effect of teachers on students, at each point in time. The situation for females appears analogous to this (see Figure 2) with the exception that the relative effects are equal and the signs reversed in Block 2. The significance of this exception is doubtful in view of the size of the effects involved.

With the same relationship in mind, consider changes over time. The information in Table 3 points to a substantial increase in the effect of boys' educational ambition on the expectations that teachers hold throughout high school (from .10 to .98). The effect of teachers is minor and constant in the first two years but increases substantially in the fourth year to -.41. The case for girls is less clear-cut but basically similar. Note, however, that teacher effects on girls' ambitions never assume much influence at any time, whereas the effects of students on teachers decrease from year one (.17) to year two (-.02) then pick up again in year four (.33).

As far as sex differences are concerned, the influence due to teachers is roughly similar in years one and two but a substantial difference in favor of boys appears in year four (-.41 vs. -.06). With the exception of the first year of high school, the effect of the student's ambitions on the expectations of their teachers is always substantially greater in the case of boys (.24 vs. -.02 in year two, and .98 vs. .33 in year four).

Some preliminary comments on the meaning of these results seem possible at this point. In general, teachers do not appear to act as an important reference figure for students' educational ambitions. This seems true throughout the whole of high school as far as girls are concerned, and for all except the latter part of high school for boys. Moreover, the effects of teachers' expectations are negative, serving to lower the expectations of students as a whole, although to a relatively minor degree.

On the other hand, the ambition of students -- the support that the student has, or thinks he has, from parents, peers, and self -- contributes quite substantially to the expectations that teachers hold, especially in the fourth year of high school when the matter is particularly salient for all. In other words, the higher a student's own ambition, the higher the expectations teachers hold for him, other things being equal. The net result of this reciprocal influence within the context defined by this model, is a dampening effect on the variability in students' ambitions.

It remains to consider the other relationships within the model, and thence, to broaden this interpretation. The complexity of the model, the sheer number of cause-effect relationships, and the relative familiarity of the subject matter, suggests that a note on the more important aspects of the model would be in the interests of clarity and parsimony.

Consider first, Block 1 in the model. The pattern of relative effects early in high school is similar for males and females. Program has a substantial effect on ambition, along with lesser effects due to intellectual ability, social origins, and academic achievement. Note the greater influence of social origins on ambition for girls (.27 vs. .16), a matter noted elsewhere (Williams, 1972) and argued to be a function of SES differentials in the value placed on an extended education for girls.

In the same year, the principal cause of variation in academic achievement is ability. The relative effect of social origins is small (but remember that this is a select population) and a negative effect of program probably reflects the different bases on which grades are assigned in different programs. The causes of teachers' expectations are much as one would anticipate; in order of relative importance, grades and ability.

Block 2 in each of Figures 1 and 2 represents the second year, and second panel, of the study. Effects on these variables that originate in Block 1 are not shown but can be determined from Tables 2 and 3. Program in year two (X_{12}) is determined principally by program in year one, but with effects due to ambition, and to some extent grades (for boys). In other words, there is some re-sorting of students according to ambition and performance, but not much. The zero-order correlations between program in the two years are .87 and .81 for boys and girls respectively.

The pattern of causation underlying grades in year two is essentially the same in each sex, although the magnitudes of some effects differ; for example, ability, social origins, program in year one, ambition. There is an apparently anomalous negative effect of program on grades, but again this could be seen as a function of different grading practices in each of the two programs,

Sex differences in the pattern of causes affecting the student's ambition (X_B) are also minimal, the major effects in question being due to earlier ambition (X_C) and current program of study (X_{12}). Teachers' expectations

are subject to a variety of effects, in order of relative importance, performance, ambition, and earlier expectations. Sex differences in the remaining effects appear in the greater effect of program on teachers' expectations for girls.

In Block 3, the third panel and fourth year of high school, essentially the same thing is happening as far as program and performance are concerned, and sex differences in the patterns of relative effects are minimal. There are, however, sex differences as far as some of the path regressions connected with performance are concerned. The meaning of these differences is less than clear, if real.

