LONGITUDINAL AND EXPERIMENTAL PERSPECTIVES ON

THE SOCIAL PSYCHOLOGY OF SOCIOECONOMIC ATTAINMENT

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ABSTRACT

Longitudinal and Experimental Perspectives on

the Social Psychology of Socioeconomic Attainment

CHARLES F. TURNER

This research was undertaken to expand our understanding of the role

psychological factors play in the process of socioeconomic attainment.

PART I: The first phase of this research used the structural equation

models of Blau and Duncan (1967) as a point of departure and attempted to

answer four questions: (1) Do such models provide an adequate description

of the process of attainment in Great Britain? (2) To what extent is the

process of attainment influenced by individual variations in human

personality? (3) Do personality variables mediate the transmission of

social and economic inequality from generation to generation? (4) And

finally, does socioeconomic attainment, itself, have an influence upon

the development of adult personality?

Data from a longitudinal study of British males (interviewed at ages

13, 24, 28, and 32) provided the basis for this research. Analyses of

these data suggested that past applications of the Blau-Duncan model to

Britain have obscured important differences between the U.S.A. and U.K.

in the structure of socioeconomic attainment and the functioning of their

respective educational systems. In particular, it was found that a

technically adequate representation of the process of status attainment

in Great Britain required the incorporation of substantively meaningful,

non-additive effects of schooling upon subsequent attainment. It is

suggested that these non-additive effects reflect a historical adaptation

of the British educational system to the different training requirements of manual and non-manual occupations.

It was also found that inclusion of personality variables in modified Blau-Duncan models significantly increased our ability to account for variations in educational, occupational and income attainment. Of the four personality variables (Neuroticism, Achievement Orientation, Introversion, and Conservatism) included in these analyses, Introversion had the strongest overall influence upon attainment. No evidence was found that personality variables transmitted status inequality from parents to offspring. We did, however, find that socioeconomic attainment had a significant influence upon adult personality development, particularly upon vulnerability to depression.

PART II: Following Heider's dictum that the "naive psychology" of the individual is central to an understanding of social behavior, the second phase of this research attempted to determine whether ascriptive biases in the "naive psychology" of important organizational gatekeepers, e.g., personnel administrators, could account for the findings of our longitudinal study.

An experiment was conducted using representative samples of British and American personnel managers as subjects (N=2024). A computerized procedure was employed to generate bogus resumes describing workers seeking employment; eight variables were experimentally manipulated in the construction of the resumes (ascribed gender, IQ, education, social class of origin, introversion, achievement orientation, social conservatism, and machiavellianism). The univariate distribution of each experimental variable was matched to the variable's actual distribution in the national

labor force. Subjects received resumes describing job seekers and were required to select appropriate occupations and salary levels.

Models of socioeconomic attainment used in the longitudinal analyses were re-estimated using the judgment data generated by the experiment. Several types of complete and partial correspondences in estimates were observed. Most importantly, analyses revealed that: (1) other things being equal, personnel managers' placement decisions are significantly biased against workers from low status (family) backgrounds; this bias was identical in magnitude to estimates of the coefficient representing the intergenerational transmission of status in our longitudinal analyses; (2) the personality characteristics of workers cause them to be placed into different types of occupations and into different levels of occupation within a given type; the magnitude of this influence was modest but consistently significant; and (3) the occupational placement and compensation decisions of personnel managers are subject to significant sex biases; the magnitude of these biases was sufficient to explain, within the limits of sampling error, both the sex segregation of the labor force and a major portion of the income disparity between male and female workers.

At a general level, we argue that the foregoing results demonstrate the need for theories of social and economic attainment to take account of not only individual variations in the psychology of workers but also the social psychology of the organizations and individuals who <u>control</u> access and advancement in the occupational marketplace.

Chapter One

TOWARD THE SOCIAL PSYCHOLOGICAL STUDY OF SOCIOECONOMIC ATTAINMENT:

a brief introduction.

"Tout l'individuel est déjà social, mais à des
niveaux successifs de sorte que l'intériorité
reproduit et contribue ainsi à produire les
profundeurs de la vie social."

-H. Lefebvre
"Psychologie des classes sociales"
in G. Gurvich (Ed.) Traite de sociologie
vol. 2, 1968

This dissertation deals with socioeconomic attainment. That is to say, it involves a study of the process by which individuals obtain valued educational and occupational statuses and monetary income.

In recent years, this topic has provided a major focus for research by American sociologists. The decade since the appearance of Blau and Duncan's (1967) seminal volume, The American Occupational Structure, has seen the publication of a large and constantly growing literature on status and income attainment. In 1976, for example, over 20 percent of the articles published by the American Sociological Review[1] cited Blau and Duncan's pioneering attempt "to present a systematic analysis of the American occupational structure, and thus, of the major foundation of the stratification system in our society (1967, p. 1)."

Although the present work will draw heavily upon the substantative and methodological contributions developed in this literature on the sociology of attainment, our aims are somewhat different. We do not intend to undertake the analysis of a national occupational structure as an end in itself. Rather, we wish to improve our understanding of the interrelationship between the sociology of occupational and income attainment and the psychology of human personality development. As such, the present study may be properly characterized as social psychological.

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[1] The American Sociological Review is the major research journal published by the American Sociological Association. Our citation count (12 of 56) excluded citations in the "comment and reply" section of the journal.

We will use two complementary research strategies in our studies:
(1) descriptive, longitudinal analysis of the interrelation between
psychological development and status attainment; and (2) experimental
simulation of causal mechanisms thought to produce observed relationships
between attainment and psychological development.

The Longitudinal Perspective: a brief summary

While considerable advances have been made in modeling the influence
of sociological variables upon status attainment, the role of psychological
factors in this process has not been extensively explored. Although, some
attempts (e.g., Duncan et al., 1972) have been made to fill this gap in our
understanding, the use of cross-sectional data has detracted from the causal
interpretation of much of this work. For example, Duncan et al's reanalysis
of data[2] on social mobility and achievement motivation requires us to assume
that the covariation of "need for achievement" (N-ach) measured in adulthood
and contemporaneous reports of occupational attainment result from the
antecedent effects of the achievement motive upon real-world attainment,
that is,
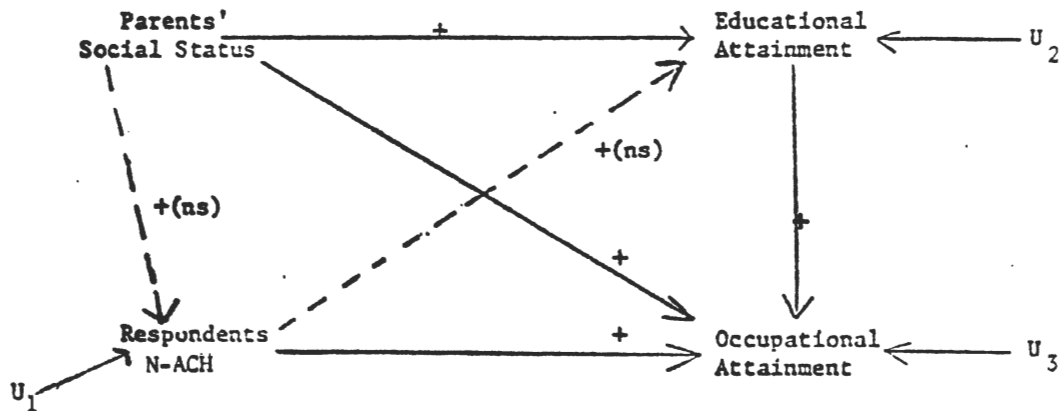
(Where U_i terms represent the other, unmeasured determinants of attainment.)

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[2]Originally reported by Crockett (1962)

However, as Duncan et al recognize but cannot remedy, an equally plausible
interpretation of these data would be that a past history of social attainment
increases an individual's tendency to view ambiguous situations in an achievement-
oriented manner, that is,
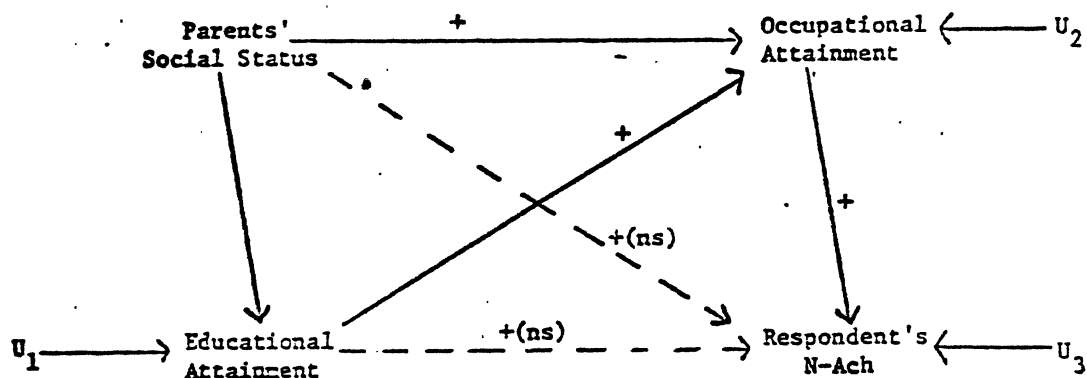
This inferential problem is not unique to the case of "achievement

motivation." Identical problems of causal interpretation arise for other

psychological variables derived from cross-sectional studies, and analogous

causal indeterminancies are encountered when synthetic cohort data are used

to construct social-psychological models of attainment (e.g., Kerckhoff, 1974).

In contrast, longitudinal research incorporating preattainment measures of

psychological variables is not subject to such causal indeterminance. The only

published analysis of this type employing a multi-causal model is Sewell and

Hauser's (1975) study of a cohort of Wisconsin men who were high school seniors

in 1957 and who were re-interviewed in 1964. While this research was remarkable

for its coverage of the population (N = 4338, reinterviewed) and the comprehensive

income data obtained from official records, the breadth of its coverage of the

psychological domain was limited to self-reported occupational aspirations and

information on the influence of teachers, parents and friends upon college

planning. Explicit measures of other attitude and personality variables were

not included in the Wisconsin database, and--except for IQ--no psychological measurements were available prior to twelfth grade.[3] In contrast, the psychological literature contains a number of _developmental_ studies which meet the requirement of broad coverage of personality and attitudinal variables in childhood and early adolescence, e.g., the Berkeley guidance and human development studies (Jones et al., 1972). These studies, however, are inappropriate for our purposes because the samples were quite small and unsystematically selected.

Although the deficiencies of previous research are relatively easy to catalogue, they are considerably more difficult to remedy. The burdens of longitudinal research of the type necessary to construct an adequate model of the social psychology of attainment are considerable, and well beyond the scope of the present dissertation. Fortunately, a practical alternative exists.

Data appropriate to our substantative interests have been collected in a longitudinal study of London schoolboys (N = 614, 73 percent reinterviewed at age 24) begun as an ancillary to the British National Mobility Survey (Glass, 1954, pp. 141-159; Himmelweit & Swift, 1971). Through the generosity of the principal investigator,   H. T. Himmelweit, data from this study were obtained for secondary analysis. These data are uniquely suited to the social psychological study of attainment. Most importantly, this database includes

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[3]This characterization is also true of one other study we recently discovered (Otto, 1976) which uses a smaller (N = 340) longitudinal sample to study the effects of adolescent "social integration" upon adult attainment. "Social Integration" is measured as participation (or non-participation) in 14 high school extra-curricular activities.

comprehensive social background and educational information (from home interviews and school records), a measure of cognitive ability (IQ), a rich variety of information upon attitudes and personality in both early adolescence and adulthood, as well as complete occupational histories including measurements at age 24, 28, and 32.

Using these data we propose to seek answers to the following questions:

(1) What contribution does the addition of adolescent attitude and personality variables make to the explanation of variations in adult attainment?

(2) To what extent do personality and attitudes serve as mediators in the social process by which status is transmitted from parents to children?

(3) Lastly, what are the contributions of social background, childhood personality (& attitudes), adult socioeconomic attainment to the shaping of adult personality and attitudes?

The Experimental Perspective: a brief summary

Although the multi-causal analyses of longitudinal data is appropriate for charting the influence of personality and status variables upon attainment, it does not identify the real-world mechanisms through which such causal influence is transmitted. Thus, such research is mute to a type of question which asks, for example, "How is it that extroverts gain an advantage in the job market over their introverted colleagues of similar intelligence, education, and ability?" Although such questions are basic to our understanding of the relationship of individual psychology to societal structure and functioning, they have not previously been the subject of experimental social psychological analysis. Such analysis, however, is not infeasible.

One plausible approach to such questions is to study experimentally those microsocial situations which serve a "gatekeeping" function by controlling

access to real-world attainments. To the extent that such situations provide a stage upon which psychological variables can influence status passage, they may offer concrete (micro-social) explanations of how causal influences documented (at the macro-social level) by our survey analyses are transmitted through the social system. So, for example, a number of plausible hypotheses may be invoked to explain the influence of personality and status variables upon occupational attainment. Proceeding with our examplary variable-- extroversion--we may posit any (or all) of the following causal mechanisms to account for our survey findings:

1) extroverts evidence greater achievement because organizational "gatekeepers" (e.g., personnel managers and employment interviewers) generally believe such men to be more qualified for high-status positions than introverts with similar qualifications

2) or, in interview situations[4] such men may be more effective in displaying their competencies, and thus have a higher probability of securing a given position than similarly-qualified introverts.

3) or, within a given occupational setting, extroverts may be perceived as more meritorious of advancement on the basis of their behavior in the work group;

4) or finally, there may simply be differential tendencies for extroverts and introverts to obtain information concerning job opportunities, to make application for positions for which they qualify, and to remain in a work situation long enough to obtain promotions.