Fairly substantial sex differences are apparent, however, in the pattern of effects underlying variability in teachers' expectations in year four, and in the magnitudes of specific effects. In the model for boys, the major effect is due to the student's ambition at this time, and in line with previous years, school performance and ability exert an influence. Among the other causes the most important are two negative effects, one from program in year four (-.23) and one from ambition in year two (-.38). The substantive meaning of these is not clear to say the least. Few would want to argue for the reality of these effects in terms of any existing theory of behavior; for example, with all else equal, teachers hold out the highest expectations for students in non-academic programs? This might be explained in terms of the excessive collinearity between program at each point in time -- all three correlations are greater than .8. If one accepts this, and the twin implications that it was unwise to use all three program variables in the first place, together with the idea that other effects (both anomalous and explainable) are also statistical artifacts to some extent, then one is led to the following conclusion. While models of this complexity may do justice to the complex nature of social processes, the problems encountered in estimating the parameters can impose some limitations on their usefulness.

Where girls are concerned, teachers are effected most by the student's performance, by concurrent ambition, negatively by ambition in year two, and by current program of study. In other words, where the over-riding effect for boys' teachers is the wishes of the student himself, performance for girls has roughly equal weight.

The patterns of direct effects on the students' ambitions at this time are basically similar for boys and girls. The greatest effect is previous ambition, followed by effects due to grades and program, and teachers' expectations. Note here the sex difference in effects from teachers' expectations (-.41 vs. -.06).

Summary

It remains to draw this information together to create a coherent, and reasonably parsimonious, statement about the social processes that the model is taken to represent. The patterns of cause and effect in the model, aside from the reciprocal relationship between teacher and student, contain few surprises, and several anomalous effects. Teachers are effected by performance in school and by the student's ability in the development of their expectations about his further education. And assumed not to be effected by his social origins. Students, in the development of their ambitions, are effected by their program of study, by their social origins, by their

ability, by their academic achievement. Sex differences and changes over time along these dimensions seem to follow no consistent pattern that would suggest an underlying social process at work.

This, however, is the matrix in which the central issue of the investigation is embedded. The major focus of the research was on the reciprocal effects of teacher on student, student on teacher, in terms of expectations/ambitions for post-secondary education. In brief, three major points emerge in this connection.

First, the predominant direction of socialization influence in teacher-student relationships, with respect to educational expectations, appears to be opposite to that of traditional arguments. Students affect teachers much more than they are effected by the expectations teachers hold.

Second, the effect of teachers' expectations on students is negative. In other words, the system contains negative feedback. What this means for the students' ambitions is that teacher-student interaction tends to dampen the combined effects of other causes of ambition (as defined within this system).

Third, sex and over-time differences in the magnitudes of the effects point to an expected increase in the saliency of the decision, but also point to a belief in the greater saliency of the decision for boys. In general, teachers' expectations are irrelevant for girls, and with the exception of the critical fourth year of high school, the reverse is also true. Not so for boys, where an early influence from students to teachers increases from year to year, and where the effects of teachers' expectations increase dramatically in the fourth year. These differences are argued to be a reflection of sex differentials in the value placed on an extended education, a result of the occupational implications of the decision, and the sex-role typing that proscribes a limited occupational career for women.

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Table 1: Correlation Matrices and Nonresponse, Males and Females (males above diagonal)