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[4]Self-presentation in interview situations is widely recognized (Guion, 1967) to be a crucial element in occupational placement. Its centrality is reflected by the recent funding of programs to train the "disadvantaged" in the skills required for successful self-presentation in placement interviews (e.g., Barbee & Keil, 1973).

Parallel hypotheses may be proposed for the other psychological and social background variables found (by survey analyses) to have a direct influence upon occupational attainment.

While information relevant to the two final hypotheses may be obtained from the comprehensive occupational histories available in the previously discussed longitudinal database, the testing of the first two hypotheses requires experimental investigation. In addition to the longitudinal survey analyses described previously, the present dissertation also undertakes an experimental investigation of the first hypothetical causal mechanism. We have studied the organizational placement decisions made by a large sample of "gatekeepers" in response to resumes describing young workers whose status and personality were experimentally manipulated. Comparison of the results of this experimental simulation to those obtained from surveys of the occupational attainments of actual workers provides a measure of the explanatory power of the first hypothetical causal mechanism.

Organization of Chapters

The organization of our study deserves some preliminary comment. Readers will find that the chapters of this dissertation are largely self-contained, and that our discussions draw upon two separate bodies of empirical evidence. Thus, Chapter Two considers a variety of elementary models of the process of status attainment using longitudinal data collected in Britain between 1951 and 1970. These data on a sample of London schoolboys aged 12 to 13 in 1951, provide the basis for our subsequent analysis of the role psychological factors play in socioeconomic attainment (Chapter 3) and these data also enable us to assess the role socioeconomic attainment plays in the shaping of adult personality (Chapter 5). Chapter Four, on the other hand, draws upon data from our experimental study of the behavior of over 2000 British and American personnel managers. This chapter describes

our attempt to determine whether differences in personnel managers' evaluations of 'workers' with different ascribed traits (i.e., social class of origin, education, personality) could account for variations in occupational attainment such as those found in our longitudinal survey data.

While the order of our presentation involves a midstream shift from the discussion of longitudinal survey data to consideration of experimental evidence (and back again to the survey data), the order of the chapters reflects a logical progression in substance. Chapter Two describes basic sociological models of the attainment process and considers a variety of theoretical and methodological issues associated with the application of these models to Great Britain. Chapter Three commences with the estimation of a final "baseline" sociological model of attainment and proceeds to consider the effects obtained when personality variables are introduced into this model. Chapter Four describes an experimental study in which the status and personality characteristics found to influence attainment in our survey analyses are experimentally manipulated (in bogus resumes) and personnel managers are required to make occupational placement decisions for the workers described in these resumes. Chapter Five concludes the dissertation with a consideration of the relationship between status attainment and the subsequent psychological state of the men in our longitudinal survey.

In preparing the chapters of this dissertation a conscious attempt has been made to incorporate considerable introductory material, discussion of empirical results, and conclusions in each individual chapter. Thus, no general review of the literature will be found in this, the introductory chapter, nor will detailed discussion of empirical results be found in the final summary chapter (Chapter Six). This material is integrated into the text of the major substantative chapters (Ch. 2-5). This organization allows

individual parts of the work to stand, by and large, as separately readable (and publishable) studies; i.e.,

(a) Ch. 2 and 3: a longitudinal study of the contribution of psychological factors to the explanation of individual differences in socioeconomic attainment;

(b) Ch. 4: an experimental study of the potential role of employment bias (as a function of ascribed status and personality) in socioeconomic attainment;

(c) Ch. 5: a longitudinal study of the impact of socioeconomic attainment upon adult personality.

The present chapter is meant to provide an introductory overview to orient the reader to the substance and methods of our research and the manner in which we will organize its presentation.

Before turning to the first substantative chapter, it is important that we briefly discuss some of the methods of our research since they are infrequently used in psychological research. Readers who are familiar with the recent sociological literature on status attainment, however, may wish to skip the following section and proceed directly to chapter two.

Method of analysis: an introduction

Three interrelated methodological issues are of central importance to the understanding of our research. They are (1) the metrics used in the measurement of status attainment variables; (2) the concrete meaning of coefficients in the equations we use; and, (3) the nature of the models we use to specify a causal ordering of the various status variables. We will briefly consider each of these issues in the following pages.

Status metrics. Two of the three attainment variables we will consider are measured in terms familiar to everyone. Income is measured simply as annual earnings (in dollars or pounds sterling). Educational attainment is defined

as the total years of (full-time equivalent) schooling completed.[5]

Occupational attainment, however, has been measured in a less obvious manner. The numbers we use for this variable represent the 'prestige'(cf. Treiman, 1977) or 'desirability'(cf. Goldthorpe & Hope, 1974) of a given occupation: the higher the number the greater the prestige or desirability of the occupation. The numbers themselves are derived from studies which ask samples of the general public to rank order lists of occupational titles in terms of their relative prestige or social standing.[6] Evidence from a wide variety of sources (summarized in Treiman, 1977) indicates that individuals in a society perform this task with a remarkable consistency, and the consistency across societies (and within one society across time) in the ranking of occupations is also very high. So, for example, Treiman's Standard International Occupational Prestige Scale (SIOPS) provides an occupational prestige metric which has an average correlation of +0.91 with the occupational orderings derived from independent ranking studies conducted in 55 nations.

To provide the reader with some feeling for the nature of this metric of "occupational prestige," Table 1.1 lists 25 occupations together with their

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[5]While other measures of educational performance may seem desirable, the experience of American researchers indicate that use of a 'years of school' measure captures over 90 percent of the covariation of educational background and other socioeconomic attainments (see, Sewell & Hauser, 1975). Our own experience re-estimating the models of chapter two incorporating performance measurements from the British national examinations yields a similar conclusion.

[6]The use of the term "prestige" to describe the dimension upon which these orderings depend has been soundly criticized by Goldthorpe and Hope (1974). They argue that "if 'prestige' is to be understood in any way approximating to its established sense within the sociological tradition, then it must refer to the position of an individual within a structure of relations of deference, acceptance, and derogation, which represent a distinctive, 'symbolic' aspect of stratification (p. 5)." They argue convincingly that scales derived from these opinion studies represent an evaluation of occupations along a dimension of 'desirability' rather than prestige, strictu sensu.

Table 1.1: "Prestige" Scores for Selected Occupations

Occupation	SIOPS Score
Chief of State (e.g., President)	90
Supreme Court Justice	82
Architect	72
Astronomer	71
Mathematician	69
Sociologist	67
Psychologist	66
Mining Engineer	63
Librarian	54
Secretary	53
Bank Teller	48
Composer/Musician	45
Machinist	43
Typist	42
Printing Press Operator	41
Tailor	40
Telephone Operator	38
Mail Carrier	33
Miner	32
Taxi Driver	28
Gas Station Attendant	25
Warehouse Laborer	21
Railway Porter	17
Garbage Collector	13
Shoe Shiner	12
Agent for Illegal Lottery	6

Notes. Occupational titles from International Labor Office List; "prestige" scores derived from Treiman's Standard International Occupational Prestige Scale (SIOPS).

To derive approximate Hall-Jones scores used in British study (Chapters 2, 3, 5) divide these prestige scores by 13, i.e.,

$$\text{H.J.} = \frac{\text{SIOPS}}{13}$$

scores on Treiman's occupational prestige scale. Since the data available from the British longitudinal survey have been precoded into another occupational prestige metric--the Hall-Jones scale--much of our discussion will deal with results which have been coded into this more compact metric (scale range: 1 to 7) rather than Treiman's Standard International Occupational Prestige Scale (range: 0 to 90). The occupational ordering used in the Hall-Jones scale is, however, highly correlated ($r = +0.94$) with the SIOPS scale.

Equations and Coefficients. The central technique in our analysis involves the construction of models of the status attainment process in the form of a system of several equations. The equations specify the level of a given attainment variable as a linear, additive function of other variables representing an individual's status characteristics and personality. For example, one of the elementary models considered in chapter two posits that the level of education achieved by an individual depends upon his intellectual ability (IQ), and family social class [measured as the level of father's occupation (O_f)]. Since this equation does not presume to include all variables influencing educational attainment, our model equation also includes a residual term (U) to represent the unmeasured determinants of attainment. Thus, our equation takes the form,

$$E = P_{E,IQ}\, IQ\ +\ P_{E,O_f}\, O_f\ +\ P_{E,U}\, U$$

The coefficients estimated in this model (P_{Ei}) represent the effect of a given independent variable (i) upon educational attainment (E)--controlling for the effects of the other variables included in the equation. The coefficients we will discuss assume two forms; and each of these forms has a particularly simple definition when only two variables are involved.

When our equation coefficients are expressed in what is called
'standardized' form (P_{ij} in our notation) they indicate the change in
standard deviation units of the dependent variable (e.g., educational attainment)
which would arise from changing an independent variable by one standard deviation
(holding constant all other variables in the equation). In the bivariate case
(i.e., when we have a single independent variable) the bivariate correlation
coefficient is the standardized form of the coefficient in our equations. In
its unstandardized form (b_{ij} in our notation), an equation coefficient such as
$b_{E,IQ}$ tells us the difference in years of schooling which should be expected to
result from a 1 point difference in IQ (again, holding constant other variables in
the equation). In the bivariate case the slope of the line plotting Education by
IQ is equivalent to the unstandardized coefficient in our equations.

In estimating the coefficients in our equations, we assume that the
relationships between independent and dependent variables are linear and
additive. That is, we assume that the relationship between variables are
well represented by straight lines such that as A increases B always
changes (i.e., increases or decreases) at the same rate[7], and that this
relationship is unaffected by the level of other variables. The latter
restriction rules out instances where a third variable determines the
direction or magnitude of the relationship between A and B. Of course,
we do allow for C, itself, to have an independent effect upon the level
of the dependent variable. To take a concrete example, the equation,

$$O = p_{oe} E + p_{o,iq} IQ + p_{ou} U$$

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[7] The rate of change may, of course, be zero.

posits that occupational attainment (O) is a linear, additive function of educational attainment (E) and IQ. This equation will provide an accurate representation of social reality if,

    a) at all levels of education and IQ, changing the level of IQ by a fixed amount produces a constant increment (or decrement) in the (mean) occupational level of the population;

    b) at all levels of education and IQ, changing the level of education by a fixed amount produces a constant increment (or decrement) in the mean occupational level of the population.

The assumption of linearity which underlies our analyses would be violated in this instance if, for example, the difference in occupational attainment between men who completed ten vs. eleven years of education was not equivalent (within the limits of sampling -variability) to the difference in occupational attainments between respondents with 16 vs. 17 years of education. The assumption of additivity would be violated if, for example, there was a significant positive relationship between IQ and occupational attainment for better-educated respondents, while for respondents with below-average educations there was no association (or a negative association) between IQ and occupational attainment.

To some extent, the adequacy of our assumption of linear, additive relationships can be tested by comparison of our model predictions to the actual data. Where possible, evidence upon the adequacy of these assumptions will be presented in our discussion of results.

Models: What distinguishes the status attainment models we will use from simple prediction equations is the fact that variables which serve as indicators of attained status (and thus dependent variables) in one equation, also appear as determinants of subsequent attainments (and thus independent variables) in other equations. This aspect of these models permits the representation of causal chains in which the influence of

an initial status variable such as parental social status has indirect effects
upon adult attainment through the mediation of an intervening variable (e.g.,
education), i.e.,

$$O_F \rightarrow E \rightarrow O$$

The use of this strategy to construct what are called 'recursive'
models is made possible by the fact that the temporal ordering of the life
cycle imposes numerous constraints upon the patterns of causal influence
which are plausible between status variables. Thus, we note that in the
general case of two correlated variables it is possible to postulate three
causal explanations for the observed correlation:

(1) <u>A causes B</u>:   A $\rightarrow$ B

(2) <u>B causes A</u>:   B $\rightarrow$ A

(3) <u>A and B are causally related to a third variable (they in</u>
<u>turn have no direct causal relationship to each other)</u>.

$$C \nearrow^{A} \searrow_{B}$$
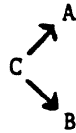
Since there are three alternative interpretations
<u>in the general case</u>, no causal inference is possible given <u>only</u> the
information that A and B are correlated. However, when the two variables
are status variables such as father's occupational status (O_f) and son's
educational attainment (E), it is possible to eliminate one of the generally
plausible interpretations. Thus, in this case it is not plausible that the level of
a son's education would exert a causal influence upon the level of his father's
occupation. So, we are left with the possibility that any correlation
observed between these two variables arises either from the influence
of father's occupation upon his son's educational attainment <u>or</u> through

the action of some third variable.

The latter instance (i.e., A and B causally related to C) can be further subdivided into two distinct types. One possibility is that the association between a father's occupation and his offspring's educational attainment is _mediated_ by some third variable. It may be true, for example, that fathers in high status occupations transmit information, attitudes, and an orientation toward achievement to their children, and that this in turn leads to greater educational attainment. In this instance, we might find that there was no advantage to the children of high status fathers other than that which was communicated through socialization of childhood attitudes, _i.e._,

$$O_f \quad \rightarrow \quad \text{Attitudes} \quad \rightarrow \quad E$$

In this instance, failure to measure the relevant attitudes impoverishes our analysis since we fail to elaborate the underlying mechanism which produces the relationship between the status attainments of parents and their offspring. However, while we have not achieved a fine-grained understanding of the exact nature of the underlying processes, we are not in error in concluding that father's occupational status _does_ _influence_ the educational attainments of their children.

A related type of 'labelling' error may also occur in our models. For example, it might be that it is not the prestige, _per se_, of occupations but rather the relative wealth of a household which exerts an influence upon children's educational attainments. Thus, the income derived from an occupation--rather than the occupation's prestige--may be the critical dimension for causal analysis. Of course, since the prestige and income of occupations are correlated, both dimensions will have significant correlations with education attainment. Here again, our analysis may be

faulty in defining the precise nature of the underlying relationships but
it is not incorrect in concluding that there _is_ a causal relationship between
the occupational attainments of fathers and the educational achievements of
their offspring--at least to the extent that occupational attainment is
correlated with income--i.e.,

$$O_f \curvearrowright INCOME \longrightarrow E$$

The substantively dangerous error in models such as these
occurs when there is neither a direct nor indirect causal connection between
two variables, nor a 'labelling' error. For example, in the case of
the link between the occupational attainments of fathers and the educational
(and occupational) attainments of their children, the possibility of a spurious
correlation (i.e., an association devoid of causal significance) arises if
the attainment of the two generations are caused by one (or more) common or
correlated factors. Formally, this error would arise if there exist one or
more variables (U_i) which exert a determining influence upon both the
educational attainments of sons and the occupational attainments of their
fathers, i.e.,

$$O_f \longleftarrow U_i \longrightarrow E$$
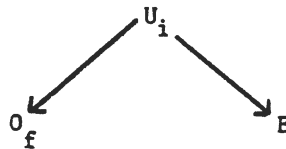
Although, it might seem unlikely that there exist variables which influence
attainments in two generations of a family, numerous hypotheses of this
type have been suggested. The best known of these (cf. Burt, 1961;
Gottesman, 1968) suggests that genotypic (i.e., heritable) differences in
intellectual ability are responsible, at least in part, for the correlations

between the attainments of fathers and sons, i.e.,

Genotypic IQ
(paternal lineage)

Father's IQ   Son's IQ

O_F O_s

(for simplicity, we ignore
assortative mating and the
contribution of maternal
heritance)
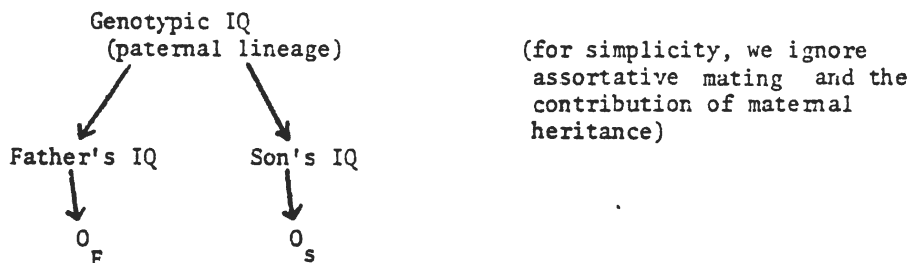
If this is a <u>correct</u> model of reality, then equations such as,

$$O = P_{OE} E + P_{OO_F} O_F + P_{OU} U$$

will lead to serious errors of causal inference. In particular the above
equation may lead us to conclude that the occupational attainment of
parents exerts a causal influence upon the occupational attainments of
their offspring, when, <u>in reality</u>, there is merely a spurious association
arising through the causal influences of an unmeasured variable--heritable
IQ--upon both dependent and independent variables.

In the technical nomenclature, errors of this sort are
called 'specification' errors, <u>i.e.</u>, they arise when we <u>mis</u>-specify the
underlying causal relationships. More particularly, in the instance treated
above, our error arises from the use of a model which does not allow for
the fact that the unmeasured residual determinants (u_i) of father's
occupational attainment and their offspring's occupational attainments are
<u>correlated</u> (or common). As a result of this misspecification, estimates
derived for our initial model are <u>biased</u> because they attribute the causal
influence of IQ to another variable (O_f). Potential misspecifications of
this type always plague any theory, however, in the context of our status
attainment models, such misspecifications can often be empirically investigated.

For example, given appropriate measurements (e.g., progeny's IQ), it is possible to introduce "controversial" variables into the relevant equations to test the plausibility of particular misspecifications. For instance in the IQ example, the difference in magnitude between coefficients estimated for equations[3] including and excluding IQ provide a measure of the extent, if any, of the bias arising from the alleged misspecification. Chapter 2 will present empirical evidence upon the adequacy of the assumptions used in our models and also upon the more specific issue of the role of IQ in educational and occupational attainment.

One final aspect of our analysis deserves note. The models we employ involve a recursive set of equations, and thus they permit certain tests to be made of the "goodness of fit" of our models to the available data. More specifically, they allow us to empirically assess the extent to which a given set of equations can reproduce the observed zero-order correlations between the variables being modelled. Even more importantly, via the so-called "fundamental theorem" of path analysis (cf. Wright, 1934), we can decompose the zero-order correlation between any two variables into the following components: (1) the direct causal effect of A upon B, (2) the sum of the indirect causal effects of A upon B which arise because A influences C_i which, in turn, influences B; and (3) the causally unanalyzable (or spurious) effects which arise because B is caused by D which in turn is correlated[9] with A.

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[8]
$$O = P_{OE} E + P_{OO_F} O_F + P_{OU_i} U_i$$
$$O = P'_{OE} E + P'_{OO_F} O_F + P_{O,IQ} IQ + P'_{OU_i} U_i$$

[9] In a relationship involving indeterminate causal linkages (according to specifications of model).

Since a substantial part of our analysis involves a determination of the extent
to which psychological variables mediate the causal relationship between the
status characteristics of parents and offspring, the availability of such
decomposition analysis makes these methods particularly appropriate for our
studies.

Let us now turn to an application of these methods to the substantive
questions which interest us.

Chapter Two

ELEMENTARY MODELS OF THE STRUCTURE OF SOCIOECONOMIC ATTAINMENT:

some fundamental insights derived from their application to Great Britain.

Each class among the inhabitants of a town or zone of
civilization has power over the classes lower than
itself. Each class seeks the support of rank from
members of the next higher class, and those who
gain it become more active among the people under
their control in proportion to the profit they get
out of it. Thus rank affects people in whatever
way they make their living...if it further has
become clear that rank is widely distributed and
one's happiness and welfare are intimately connected
with the acquisition of rank, it will be realized that
it is a very great and important favour to bestow a
rank on someone...

> —Ibn Khaldun, . Muquadimmah
> Prologue to Kitab al Ibar
> circa 1377.

In the earlier epochs of history we find almost everywhere
a complicated arrangement of society into various orders,
a manifold gradation of social rank. In ancient Rome we
have patricians, knights, plebians, slaves; in the Middle
Ages, feudal lords, vassals, guild masters, journeymen,
apprentices, serfs; in almost all of these classes,
again, subordinate gradations. The modern bourgeois
society that has sprouted from the ruins of feudal
society has not done away with class antagonisms. It
has but established new classes, new conditions of
oppression, new forms of struggle in place of the old ones.

> —Karl Marx & Friedrich Engels,
> Manifesto of the Communist Party
> 1848.

In his anti-Duhring tracts, Engels wrote at length about the historical development of the concept of equality. In these writings, Engels identified two aspects of equality: one aspect might be termed <u>equality of political rights</u> and the other economic (or socioeconomic) equality. Engels argues that the political struggles of eighteenth and nineteenth century were waged through the momentary alliance of competing interpretations of "equality". In Engel's own words,

> As is well known, however, from the moment when, like a butterfly from the chrysalis, the bourgeoisie arose out of the burghers of the feudal period, when this "estate " of the Middle Ages developed into a class of modern society, it was always and inevitably accompanied by its shadow, the proletariat. And in the same way the bourgeois demand for equality was accompanied by the proletarian demand for equality. From the moment when the bourgeois demand for the abolition of class privilèges was put forward, alongside of it appeared the proletarian demand for the abolition of the <u>classes themselves</u>... The proletarians took the bourgeoisie at their word: equality must not be merely apparent, must not apply merely to the sphere of the state, but must also be real, must be extended to the social and economic spheres. Especially since the French bourgeoisie...brought bourgeois equality to the forefront, the French proletariat has answered blow for blow eith the demand for social and economic equality. (Engels, 1877-8, 276).

Today, in the formality of the law, equality of political rights is an established ideal. Socioeconomic equality is not.

Social inequality continues as a major source of class conflict in contemporary capitalist societies. Considerations of "moral equity" provide a frequent, but usually implicit, basis for their consideration.[1] Thus, Tawney formulates it as the mark of a <u>civilized</u> society "to aim at eliminating such inequalities as have their source not in individual differences but in (society's) own organization (1931, p. 57)." Much of the non-Communist world has subscribed to an ideological position similar to the one Tawney proposes: social and economic <u>inequality</u> is sanctioned,[2] but the state "attempts" to insure that all citizens have an "equal opportunity" of rising to the highest status their "abilities" will permit--or, so the political folklore goes.

Chapters 2 through 4 of this dissertation examine the role which the social and psychological characteristics of individuals plays in the production of socioeconomic inequality.

Taxation and Economic Equality

British society has confronted the question of equality in two interdependent ways. First, an attempt has been made to reduce gross differences in income by the introduction of a progressive tax on earnings,[3] while a parallel tax on inheritances[4] has been used to reduce the intergenerational transmission of wealth.

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[1] See, for example, Bell's (1973) prognosis for the 21st century and his notion of a "just meritocracy" as alternative to Rawl's (1971) proposals about the nature of a "fair" society.

[2] Functional arguments, e.g., Davis and Moore (1945) being made to justify them.

[3] Direct taxation of income was first introduced by Pitt at end of the 18th century as a temporary wartime measure. It was reintroduced by Peale in 1842 in the form of a levy upon the incomes of the most prosperous citizens.

[4] In 1884 Sir William Harcourt, then serving as Chancellor of the Exchequer, reformed the death duties by introducing the graduated tax on capital inheritances.

Historically, the year 1909 is important; it marked the introduction by Lloyd George of a "people's budget" which raised taxes[5] in order, "to wage implacable warfare against poverty and squalidness (Lloyd George, cited in Havighurst, 1962, 102)." Lloyd George's attempt to use taxation as a method for income and wealth redistribution generated a two year conflict between the Houses of Parliment. This clash between the House of Lords representing the interests of the wealthier segments of citizenry and the House of Commons was finally settled by the Parliment Act of 1911 which paved the way for freer use of tax revenues to support social legislation and an expected redistribution of wealth and income, e.g., via the National Insurance Act of 1911 (cf. Reynolds & Fraser 1966). Between 1911 and 1914 the standard rate[6] of income tax in England hovered around 1 shilling in the pound (i.e., 5 percent), but with the onset of World War One it rose dramatically, never to return to its pre-war level. In 1976, it stood at 34 percent.

In spite of these efforts to redistribute wealth and income, analyses of 20th century trends in economic inequality suggest that redistributive effects of taxation in Britain have not been dramatic. Strachey's (1956) examination of prewar income statistics revealed that in 1939, as in 1911, ten percent of the British population received slightly less than one half of the national income, leaving the other half to be divided among the remaining ninety percent of the population. Although economic consequences of the second world war induced some redistribution of income during the 1940's, countervailing trends which arose in

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[5]Including a higher and more sleeply graduated income taxes with a "super tax" on large incomes (£ 5000+), special taxes on "unearned" incomes (e.g., earnings through land speculation), a one-third increase in inheritance taxes (i.e., death duties) and new land taxes.

[6]

The standard rate is the base rate for the computation of tax liability. In addition to the base rate, a graduated scale of additional taxation is applied to higher incomes. In 1976-7, the first £5000 of taxable income was taxed at the standard rate of 35%; the excess over £5000 was taxed at higher rates, e.g., 40% of income between £5000 and 5500; 45% on excess between £5500 and £6000, etc. Taxable income in excess of £20,000 was taxed at the highest rate: 83%.

the postwar period wiped out much of this effect (cf., Brittain, 1960).

Concerning these post-war trends Richard Titmuss observed that

> there is more than a hint from a number of studies
> that income inequality has been increasing since
> 1949 whilst the ownership of wealth...has probably
> become still more unequal, and in terms of family
> ownership, possibly strikingly more unequal in
> recent years. (1962, 198).

In 1975 a Royal Commission on the Distribution of Wealth and Income under the direction of Lord Diamond reported on twentieth century trends in economic inequality in Britain. They concluded that[7]

> "In general, changes in the distribution of income since
> 1959 have not been very pronounced...the extent to
> which income tax has affected the distribution has
> not changed substantially...

> "The results of the Central Statistical Offices
> work on the incidence of taxes and social service
> benefits show that the progressive effect of

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[7] Reynolds & Smolensky's (1977) study of the U.S.A. income distribution, (1950-1970) reached similar conclusions,

> Dispersion in the final distribution of income, which includes
> the benefits of government expenditures and the burdens of
> taxation, did not increase over the period and, if anything,
> decreased slightly. However, differences in final dispersion
> were generally not statistically significant.

and,

> that the overall tax system had drifted from progressive
> to proportional or perhaps even to slightly regressive by
> 1970. The rapid rise in government transfer payments,
> especially Social Security, as well as other government
> spending, however, preserved or slightly increased the
> difference between initial and final distributions. (p. 92)

> direct taxation on the degree of inequality is
> largely offset by the regressive effect of
> indirect taxation." (Diamond Commission, 1975,
> v. 1, 156-157)"[8]

Figures 2.1 and 2.2 summarize the Diamond Commission tax data on

the share of personal wealth and national income (after taxes) held by

the top ten percent of the British population. The figures for personal wealth

show a modest trend toward equalization between 1911 and 1973, while the income

data between 1938 and 1972 show an apparently substantial trend toward

equality; the latter trend is particularly pronounced during the period of

the second world war.