	X_{24}	X_{23}	X_{22}	X_{21}	X_{20}	X_{19}	X_{18}	X_{17}	X_{16}	X_{15}	X_{14}	X_{13}	X_{12}	X_{11}	X_{10}	X_{9}	X_{8}	X_{7}	X_{6}	X_{5}	X_{4}	X_{3}	X_{2}	X_{1}
X_{24}		.59	.43	.24	.21	.21	.40	.37	.44	.35	.27	.36	.43	.35	.39	.34	.31	.36	.43	.29	.44	.33	.32	.35
X_{23}	.59		.54	.17	.18	.16	.34	.38	.42	.29	.24	.30	.37	.36	.36	.31	.26	.32	.37	.30	.42	.32	.27	.33
X_{22}	.41	.51		.10	.13	.10	.22	.31	.34	.22	.18	.22	.26	.26	.28	.25	.20	.24	.26	.20	.31	.24	.19	.24
X_{21}	.21	.16	.10		.57	.45	.27	.11	.13	.28	.22	.26	.28	.09	.14	.26	.26	.26	.27	.09	.16	.25	.24	.27
X_{20}	.22	.18	.10	.57		.59	.21	.13	.16	.23	.20	.22	.21	.11	.15	.24	.21	.23	.21	.11	.17	.21	.19	.21
X_{19}	.22	.15	.07	.42	.57		.22	.13	.16	.22	.21	.22	.20	.10	.13	.23	.20	.23	.20	.11	.16	.21	.18	.21
X_{18}	.34	.28	.17	.26	.24	.25		.15	.31	.58	.47	.58	.87	.17	.29	.56	.54	.55	.80	.05	.34	.58	.61	.58
X_{17}	.42	.41	.30	.10	.12	.12	.11		.61	.21	.19	.21	.29	.68	.56	.29	.25	.30	.31	.51	.48	.27	.19	.27
X_{16}	.49	.45	.31	.16	.17	.17	.27	.60		.28	.25	.30	.38	.51	.52	.32	.31	.36	.37	.41	.47	.30	.26	.33
X_{15}	.39	.29	.18	.32	.36	.32	.64	.23	.33		.53	.86	.61	.19	.25	.66	.48	.63	.59	.11	.27	.54	.45	.51
X_{14}	.28	.21	.13	.25	.26	.25	.50	.18	.25	.59		.57	.48	.14	.23	.44	.53	.47	.46	.10	.23	.38	.45	.43
X_{13}	.40	.31	.19	.30	.36	.31	.63	.24	.34	.91	.60		.61	.19	.27	.62	.50	.65	.59	.12	.29	.53	.50	.55
X_{12}	.41	.36	.23	.26	.27	.25	.81	.25	.38	.66	.52	.66		.20	.34	.63	.59	.61	.93	.06	.38	.59	.64	.61
X_{11}	.42	.38	.26	.09	.10	.13	.08	.70	.54	.15	.11	.16	.11		.64	.24	.21	.28	.22	.69	.53	.26	.19	.30
X_{10}	.40	.39	.28	.14	.14	.14	.22	.56	.54	.27	.22	.28	.33	.60		.32	.29	.35	.33	.49	.50	.32	.30	.35
X_{9}	.42	.35	.23	.32	.35	.30	.62	.33	.40	.75	.52	.74	.76	.23	.37		.57	.88	.61	.12	.32	.60	.49	.59
X_{8}	.34	.29	.17	.28	.29	.26	.59	.26	.33	.56	.55	.59	.66	.21	.30	.64		.61	.56	.15	.30	.47	.59	.52
X_{7}	.42	.34	.22	.31	.34	.29	.60	.34	.40	.71	.50	.74	.73	.26	.37	.89	.66		.61	.17	.35	.60	.51	.62
X_{6}	.39	.33	.23	.26	.25	.23	.69	.29	.38	.59	.45	.61	.89	.14	.34	.72	.61	.69		.05	.35	.58	.63	.59
X_{5}	.32	.31	.21	.06	.09	.10	-.05	.55	.40	.05	.03	.04	-.05	.73	.42	.08	.09	.09	-.08		.56	.20	.12	.26
X_{4}	.48	.44	.28	.20	.19	.20	.35	.50	.53	.34	.29	.37	.40	.54	.50	.40	.36	.39	.40	.53		.35	.33	.39
X_{3}	.39	.35	.22	.34	.37	.34	.65	.30	.37	.67	.52	.69	.71	.28	.32	.75	.62	.73	.69	.14	.41		.59	.83
X_{2}	.41	.37	.19	.33	.33	.29	.72	.25	.37	.64	.56	.64	.78	.23	.34	.67	.69	.67	.72	.07	.40	.67		.65
X_{1}	.41	.36	.20	.35	.36	.33	.64	.33	.39	.66	.52	.68	.71	.30	.36	.74	.62	.76	.70	.17	.42	.89	.70	
Percent Nonresponse																								
Males	3	3	3	19	18	18	3	12	3	17	26	13	5	6	8	13	21	13	5	3	29	34	38	34
Females	3	3	2	19	18	14	2	12	3	18	26	15	7	5	8	16	22	17	4	3	31	37	38	38