In considering these income data it should be noted that, to some

extent, the   income trends reflect   re-definitions of "taxable income"

and thresholds for reporting income to the taxing authority they also reflect

changes in modes of employee compensation, particularly at higher levels,

which had the effect of sheltering compensation from taxation by substituting

non-taxable "benefits in kind" for monetary income. Thus, the British taxing

authority, Inland Revenue, observes that the income statistics of Fig. 2.2

provide an incomplete accounting of national income because they exclude

deductions from income allowed for capital acquisitions and mortgage payments,

the imputed rental value of owner-occupied housing, and income which 'disappears'

through tax evasion. Furthermore,

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[8]The Diamond Commisison did, of course, find modest redistributive
effects arising from the combined impact of taxation and the receipt of
transfer payments (e.g., health and social security benefits). So, for example,
while there was an overall increase in the inequality of the distribution of
taxable personal income between 1962 and 1972, the distribution of post-tax
income (including transfer payments) did not become more unequal during this
period.

> "Inland Revenue thinks that investment income is
> understated in their statistics...(and they) doubt whether
> "income in kind" and fringe benefits which are reported
> and which are taxable are valued accurately in all cases
> (Diamond Commission, 1975, $\underline{v}$. 1, 37)."

Allowing for these deficiencies, which formed the basis for critiques by Titmuss (1962) and Brittain (1960) of the illusory nature of post-war income redistribution, there are two conservative conclusions which can be drawn from these figures. First, the effect of inheritance and income taxation has not been so great as to eliminate economic inequality in Britain. Second, the recent history of the effects of taxation does not encourage the belief that economic inequality will disappear in the near future.

Education, Opportunity, and Social Inequality

The limitted effects of tax programs adapted from Marx and Engel's ten point program[9] for "communizing" industrial states leads us to consider the concept of "equality of opportunity". In this formulation, social and economic inequality is permitted to persist, but the state's ideal becomes the provision of equal opportunities for securing unequal rewards.[10]

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[9]The ten points incorporated in the Manifesto of the Communist Party included (1) abolition of property in land, (2) heavy progressive taxation of incomes, (3) abolition of inheritance, (4) confiscation of property of emigrants and rebels, (5) centralization of credit in the hands of the state, (6) centralization of transport and communication in hands of state, (7) extension of factories and means of production owned by state, (8) equal liability of all to labor, (9) abolition of distinction between town and country, and (10) free education for all children.

[10]See Bottomore (1964) for an engaging treatment of the paradoxical implications of this position.

Y E A R
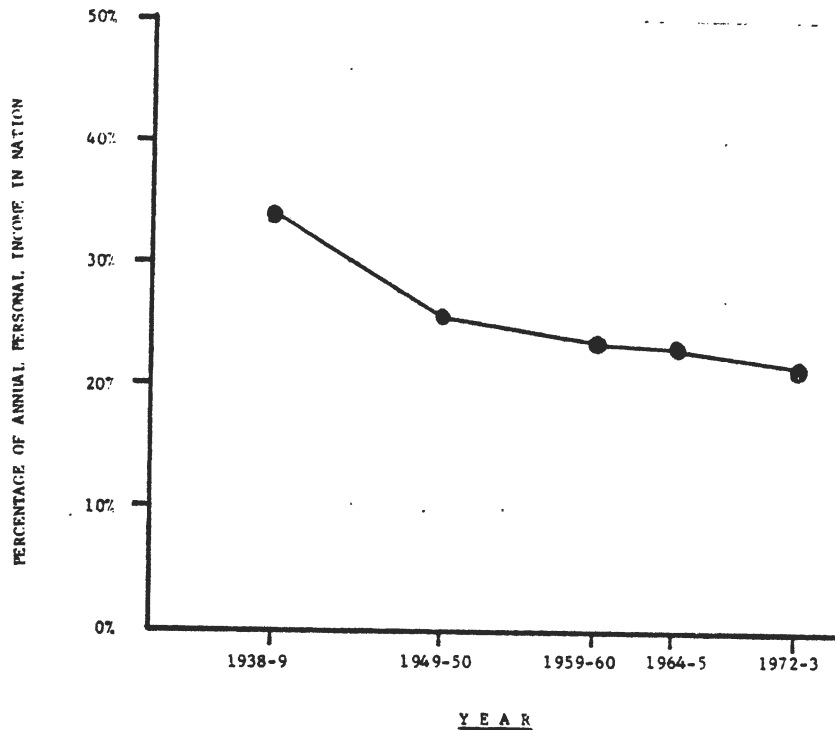
SHARE OF PERSONAL INCOME EARNED BY TOP PAID 10% OF POPULATION

Figure 2.2: Trends since 1938 in distribution of personal income after taxes: percentage share of post-tax personal income earned by top ten percent of population. (Source: Diamond Commission, 1975, v.1, Table 10; Note: see text for limitations of data. Gini coefficients are computable for 1959, 1964, and 1972; estimated values are 29.1, 28.8, and 26.6)

Y E A R
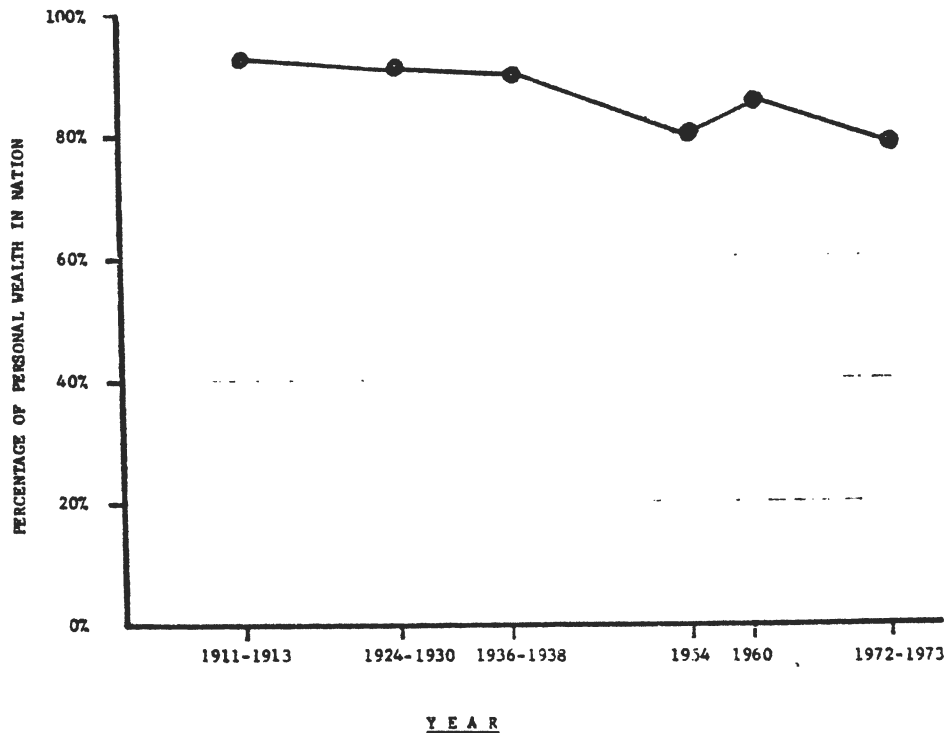
SHARE OF PERSONAL WEALTH OWNED BY "RICHEST" 10% OF POPULATION

Figure 2.1: Trends since 1911 in distribution of personal wealth: percentage share of personal wealth owned by richest ten percent of population. [Source: Diamond Commission, 1975, Figures 12 and 13; data are Inland Revenue Estimates (series B) and assume that persons not covered have no wealth; population covered: total population aged 25 and over (series beyond 1960 adjusted a constant +6% to reflect population aged 25+ rather than 18+; adjustment derived from comparison of data for two populations in 1960).

Towards the end, the British state has invested substantial portions of the revenue realized from taxation in social welfare programs designed to insure free access to "prerequisites" for attainment, e.g., education and medical care.

Embracing such an ideological position does raise some semantic and psychological questions. Initially, one must allow that the very <u>meaning</u> of "ability" is subject to bias.[11] It may be argued, for example, that this term is defined by the socially dominant classes and is meant as a description of themselves and their offspring.

Thus, it is not easy to dismiss the argument that western societies' fixation upon the "cognitive" ability reflects such self-serving biases. The most frequent justification for this fixation invokes the observed correlation between occupational mobility and IQ (e.g., Burt, 1959; 1961). However, a correlation of substantial magnitude and <u>no</u> theoretical significance is <u>inherent</u> in the widespread use of IQ measures as screening devices in educational and occupational placement. Furthermore, one can make the argument

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[11] There is some rather dated psychological research which meekly suggests this possibility. McNeil (1953) has shown that if you distinguish between conceptual and motoric modes of expression, one finds that while middle class boys in America excell at tasks requiring conceptual expression, they are <u>inferior</u> to working class boys in tasks that demand motoric expression. Some supporting evidence is found in research by Coleman (1961) and Pope's (1953) on prestige in peer cultures. Pope, for example, found a higher valuation of fighting, and "leadership in active play" among children from a lower socioeconomic group while school performance and being the "little gentleman" were more salient to boys of higher socioeconomic status. These results suggest that performance differences between socioeconomic groupings may mirror a differentiation in value systems which may correspond to the requirements of adaptation to significantly dissimilar milieux. Despite this possibility and the fact that most productive processes require a complex interaction of cognitive and motoric skills, it is conceptual ability, to the exclusion of almost all else, which is valued by the middle class educators who police the "main roadway" to status attainment (see, for example, Wing & Wallach's (1971) study of the impact of a broader definition of talent upon college admissions in America).

suggested by O. D. Duncan and his colleagues (1972) that what psychologists have taken to be the relevant aspects of "mental performance" in their tests correspond to elements of role performance in high status occupations. Thus "a correlation between IQ and occupational achievement was more or less designed into IQ tests by virtue of the psychologists' implicit acceptance of social standards of the general population (Duncan et al., 1972, 92)."

. The Education Reforms of 1944

Despite such unresolved questions, the "liberal" ethic of "equal opportunity," rather than the "socialist" ethic of socioeconomic equality, has prevailed in Great Britain. Since education has been the most frequently utilized means to social mobility for the lower classes, it has been the major focus of political attention. In 1944 the British government guaranteed free public education at all levels as a means of fostering educational opportunity.

The Education Act of 1944 continued the British tradition of a divided state school system. Under this system approximately 20 percent of the pupils were assigned (at age eleven) to grammar schools whose curricula were geared to the academic requirements of university entrance and "the problems which involve work with tongue and pen."[12] The remaining students[13] were assigned by default, to secondary modern schools which have been characterized as providing "custodial care of an educational kind (Himmelweit and Wright, 1967, 9)." While the divided school system antedates 1944, the educational reforms legislated in that year granted access to all, and

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[12]From the report of the Spens committee (1938) on secondary education which argued in favor of a separate grammar school education of the "able" in preparation for such careers and "Modern" schools to guarantee a general education to everyone.

[13]This dichotomy is somewhat oversimplified since a small proportion of secondary school pupils in the state system attended technical schools during the decade following the war. The National Survey (Douglas, et al., 1968) indicates that approximately four percent of all boys born in 1946 enrolled in such schools.

prescribed that selection be accomplished in ways that would not intentionally penalize students from poorer families. Thus, tuition fees were abolished and teachers judgements were de-emphasized as criteria for secondary school placement in favor of standardized tests of intellectual aptitude and academic achievements.

Despite these egalitarian reforms, unequal access to education has persisted. Elite independent schools such as Eaton and Harrow continued to recruit fee-paying pupils using different admission criteria. Moreover, although Leonard Fletcher, then Assistant Secretary in the Ministry of Education, could report to a 1961 OECD conference that, "selection for grammar schools in England is a rigorously objective and honest process (Halsey, 1961, 32)," a substantial underrepresentation of the children of the working classes existed at all levels of post-primary education. Douglas et al. (1968) using data from the National Health Survey of a cohort born in 1946 documented a strong association between social class and educational attainment which persisted even after the "effects" of "intelligence" were controlled. Table 2.1 summarizes these data. The relationship between social class and educational attainment is ordinally perfect, except for two reversals of a single percentage point. Within each level of ability, children from any one social class have a higher proportion gaining certificates, remaining in school, and gaining "good certificates,"[14] than children in all lower social classes. These data belie the notion that the reforms of 1944 would afford equal access to education for all social classes. Unfortunately, analyses of these data (Douglas, 1964; Douglas et al., 1968) have not yet provided a systematic insight into the interrelationships which exist between the various social factors which give rise to such differences in educational attainment, and their relationship to subsequent social and economic attainment.

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[14]Ordinary level of the General Certificate of Education with at least four passes covering three of the following branches: English, mathematics, science and foreign language.

Table 2.1:   Percent of National Health Survey Sample Remaining in School
             and Obtaining Credentials by Social Class and IQ (from Douglas
             et. al., 1968)

Social Class	Ability at age 15 (In percentiles)				
	0-29	30-49	50-70	70-84	85+
	% still in school at age 16				
Lower Manual	2	4	12	20	50
Upper Manual	3	10	20	43	67
Lower Middle	8	20	37	52	78
Upper Middle	20	42	71	82	90
	% gaining "good" credentials				
Lower Manual	0	0	3	9	37
Upper Manual	0	1	2	15	53
Lower Middle	0	0	6	18	60
Upper Middle	0	1	11	33	77

NOTE.   See text footnote 10 for definition of "good" credentials; social class
        categories were composite of (a) father's occupation, (b) father and
        mother's education, and (3) father and mother's social class origin
        (see, Douglas et. al., 1968, p. 199).

Fitting An Elementary Model of Socioeconomic Attainment to Britain

Using procedures first applied to the study of social stratification by Blau and Duncan's (1967) in the American Occupational Structure, Treiman and Terrell (1975) have proposed a four-variable structural equation model of status attainment in Great Britain. This model interrelates father's occupation (O_f), son's educational attainment (E), son's occupational attainment (O_s), and son's income (I) by the following set of equations,

$$O_f = P_{O_f} U_1 \tag{1}$$

$$E = P_{EO_f} O_f + P_{EU_2} U_2 \tag{2}$$

$$O = P_{OE} E + P_O O_f + P_{OU_3} U_3 \tag{3}$$

$$I = P_I P_{IO_s} + P_{IE} E + P_{IU_4} U_4 \tag{4}$$

The P_{ij} terms are path coefficients representing the direct "causal effect" of variable "j" upon variable "i," net of the effects of other variables in the equation. In its standardized form the coefficient P_{ij} is calibrated to express these effects as the proportion of a standard deviation change in "i" induced by a one standard deviation increment in "j." Residual terms for all unmeasured variables operating in this system are denoted by U_i.

Under the assumption that unmeasured residual factors (U_i) are uncorrelated and that the underlying relationships are linear and additive, the structural equations 1-4 are an overidentified causal system whose coefficients may be estimated by multiple regression techniques (e.g., ordinary least square procedures). The elementary causal model embodied in structural equations 1-4 corresponds to the following verbal theory:

a) a son's educational attainment is directly determined
by his father's occupational level;[15]

b) a son's occupational attainment is directly determined
by his father's occupational attainment and his own
educational attainment;

c) a son's income is directly determined by his own educational
and occupational attainment (but not by his father's
occupational attainment).

Treiman and Terrell have estimated the coefficients of this model
by reanalyzing data from the British Electoral Survey of 1963 [Butler and
Stokes, (1969)]. Figure 2.3 presents a diagram of this model and the
standardised coefficients estimated by Treiman and Terrell.

Insert Figure 2.3 about here

From these results it is clear that, over the population sampled
(i.e., males 25-64) a father's social status exerted an important determining
influence upon his son's occupational attainment, both directly (p_{OO_f} = +0.27),
and also _indirectly_ via its effect on the length of son's education which,
in turn, had a causal impact upon his occupational success ($p_{OE}p_{OE_f}$ = +0.10).
Treiman and Terrell also found that the effect of education on occupational
attainment was substantial (P_{OE} = .39) and similar in magnitude so that
in the U.S.A. In discussing these results, Treiman and Terrell argued that
differences between Britain and the U.S.A. in the process of socioeconomic

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[15]Plus other unmeasured factors subsumed in the residual term U_1.
Since this qualification will be true for all our model equations, we will
omit compulsive notation of this fact in our descriptions.
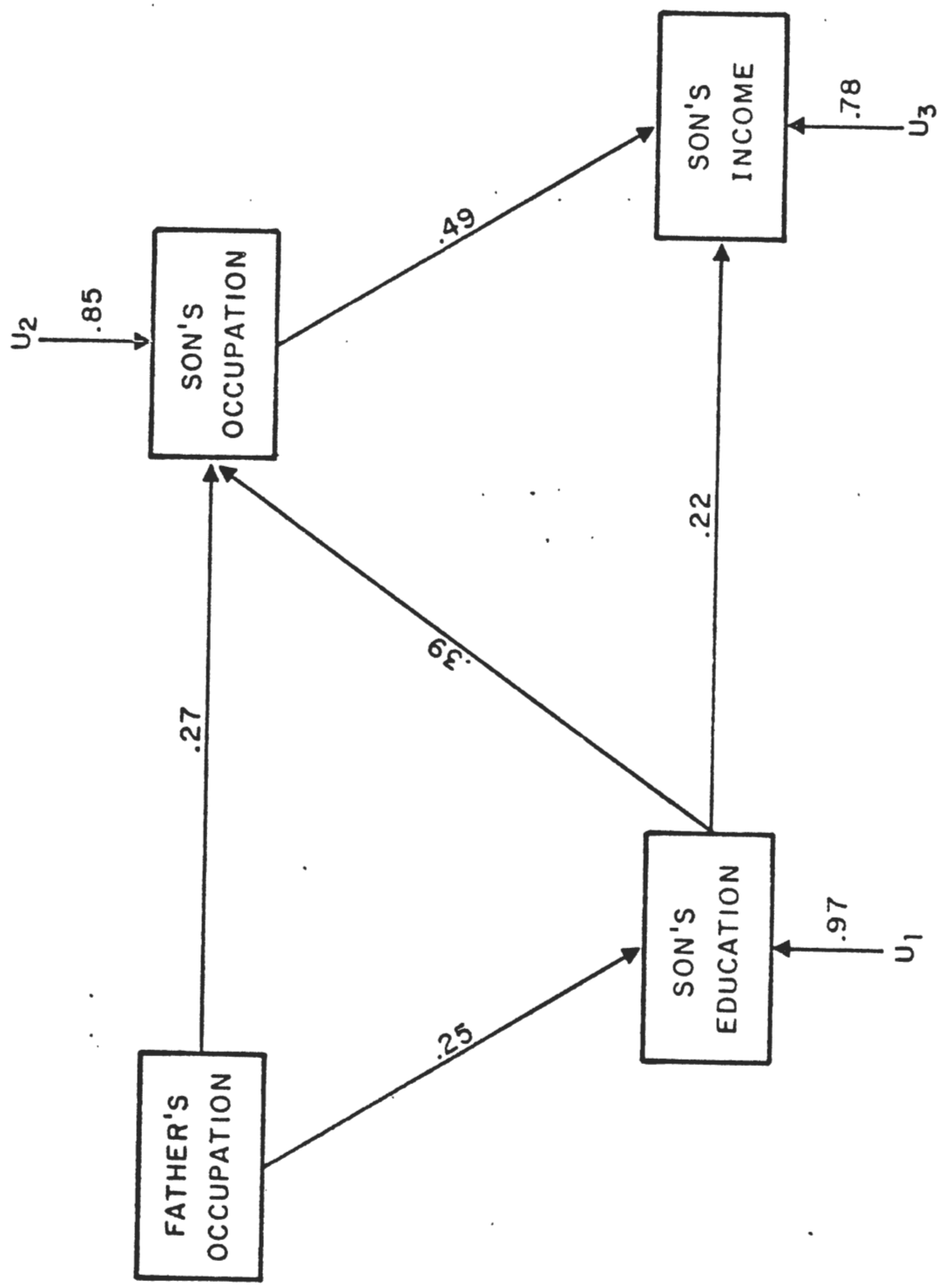
FIGURE 2.3: Path diagram of Treiman and Terrell's model of the status attainment process in Great Britain. Entries show standardised path coefficients estimated from data for the British National Electoral Survey of 1963.

attainment "do not lie in the respective educational systems." The authors suggested that the results of their analysis pointed to the need for a substantial revision of the widely held view that, by comparison with the United States, the British class system retained a more elitist and ascriptive character (Lipset, 1966) with education acting as a powerful "sponsor" of upward mobility (Turner, 1960).

Because the social psychological analyses we plan to undertake depend upon our establishing a reasonable baseline model of the interrelation of the relevant socioeconomic variables (i.e., social origin, education, occupation, income) we must consider Treiman and Terrell's findings carefully. In particular we must ask whether their results provide an adequate representation of the English stratification system.

Analytic deficiencies. In common with most of last decade of American status attainment studies, Treiman and Terrell's analysis assumes that the stratification system is functionally unified. In particular, they assume that the process of attainment portrayed by their model is universal. Such models deny the possibility that there are regular, lawful, and socially meaningful variations in the nature of the attainment process. So, for example, this class of models denies the possibility that the system may work in a different manner for particular groups (such as elites or the severely disadvantaged) than it does for the rest of the population. Rather, these models posit that at all levels of social background and cognitive ability, and for all sectors of the educational system, the economic and occupational consequences of further education are identical and that the handicaps of disadvantaged social origins are equivalent.

Aggregate analyses such as those of Treiman and Terrell, or more recently Ridge (1974), we would suggest, provide an insufficient basis for drawing conclusions concerning the "sponsored mobility" hypothesis. Their inadequacy for this purpose arises from their failure to allow for the possibility that the historic structural division of the British educational system yielded component subsystems (specifically, the state grammar and secondary modern schools) which had different functional roles in the status attainment process. An adequate test of the "sponsored mobility" hypothesis requires a disaggregation of the components of the educational system so as to permit a consideration of the more specific hypothesis that the British grammar school, but not the secondary modern school, sponsored the mobility of its "candidates for elite status" without regard to their social origins. Since only nineteen percent of post-war British schoolboys were awarded

grammar school places, aggregate analyses obscure   evidence of
such school-specific sponsorship mechanism.

Viewing the grammar school as the unique component of the state
educational system which sponsors the mobility of its recruits, is, we
believe, a more sensitive rendering of Turner's metaphor, and a more
adequate representation of social reality in Britain. It is also
consistent with the observation of Hall and Glass (1954) that, "the
decisive stage in educational background is the grammar school or its
equivalent (p. 306)." In this regard it can be argued that the
traditional grammar school was a strong social system possessing coercive
powers over its pupils which derived from the nature of the objectives
assigned to the school and their salience for individuals within the
system. This strength is reflected in the grammar schools rigorous
selection policy, its explicit academic goals, and its power to confer
formal qualifications which had substantial currency in the outside
world. Moreover, there is suggestive evidence (Himmelweit & Swift,
1969) that the grammar (but not the secondary modern) school system
is able to overcome the low achievement aspirations of its working-
class students. In contrast to the grammar school, the secondary
modern school might be characterized as a "weak" system because it
was unselective in admissions, amorphous in educational goals, and
unable to provide occupationally valuable qualifications (e.g.,
certificates, examination results, etc.).

The interpretive deficiencies of Treiman and Terrell's analysis
are shared by other recent research which includes "type of secondary
school" as an endogenous variable with presumed linear, additive

effects upon attainment. Ridge (1974), for example, has reanalyzed
cross-sectional data from the national study of social mobility undertaken
at the London School of Economics in 1949 (Glass, 1954). He employed
a model of educational attainment which used a four-category "type of
secondary school" scale as an endogenous variable.[16] The dubious
nature of the metric of Ridge's "scale" is less bothersome
than his failure to consider the possibility that school type may _interact_
non-additively with the other variables in his model. Here again, as
with Kerkhoff's (1975) work, we are presented with aggregate analyses
which obscure functional differences between educational subsystems.

The above criticisms suggest some straightforward remedies--
the basic question being whether the functional relationships described
by such models are static across subsystems of the divided British
educational structure. One approach to this question would be to
re-analyze the Butler and Stokes' sample by re-estimating the Treiman
and Terrell model _within each educational subsystem_. Since the
"sponsorship" hypothesis is time-bound, we would wish to include
only those men who were young enough to have benefitted from the
reforms embodied in the Education Act of 1944 (i.e., the
abolition of fee-paying in state secondary schools and the provision
of maintenance grants for further education). Unfortunately the Butler and

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[16] The scaling of types of school was: (1) none,
(2) secondary modern or its equivalent, (3) state grammar school,
(4) independent boarding school. The equation representing
occupational attainment included the following is independent
variables: Father's occupation, Urban (vs. non-urban) residence, Age,
Type of secondary school, Secondary school certificate obtained, Further
education, Further education qualifications. Significant occupational
effects were found for all independent variables except urban residence.

Stokes' sample does not contain a sufficient number of such respondents for reliable analysis ($N_{gs} < 15$; $N_{sm} < 42$). Similar shortages of appropriate respondents are encountered even with more recent representative samples (e.g., the Electoral Survey of 1970).

The LSE Sample. As a practical alternative we will use the longitudinal data which will be the basis for testing our social psychological models. These data derive from a study begun at the London School of Economics in 1951 as an ancillary to the National Mobility Survey (cf., Glass, 1954, pp. 141-159). In addition to providing an adequate number of respondents who attended the two types of state secondary schools after the post-war reforms, this study has the advantage of sampling from a homogeneous age group for which childhood IQ measurements are available.

The first part of the study, carried out in the Greater London area in 1951, aimed at sampling approximately equal numbers of grammar and secondary modern schoolboys. In all, 614 boys were studied, representing the entire third forms (12-13 year olds) of four grammar and five secondary modern schools.[17] To avoid "neighborhood effects" being confounded with school type, localities—varying in social class composition—were selected and within each, adjacent grammar and secondary modern schools.

The second phase of the study was carried out in 1962. After eleven years 73% of the original sample could be traced and reinterviewed. It is this follow-up sample on which the subsequent analyses are based ($N_{gs} = 264$; $N_{sm} = 186$). A careful study (Bebbington, 1970) of attrition across time in this sample reveals a slightly higher rate of loss for subjects who

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[17] All were single-sex schools which formed the majority of secondary schools at the time. It also should be noted that one non-urban locality included in the 1951 sample (N = 725; Himmelweit, 1954) was not included in the 1962 follow-up (N = 614) so as to yield a more homogeneously urban sample.

showed signs of psychological maladjustment or juvenile delinquency in adolescence, and a slightly greater loss of working class and low IQ children.

Table 2.2 presents the social class compositions of the final sample. The strong tendency for grammar school students in this sample to come from the higher social classes conforms to a pattern previously observed by other researchers (e.g., Douglas, 1964).