Table 2: Path Coefficients for Figures 1 and 2, Males and Females (figures for males on top line)

Dependent Variable (effect)	Independent Variables (causes)														Residual
	X_Q	X_S	X_{18}	X_{17}	X_{16}	X_C	X_{12}	X_{11}	X_{10}	X_B	X_6	X_5	X_4	X_A	
X_{17}	.50	.04	-.08												.87
	.55	.03	-.10												.85
X_{16}	.26		.06	.45		.09									.73
	.29		.01	.41		.16									.73
X_C	.14	.16	.56	.10	-.05										.82
	.10	.27	.58	.14	-.05										.63
X_{12}	.02	-.02	.72	.11	.03	.18									.45
	.08	-.02	.59	.05	.05	.26									.52
X_{11}	.11	-.02	.23	.60	.12	.03	-.30								.70
	.17	.04	.14	.56	.18	-.03	-.28								.67
X_{10}	.08		.06	.09	.13	-.10	-.01	.43		.23					.71
	.09		-.08	.12	.15	.03	.22	.37		-.02					.73
X_B	.01	.06	-.04	.04	.04	.58	.32	.09	-.06						.57
	-.02	.06	-.09	.03	.00	.54	.48	.10	.02						.36
X_6	.03	.01	-.05	.02	.03	.02	.92	.02	.01	.04					.35
	.00	.01	-.07	.04	.01	-.09	.82	-.04	.02	.20					.44
X_5	.08	.06	-.03	.05	.05	.06	.08	.58	.07	-.02	-.26				.70
	.12	.06	.02	.12	.02	-.05	.07	.60	-.00	.06	-.36				.64
X_4	.20		-.14	.07	.07	-.09	.19	.05	.05	-.38	-.23	.24		.91	.82
	.12		.05	.03	.12	,09	-.02	-.01	.11	-.29	.19	.38		.31	.69
X_A	.16	.02	.23	-.04	-.03	-.01	.09	.02	.08	.52	.15	.28	-.44		.37
	.00	.10	.17	-.07	.00	.09	.02	.12	-.03	.52	.22	.09	-.07		.26

Table 3: Path Regressions for Figures 1 and 2, Males and Females (figures for males on top line)

Dependent Variable (effect)	Independent Variables (causes)													
	X_Q	X_S	X_{18}	X_{17}	X_{16}	X_C	X_{12}	X_{11}	X_{10}	X_B	X_6	X_5	X_4	X_A
X_{17}	4.00	.33	-1.50											
	4.45	.26	-1.98											
X_{16}	.29		.17	.06		.10								
	.32		.03	.06		.17								
X_C	.14	.16	1.40	.01	-.04									
	.10	.27	1.41	.02	-.05									
X_{12}	.01	-.01	.76	.01	.01	.07								
	.04	-.01	.64	.00	.02	.11								
X_{11}	.83	-.14	4.45	.59	.88	.22	-5.21							
	1.36	.31	2.75	.56	1.28	-.24	-5.07							
X_{10}	.08		.15	.01	.13	-.11	-.02	.06		.24				
	.11		-.21	.02	.15	.04	.55	.05		-.02				
X_B	.01	.06	-.10	.01	.04	.58	.76	.01	-.06					
	-.02	.06	-.22	.00	.00	.54	1.08	.01	.02					
X_6	.01	.00	-.05	.00	-.01	.01	.91	.00	-.00	.02				
	.00	.00	-.07	.00	.00	-.04	.81	-.00	.01	.09				
X_5	.77	.55	-.70	.06	.45	.54	1.70	.69	.63	-.22	-5.94			
	1.05	.52	.37	.13	.13	-.42	1.37	.68	-.04	.50	-7.40			
X_4	.21		-.38	.01	.07	-.09	.49	.01	.05	-.41	-.61	.03		.98
	.13		.13	.00	.12	.10	-.05	-.00	.10	-.32	.49	.05		.33
X_A	.16	.02	.58	-.00	-.03	-.01	.22	.00	.07	.52	.35	.03	-.41	
	.00	.10	.40	-.01	.00	.09	.05	.02	-.02	.52	.51	.01	-.06	