Insert Table 2.2 about here

Although our sample was not designed to be representative of the English population, it does nevertheless provide a good coverage of the social class spectrum. Weighting the averages for the two subsamples to correct for the oversampling of grammar schoolboys, we find that the social class composition of this sample closely parallels the distribution obtained in the National Mobility Survey of 1949 (Glass, 1954)--except in the highest occupational categories. The under-representation of these categories is largely attributable to the tendency of the upper classes to opt out of the state school system by paying substantial tuition fees so their children may attend elite "independent" schools.

If we compare the correlations between status variables obtained from our longitudinal data with those obtained from representative national surveys of the British population we also find a remarkable similarity. Table 2.3 compares the intercorrelations between Father's occupational

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Insert Table 2.3 about here

Table 2.2 Percentage distribution of Occupations for
Fathers of boys in Longitudinal Study(1951)
and for all Men in British National Mobility
Survey of 1949.

Hall-Jones Occupational Class	Longitudinal Study			National Survey of 1949[b]
	Grammar	Sec. Modern	Weighted[a] Average	
1. Unskilled Manual	3.0	14.4	12.2	12.4
2. Semi-Skilled Manual	14.8	25.7	23.6	16.5
3. Skilled Manual & Routine Non-Manual	34.6	43.3	41.6	41.2
4. Inspectional, Supervisory & other Non-Manual (lower grade)	23.6	11.2	13.6	12.7
5. Inspectional, Supervisory & other Non-Manual (higher grade)	17.1	4.3	6.8	9.8
6. Managerial & Executive	4.9	0.5	1.4	4.5
7. Professional and High Administrative	1.9	0.5	0.8	2.9

[a]Since the longitudinal study purposely oversampled grammar schoolboys the average is weighted to reflect the proportions of boys in each type of state school: 19% grammar and 81% secondary modern or its equivalent (cf., Ministry of Education, 1953).

[b]Estimate for all men residing in England, Wales or Scotland (Glass, 1954).

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Table 2.3: Product moment correlations for status variables computed from longitudinal sample and national crossectional surveys

STATUS VARIABLE	STUDY[a]	CORRELATION WITH		
		Son's Education	Son's Occupation	Son's Income
Fathers occupation	1-National Mobility Survey	(b)	.43	na
	2-LSE-longitudinal	.38	.35	.16
	3-Electoral Survey, 1962	.35	.36	.30
	4-National Health Survey	.39	na	na
Son's Education	1-National Mobility Survey	---	(b)	na
	2-LSE-longitudinal	---	.71	.09
	3-Electoral Survey, 1962	---	.62	.57
	4-National Health Survey	---	na	na
Son's Income	1-National Mobility Survey	---	---	na
	2-LSE-longitudinal	---	---	.25
	3-Electoral Survey, 1962	---	---	.60
	4-National Health Survey	---	---	na

NOTES: (a): Studies are (1) National Survey of population of England and Wales in 1949 (Glass, 1954); correlation estimates are derived from Ridge (1974) who reanalyzed a subset of the data representing reports of wives on husbands aged 21+ (Sample Size = 713).

(2) LSE-longitudinal study (see text) reweighted to reflect actual proportions attending each of two types of secondary school; n.b. data are from 1962 measurements, i.e., when men were 24-25 years of age (Sample Size = 450).

(3) National Electoral Survey of 1962: a representative sample of Great Britain. Correlations represent men aged 25-64 and are derived from Treiman and Terrell (1975); (Sample Size = 536).

(4) National Health Survey: a representative sample of boys born in Britain during the first week of March, 1946 (illegitimate and multiple births excluded). Data reflect measurements through age 21 (Sample Size = 4720); correlations reported in Douglas (1964) and Douglas et al. (1968).

(b) no appropriate measure of educational attainment is available in Ridge's reanalysis; available measures are all dichotomies or trichotomies of some limited aspect of educational attainment.

NOTE: Several variables are measured in quite different ways in the various surveys. The status of occupations is measured by the Hall-Jones seven point scale in the LSE studies, by a five point scale representing a collapsing of the Registrar General's classification of types of occupation for British Censuses in the National Health Survey, and by scores (0-100) on Treiman's (1977) Standard International Occupational Prestige Scale in the Electoral Survey of 1963. Educational attainment is coded as total years completed in the LSE-longitudinal study, as a six point scale of secondary school qualifications in the National Health Survey, and by an "effect proportional" scale designed to maximize the correlation between occupational attainment and education in the Electoral Survey sample.

status, Son's Educational attainment, Son's occupational attainment,
and Son's income for our longitudinal study and three national surveys.
Except for Income we find a marked similarity between correlations
computed from our longitudinal data and those obtained from independent
surveys of the entire nation. This similarity is particularly impressive
since the status variables used in these studies were frequently measured
using different scales.

The dissimilarities in the income correlations reflect the fact that
we are comparing data for a cross-section of men of all ages to longitudinal
data a single age group (24-25 year-olds) who have just begun their
occupational careers. Thus, the standard deviation of the income
distribution is much greater in the cross-sectional sample (s.d. = ₺441
vs. ₺147). This restriction of range in incomes in the early phases of
the occupational career attenuates the observed correlations between
income attainment and other status variables in the longitudinal sample.
We should note that a parallel result was obtained in Sewell and Hauser's
(1975) analysis of income data derived from their longitudinal sample at
age 24. Table 2.4 presents the relevant comparisons from the Wisconsin
study;

Insert Table 2.4 about here

This comparison reveals an attenuation of estimated longitudinal income
correlations (vs. national cross-sectional estimates) similar to that
obtained in comparisons of the LSE longitudinal data to cross-sectional
survey data for Britain.

Table 2.4: Comparison of income correlations for men in early career and men of all ages

	Correlation between individual earnings and			Standard Deviation of Income Distribution (in 1961 dollars)
SAMPLE	Father's Occupation	Education	Occupation	
Wisconsin Men, aged 24-25	.04	.11	.19	$2,202
American Men, aged 25-64	.16	.42	.39	$3,659
London Men, aged 24-25	.16	.09	.25	$ 411 (A)
British Men, aged 25-64	.30	.57	.60	$1,235

NOTES: Wisconsin data are from Sewell & Hauser (1975, Table 3.11); correlations reflect income and occupation as measured in 1965. Cross-sectional data are from Blau & Duncan (1967) using aggregate income correlations reported in Treiman & Terrell (1975) for American population in 1962.

Income standard deviations were adjusted to 1961 dollars using national median personal income as a deflator (1960-1965 average annual change = +6%). Per capita income in Wisconsin is only slightly below national average (-1.6% in 1960).

British data are from sources noted in Table 2.3

(A)

Converted at 1962 echange rate of $2.80/pound.

Fitting the Elementary Model to a Divided Educational System

The foregoing comparisons indicate that the longitudinal sample we will be working with is not atypical in terms of its social class composition or the patterns of intercorrelation for the status variables incorporated in our elementary model. This provides some basis for the expectation that conclusions derived from analyses of this sample may be generalizable to a larger population.

Initially, we will use this sample to re-estimate the parameters of the Treiman and Terrell model distinguishing between the two educational subsystems. Since standardized (metric-free) coefficients are functions of population variance, we will concentrate our cross-school analyses upon estimates of the metric form (unstandardized) model coefficients for the two components of the state educational structure. The latter coefficients express "effects" in terms of the units in which the raw data were coded, e.g., $b_{OE} = +0.5$ indicates that, net of other factors, each additional year of education produces an increment in occupational status of 1/2 unit on the seven-point Hall-Jones scale. Since all variables in this and subsequent analyses are identically coded in each subsample, the metric form coefficients derived from the two subsamples (i.e., school systems) may be meaningfully contrasted (Shoenburg, 1972).

In estimating our models we employ measures of fathers' (O_f) and sons' (O) occupation coded on the Hall-Jones (1950; Moser and Hall, 1953) scale of occupational prestige.[18] The coding of the Hall-Jones scale

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[18]To test the presumed linearity of this prestige scale, the thirty occupations reported in Hall and Jones' (1950) validational study were re-scored using the Standard International Occupational Prestige Scale (Treiman, 1977). The magnitude of the resultant correlation (r = +0.96) engenders confidence in our assumption that the seven categories of the Hall-Jones scale approximate a linear continuum of occupational prestige or 'desirability.'

has been reversed throughout our analyses, so that a high scale score corresponds to a highly prestigious occupation. Education (E) is measured as total years of schooling. Postsecondary education[19] was evaluated from educational histories collected in 1962. IQ scores at age eleven (IQ) were also obtained for each member of the sample from the aptitude portion of "eleven-plus" examination (the exam used for secondary school assignment); these scores were standardized to have a mean of 100 and a standard deviation of 15. Our final variable, yearly income (I) in 1962, is coded in pounds sterling.

Table 2.5 presents the means, standard deviations and intercorrelations for all variables used in this chapter's analyses; correlations for the grammar school appear above the main diagonal of this table, corresponding values for the secondary modern sample are below the diagonal. The means for the two school samples show marked differences in school input and output characteristics, as well as in the mean educational attainment of the pupils. The grammar school sample had fathers whose occupations were, on the average, one Hall-Jones class higher, and IQs (measured at age 11) which were 20 points higher than their secondary modern counterparts. The grammar schoolboys received about three more years of schooling, and subsequently, they entered occupations which were 1.7 class units higher than those of secondary modern students although their earnings at age 25 were quite similar (£847 vs. £807 yearly).

Using these data we have re-estimated the coefficients for the Treiman and Terrell model within each type of state school. From Table

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[19]Part-time further education was assigned the following full-time equivalents: completed an undergraduate degree, 3 years; completed a degree equivalent programme (e.g., chartered accountancy), 3 years; reached an intermediate stage of study in a degree or degree-equivalent program, 1.5 years; miscellaneous incomplete further education, 0.5 years.

Table 2.5: Intercorrelations, means and standard deviations for variables used in this chapter.

Variables:		O_f	IQ	E	O	I	GRAMMAR Mean	GRAMMAR S.D.
Father's Occupation	(O_f)	---	-.04	.16	.09	.06	3.59	1.26
IQ at age 11	(IQ)	.11	---	.00	.00	-.08	118.12	6.72
Education	(E)	.28	.36	---	.67	.13	12.91	1.93
Occupation at age 25	(O)	.27	.24	.54	---	.34	5.00	1.29
Income at age 25	(I)	.16	.10	-.02	.20	---	847.42	165.72
SECONDARY	Mean	2.69	97.61	10.20	3.28	806.14		
MODERN	S.D.	1.08	12.41	1.21	1.20	177.64		

NOTE: Correlations for grammar school appear above the main diagonal; those for the secondary modern school sample appear below.

2.6 we can see that the direct influence of the social background variable

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Insert Table 2.6 about here

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included in this model (O_f) is _attenuated_ within the grammar school

subsystem. For grammar school boys a unit change in father's occupation

has _no_ direct effect upon his son's occupational attainment (b_{OO_f} = -0.02;

se_b = 0.05), when education is held constant. However within the secondary

modern subsystem, a similar change in father's occupational status causes

a significant[20] alteration in son's occupation (b_{OO_f} = +0.15; se_b = 0.07)

via the direct path linking the two variables. Furthermore, the estimated

intercepts for the equation predicting occupational attainment (-.53 (GS);

-2.13 (SM)) suggest that there is a general elevation of occupational

attainment for the grammar school sample which is independent of the

actual _length_ of educationor the boy's social origins. Using our model

to calculate the expected occupational attainments of boys from _average_

social backgrounds (see Table 2.7) we find a constant advantage for

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Insert Table 2.7 about here

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grammar schoolboys. Even for boys who leave school at the minimum

school leaving age (15 years) the expected occupation of the grammar

school boy is still 0.6 class unit (on a 1-7 scale) higher than that of

secondary modern boys.

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[20] We shall refer to coefficients which exceed 2 s.e. (under the assumption of simple random sampling) as "significant," although, in reality, the nature of the sampling for the LSE inquiry makes it impossible to make exact inferences to a specifiable population.

Table 2.6: Coefficients for elementary model of status
attainment estimated separately for two
school systems

A. Metric Form (Unstandardized) Model Coefficients

Independent Variable	Sample	DEPENDENT VARIABLE		
		Education	Occupation	Income
Father's Occupation	Grammar	+.25*	(-.02)	——
	Sec. Modern	+.32*	+.15*	——
Education	Grammar	——	.43*	-14.33*
	Sec. Modern	——	.49*	-25.64*
Occupation	Grammar	——	——	58.90*
	Sec. Modern	——	——	43.07*
Intercept	Grammar	12.02	-0.53	737.93
	Sec. Modern	9.34	-2.13	925.90

B. Metric Free (standardized) Model Coefficients

Independent Variable	Sample	DEPENDENT VARIABLE		
		Education	Occupation	Income
Father's Occupation	Grammar	+.16*	(-.02)	——
	Sec. Modern	+.28*	+.13*	——
Education	Grammar	——	.67*	-.17*
	Sec. Modern	——	.50*	-.18*
Occupation	Grammar	——	——	.46*
	Sec. Modern	——	——	.29*
R^2	Grammar	.02	.45	.13
	Sec. Modern	.08	.30	.06

NOTE: Estimates derived for Equations 1-4 using LSE longitudinal data. Coefficients
in parentheses do not exceed the standard errors of their estimates (based on
assumption of simple random sampling); those marked with an asterisk exceed
twice the standard errors of their estimates [i.e., under assumption of SRS
sampling they would be significantly different from zero ($p < .05$ two tailed)].

(A) ESTIMATES FOR GRAMMAR SCHOOL SAMPLE

FATHER'S OCCUPATION — -.02 (-.02) → SON'S OCCUPATION
U_2 .74
+.25* (+.16)
+.83* (+.67)
+58.30* (+.46)
SON'S EDUCATION
-14.31* (-.17) → SON'S INCOME
.99 U_1
.93 U_3
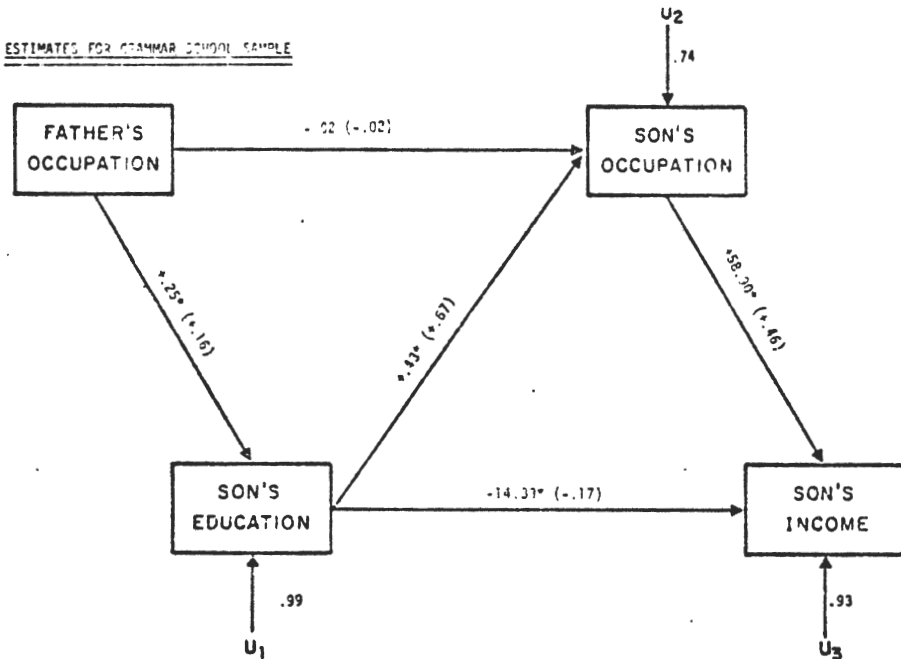
(B) ESTIMATES FOR SECONDARY MODERN SCHOOL SAMPLE

FATHER'S OCCUPATION — +.15* (+.13) → SON'S OCCUPATION
U_2 .84
+.32* (+.28)
+.49* (+.50)
+43.07* (+.23)
SON'S EDUCATION
-25.64* (-.18) → SON'S INCOME
.96 U_1
.98 U_3
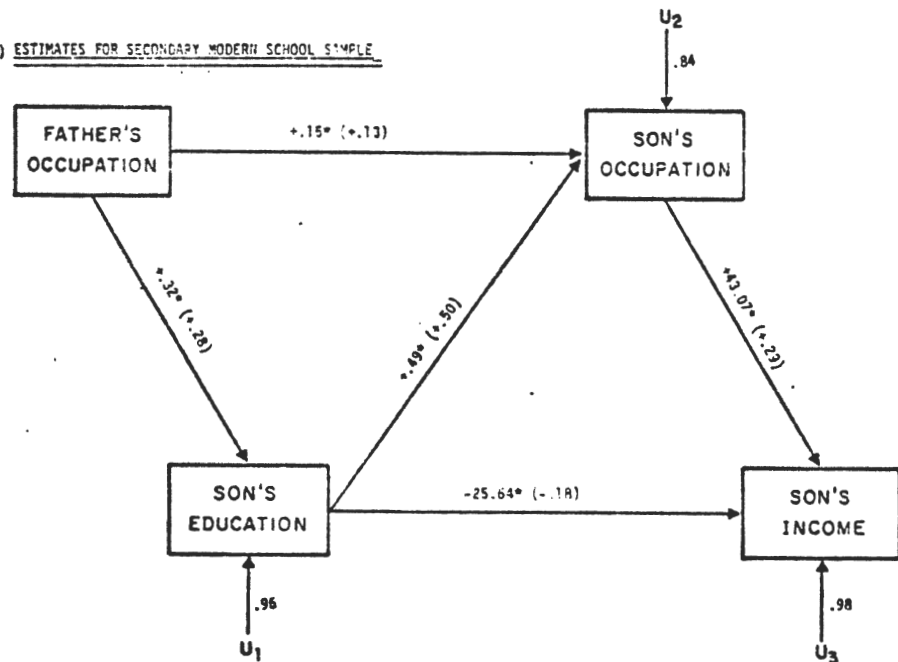
TABLE 2.6 (continued): Diagramatic representation of model estimates for grammar and secondary modern school samples. Entries represent unstandardized coefficients (standardised coefficients appear in parentheses); see text of main table for futher details..

Table 2.7: Expected level of occupation at age 25 for boys of "average" social origin

School Leaving Age	Years of Education		Secondary School System Attended	
			Sec. Modern	Grammar
15	9		2.7	3.3
16	10		3.2	3.7
16.2	10.2	(Mean education-sec. modern)	3.3	3.8
17	11		3.7	4.1
18	12		4.2	4.6
18.9	12.9	(Mean education-grammar school)	4.6	4.9
19	13		4.7	5.0
20	14		5.2	5.4

NOTE: Evaluation assumes that level of father's occupation was 2.8 which is weighted average for grammar and secondary modern school samples. School-leaving age represents age at which education would be completed if boy attended school full-time without interrupting his studies.
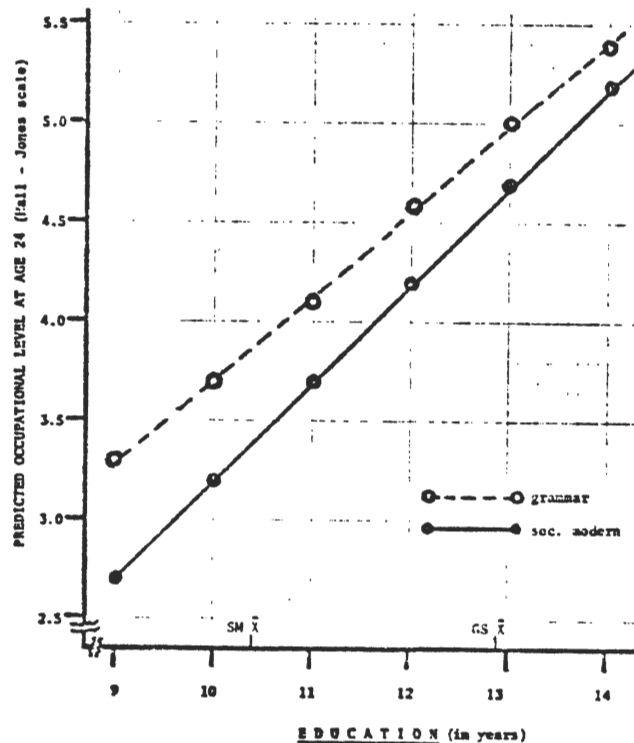
This evidence of the inflated occupational achievements of grammar schoolboys as well as the <u>direct</u> intergenerational transmission of occupational status within the secondary modern subsystem (but not the grammar school) provides empirical support for the 'sponsored mobility' hypothesis. In particular, this analysis suggests that the "sponsorship" provided by the grammar school consists of both the provision of a general advantage in the job market and an attenuation of the influence of social origins upon children's occupational and economic opportunities.

Our analysis also reveals that the effects of the <u>length</u> of schooling, itself, are approximately equivalent in the two school systems. An additional year of education prodices an increment of almost one-half of a Hall-Jones' unit in occupational status at age 25 (b_{OE} = +0.43 (GS) and +0.49 (SM)). However, occupational status is more accurately predicted in the grammar school sample; our model equation for occupational attainment accounts for 45 percent of the variance in the occupational attainments of the grammar school sample, but only 30 percent of the variance for the secondary modern schoolboys. In contrast, although the impact of father's occupation upon educational attainment is approximately equivalent in the two subsystems (b_{EO_f} = +0.25 (GS) and +0.32 (SM)); educational attainment is more <u>dependent</u> upon father's occupation in the secondary modern school (R^2 = 0.08 (SM) <u>vs.</u> 0.03 (GS)).

These are interesting results. In terms of the function of the two educational subsystems, we observe that the intergenerational transmission of social status occurs <u>completely</u> through the mediation of education for grammar school students (i.e., via the compound path whose standard form coefficient is $p_{OE}p_{EO_f}$), while there is a significant effect transmitted <u>outside</u> of the educational system in the secondary modern system. To

further illustrate this variation in function, Table 2.7 decomposes the zero-order correlation of intergenerational status immobility.

Insert Table 2.8 about here

A somewhat anomalous result revealed by our analyses is the negative direct impact of education upon income. While education is a strong determinant of occupational attainment in both samples, it has a reliable negative effect upon income when occupation is held constant. That is, within a given occupational grouping the less-educated earn slightly more at age 25 than their better-educated colleagues. In assessing this finding we must bear in mind that income is poorly determined at this point in life. Thus, these negative path coefficients are most plausibily explained by the inverse relationship which exists between the duration of a student's education and the length of his tenure in an occupation (e.g., while university graduates are just commencing their careers at age 25, those who left school at age 15 have up to 10 years seniority in their positions).

Overall, the results we have obtained are consistent with verbal metaphors which view the grammar school as the "strong" component of the state educational structure which "sponsors" the mobility of its "recruits for elite status." At this point, it is worthwhile to summarize the points of convergence between these verbal metaphors and the evidence provided by the systematization of status attainment into an elementary, four-variable path model:

Table 2.8: Transmission of social advantage from fathers to sons; decomposition of correlation between occupational status of fathers and sons using results from elementary model

Sample	Total Correlation		Method of Transmission	
			Direct (p_{OO_f})	Via Education [A] ($P_{OE}P_{EO_f}$)
Grammar r = (r%)	+.09 (100%)	=	-.02 (-20%)	+.11 (+120%)
Sec. Modern r =	+.27 (100%)	=	+.13 (48%)	+.14 (52%)

NOTE: Decomposition accomplished using results for elementary model as presented in Table 2.5.

[A] I.e., indirect effect via influence of social origins upon length of education which in turn influences occupational attainment.

1) <u>in terms of variance accounted for</u>: Social background
   is more effective in accounting for variation in educational
   attainment within the secondary modern (<u>vs</u>. grammar) school
   system, while educational attainment is a more efficient
   predictor of occupational attainment for grammar school
   students.

2) <u>in terms of mean effects</u>, it is differences in the causal
   path between father's and son's occupation which diff-
   erentiates   the two subsystems. This functional difference
   is in the direction predicted by theories (e.g., Turner, 1960;
   Himmelweit and Swift, 1969) which view the grammar school
   as a "strong subsystem" whose importance in subsequent
   status attainment overwhelms the effects of social
   background.

Our analysis of this four variable model of attainment suggests
that the components of the tri-partite British educational system have functional
as well as structural differences that have been obscured in aggregate
analyses (e.g., Treiman & Terrell, 1972; Ridge, 1974). Our analyses indicate
that the divided <u>state</u> school system which educated approximately 95 percent
of the postwar population in Britain was constituted from two components,
one of which was relatively strong and able to attenuate the influence of
outside social factors on the occupational attainment of its students,
and a second weaker component which did not eliminate the influence of
social background factors in determining the attainment of its pupils in
later life. The third component of this educational system, the independent
(or "public") school, functions in a manner which we cannot empirically

characterize, although we know that "ability to pay" and social position are criteria for admission, and that the education is of an objectively high quality (Kalton, 1966).

A Model of Status Attainment That Incorporates IQ

While the foregoing analyses provide some insight into the process of status attainment in postwar Britain, the four-variable path model we adopted from Treiman and Terrell's work is vulnerable to a number of criticisms. Most importantly, it can be argued that the exclusion of intellectual ability from this model confounds the causal effects of parental social status with those of genotypic intellectual ability. This objection is technically equivalent to postulating that there is an unmeasured variable, heritable I.Q., which causally determines both fathers' and sons' attainments—a view long and widely held among psychologists (e.g., Terman, 1916; Burt, 1961; but see Kamin, 1974, and Bowles & Gintis, 1975, for vigorous dissents). The exclusion of this variable from our elementary model will, if this postulate is true, falsify the assumptions concerning uncorrelated residuals which allow our model to be estimated (because IQ is subsumed in the residual term of two or more equations), and bias our estimates of the model's coefficients.