FIGURE 1: Path Model for Males showing Path Coefficients Within Blocks

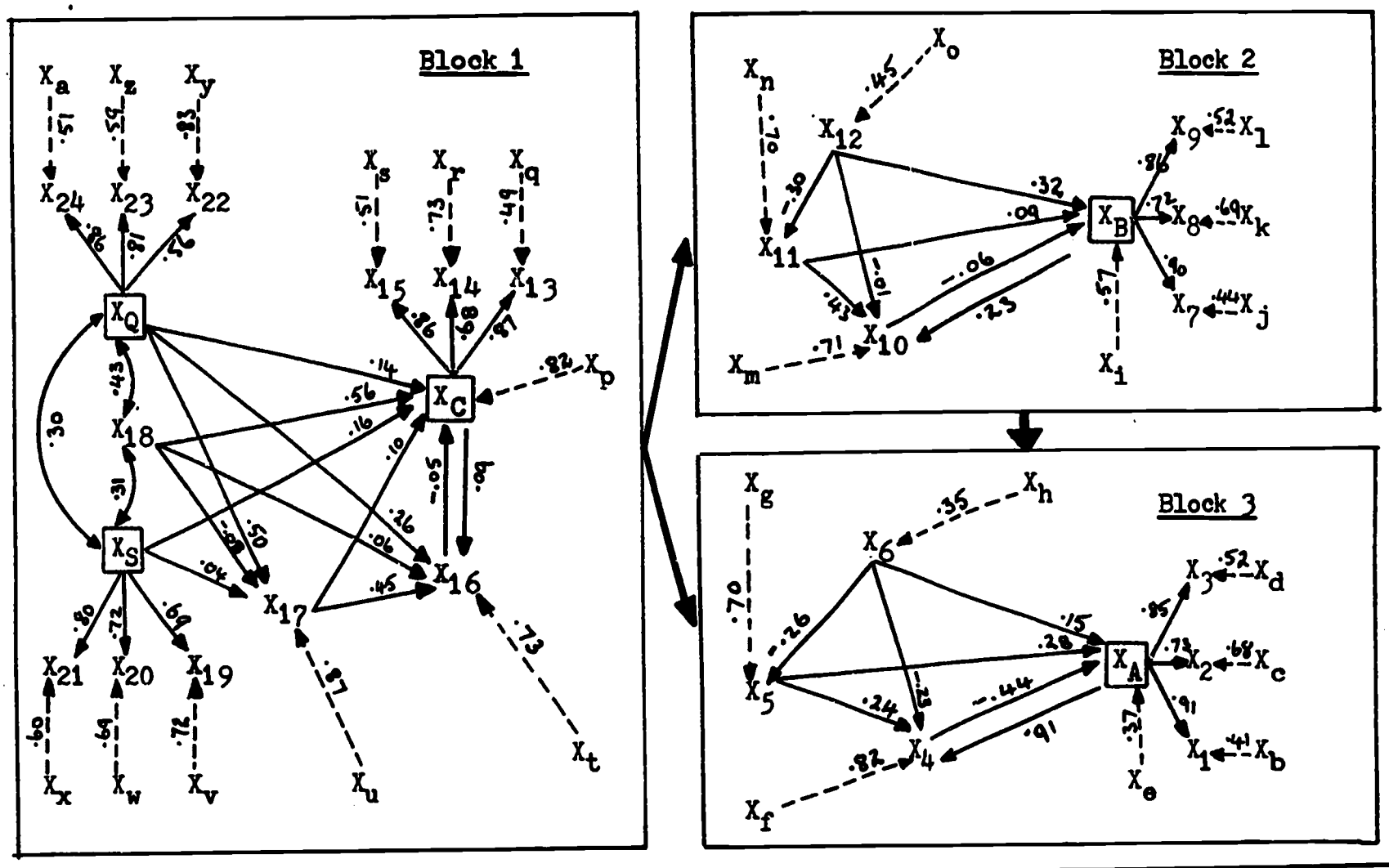

FIGURE 2: Path Model for Females showing Path Coefficients Within Blocks.