To counter this objection we can expand the elementary model by introducing childhood IQ as an exogenous variable. The resultant model is shown in Figure 2.4. When the coefficients for this expanded model (see Table 2.9) are compared with those for our initial model (Table 2.6) one finds that very little bias was introduced by the exclusion of IQ from our elementary model. Thus, the results obtained for our "unbiased" model do not alter our conclusions concerning functional
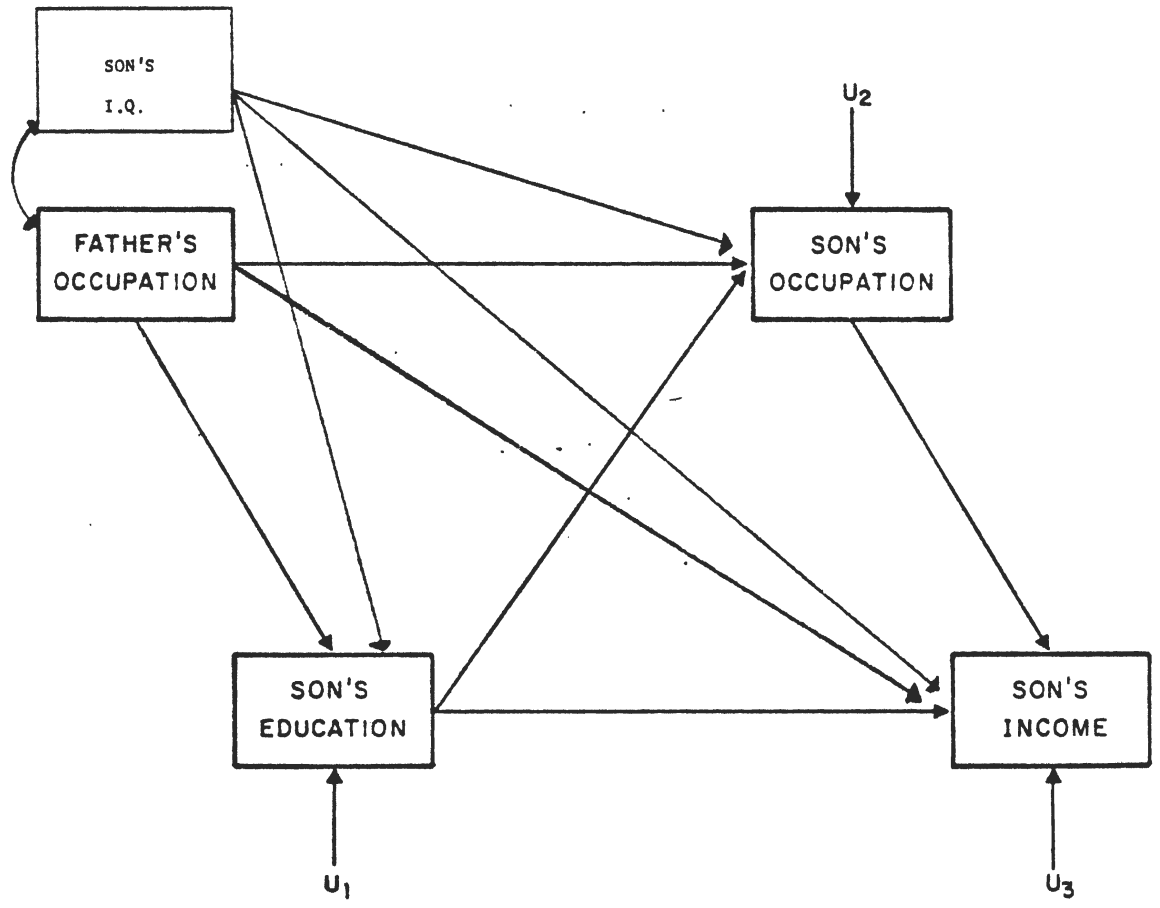
FIGURE 2.4: Expanded model of status attainment incorporating childhood I.Q. as an exogenous variable.

Table 2.9: Estimated Coefficients for Model of Status
Attainment Incorporating Childhood IQ

A. Metric Form (Unstandardized) Model Coefficient

Independent Variable	Sample	Dependent Variable		
		Education	Occupation	Income
Father's Occupation	Grammar	+.25*	(-.02)	(+6.0)
	Sec. Modern	+.28*	+.15*	+24.4
IQ at age 11	Grammar	(+.002)	(-.001)	-1.90
	Sec. Modern	+.033*	(+.05)	+1.50
Education	Grammar	--	+.43*	-14.98*
	Sec. Modern	--	+.47*	-34.51*
Occupation	Grammar	--	--	59.02*
	Sec. Modern	--	--	38.26*
Intercept	Grammar	11.75	-0.40	947.9
	Sec. Modern	6.25	-2.47	820.6

B. Metric Free (Standardized) Coefficients

Independent Variable	Sample	Dependent Variable		
		Education	Occupation	Income
Father's Occupation	Grammar	+.16*	(-.02)	(+.04)
	Sec. Modern	+.24*	+.13*	+.15
IQ at age 11	Grammar	(+.01)	(-.01)	-.08
	Sec. Modern	+.33	(+.05)	+.10
Education	Grammar	--	+.67*	-.18*
	Sec. Modern	--	+.48*	-.24*
Occupation	Grammar	--	--	+.45*
	Sec. Modern	--	--	+.26*
R^2	Grammar	.02	.45	.14
	Sec. Modern	.19	.31	.09

Notes: Model estimated was:

$$E = P_{EO_F} O_F + P_{E,IQ} IQ + U_1$$

$$O = P_{OO_F} O_F + P_{O,IQ} IQ + P_{OE} E + U_2$$

$$I = P_{IO_F} O_F + P_{I,IQ} IQ + P_{IE} E + P_{IQ} O + U_3$$

Unlike elementary model (equ. 1-4), this model does allow for a direct causal influence of father's occupation upon income (i.e., P_{IO_F} is not specified as zero). In estimating

this model for the secondary modern sample our analyses indicated that the joint assumptions of

(1) $P_{IO_F} = 0$

(2) $r_{U_i U_j} = 0$

produced an inadequate fit to the data. The first assumption was therefore relaxed, and the estimated coefficient for the coefficient P_{IO_F} was found to be substantially greater than zero (t>2.0).

- Coefficients in parentheses do not exceed the standard errors of their estimate; asterisks denote coefficients which exceed twice the standard errors of their estimate.

differences in the two educational systems). Thus we find a positively

valued and statistically reliable coefficient of direct intergenerational

status transmission (P_{OO_F}) for the secondary modern school sample (but not

for the grammar school), and we find that the occupational attainment of

the grammar school sample is markedly 'inflated.'

Rather than engage in prolonged consideration of these results,

let us recognize that an even more expanded model of attainment is

probably appropriate. In enlarging the scope of our elementary attainment

models we would wish to assess the relative importance of a number of

further social background factors (e.g., Parents' education, family

size), and to take account of individual differences in personality

and attitudes. These models will be considered in the following chapter.

Theoretical Implications of the Functional Differentiation

of the Educational System

By systematizing status attainment into a four variable

structural equation model we have formalized the verbal metaphor which

holds education to be the "main highway" to occupational success. In

this regard, Treiman and Terrell's analysis of national data for British

males born between 1899 and 1938 adds further substance to the conclusions

of Hall and Glass (1954) that educational and occupational attainment are

strongly related. This result, in itself, is not surprising. The

introduction of "opportunity" and "ability" into our discussion provides

leavening which holds some promise of more stimulating theoretical insights.

Toward this end we note that in a four variable model such as

we initially discuss, "equal employment opportunities" for children of

all social classes might be defined as the case wherein there exists a

null causal path between father's occupation and son's occupation (i.e.,

$P_{OO_F} = 0$). Similarly, education conforms to its metaphoric rule as a

pathway to occupational success when the path coefficient from education

to occupational attainment assumes an appropriately large (positive) value.

Finally a substantial causal path linking father's occupation and son's

education can be interpreted as evidence of unequal educational opportunities.

Within this context the results obtained by Treiman and Terrell provide a

formal demonstration of inequality in both spheres of attainment in Britain.

Our own results with the same four variable model identify an educational

subsystem (the state grammar school _circa_ 1951-5) for which occupational

opportunities are equitably distributed (i.e., not directly influenced

by father's occupation). Recruitment into this subsystem (at age 11), of

course, is still open to social bias.

Following Hall and Glass' conclusion that the "decisive

stage in educational background is the grammar school (1954, 306),"

one may attribute variation in model parameters[21] (between school systems)

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[21]Since these comparisons have employed metric form coefficients
and variables that are identically coded in the two subsystems, differences
in sample variances are excluded as a potential explanation for our findings.
Nonetheless, since the "input characteristics" of the two educational
systems differ, it is possible to offer a class of alternative explanations
which challenge the assumption of linear effects for one or more exogenous
variables. So, it might be proposed that father's social status ceases
to be effective _above_ a certain "threshold" level, and hence, the
parameter estimates for the grammar school could be seen to reflect the
relatively greater frequency of "high status" families in this sample,
rather than a difference in the functional characteristics of the two
educational subsystems. We are inclined to reject outright this genre
of interpretation because of the great overlapping of the social class
distributions in the two subsystems and the findings of linearity in the
effects of similar variables in American populations. Nevertheless, since
the distributions do overlap in the two subsystems, we can partially test
the validity of this alternative interpretation. To accomplish this we
divided the grammar school sample at the mean SM value for father's
occupation (O_f) and re-estimated the parameters for the model equations
predicting educational and occupational attainment within each of the four
resulting partitions of the sample. Variations in the value of the model's
parameters did not exceed chance expectations. This finding engenders
some confidence in our attribution of variation in parameter extimates to
functional characteristics of the subsystems.

to the peculiar importance of the British grammar school in status
attainment. Allied considerations of the "strength" of the grammar
school (Himmelweit and Swift, 1969) and its ability to "sponsor" status
attainment (Turner, 1962) provide a further basis for this interpretation.
Within the structure of our linear, additive model, a differentiation in
the functioning of components of the educational system will express itself
in a systematic variation in model parameters. This interpretation is
equivalent to viewing school type as an interactive factor which determines
the strength of relationships between variables in the model. By focusing
attention upon the role of educational achievement as a mediating variable
in the attainment of occupational status, we have been afforded a number
of further insights. Most importantly, we find that education appears
to function as an all encompassing mechanism for the intergenerational
inheritance of occupational status for grammar schoolboys, but in the
secondary modern subsystem education mediates effects which are
supplemental to the direct intergenerational transmission of status.

At this point we might simply conclude that functional
consequences for stratification follow from the structural division
of the British educational system. Drawing attention to the dangers
implicit in mechanical translations of American analytical models into
foreign idioms, we might well conclude our discussion with a plea for
heightened sensitivity to cross-national variations in the nature of the
stratification process. Indeed, a recent philippic on the "ethnocentric"
errors of Treiman and Terrell's analyses (cf. Burroway, 1977), drew just
such a lesson ad nauseam.

Alternatively, one might inquire whether any of these
conclusions have more general application.

Are their parallel cleavages in the process of status attainment
in the U.S.A.? Traditionally, the selection of grammar school students in
Britain is done largely on the basis of IQ. The 'brightest' eighteen
percent of the population is assigned to grammar schools where they are
prepared for the professions "of pen and tongue." The remainder of the
state school pupils (i.e., 82 percent) are consigned to a custodial system
in anticipation of their laboring as manual workers. This division of
the educational system corresponds rather closely to division of the British
labor force; figures from the 1931 Census of England and Wales[22a] indicate
that about 75 percent of the British labor force was employed in non-manual
occupations at the time this reform of secondary education was recommended
(Spens Committee, 1938).

What we would like to know is whether the dissimilarities we
found in the process of status attainment for pupils in the two separate
educational systems in the U.K., have implications for other countries,
such as the United States. We would also like to know if the variations
in the structure and function of education in Britain are related to
national labor needs.

The appropriate analyses are straightforward, although it
is difficult to obtain strictly parallel data   in
sufficient quantity to permit the necessary subsample analyses (e.g.,
separate analyses for 'brightest' 18%). Longitudinal databases of
sufficient size (with pre-career IQ measures), needless to say, are
virtually non-existent.[22] One body of cross-sectional data which includes

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[22]The one American exception being Sewell's work (cf. Sewell
& Hauser, 1975); data from this study are not publicly available.

[22a]
     cf. Census of England and Wales, 1931: General Report,
XLVIII.

a gross measure of verbal IQ (Thorndike-Lorge Verbal Intelligence Test)
is publicly available from NORC's General Social Survey. By combining
surveys done in 1974 and 1976 we obtain a combined sample of 1360 men.[23]

Structural equation models of status attainment (e.g., Blau &
Duncan, 1967; Sewell & Hauser, 1975; Treiman & Terrell, 1975; Hauser &
Featherman, 1977) and human capital studies of returns to investments
in education commonly assume that system of occupational stratification
in America is functionally unified. The evidence we have seen so far
indicates that this is not the case in Britain. To test this assumption
we can re-estimate for the U.S.A. the common model equation representing
occupational and income attainment to assess whether,

1. At all levels of cognitive ability, education is equally
   productive in terms of the occupational and economic
   rewards it produces;

2. and, whether the levels of status and income inheritance
   portrayed in such models are constant across all levels of
   ability.

To apply of our notion of a divided stratification system to the
U.S.A. we have replicated the British division of the population by IQ (the
criterion used for school placement in the U.K.).[24] Our analyses employ

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[23]The status attainment measures in this database are carefully
conceived and highly reliable; re-estimating Treiman and Terrell's
elementary attainment model with these data, we have obtained estimates
for the model coefficients (cf. Appendix Table A1.2) which are virtually
identical to those derived in the original study which used Census (CPS)
survey data on 20,000 American men.

[24]The use of an adult IQ measure will necessarily result in
some misclassification of the populations' pre-career IQ (i.e., their IQ
in secondary school). Blooms (1964) work on the stability of IQ between
childhood and adulthood suggests that the resultant errors will be modest;
the coefficient of temporal stability for IQ appears to be quite high ($r = +.9$). Explorations by Duncan et al. (1972, Ch. 5) suggest that the role
played by education in determining IQ scores measured in adulthood are
quite small in models of the type estimated here (e.g., bias in estimate of
"effect" of education is -4% (for prediction of adult income and occupational
status); bias in estimated effect of IQ, however, is approximately +25%).

three subpopulations[25] obtained by breaking the IQ distribution at a point

one standard deviation above and one standard deviation below the mean

IQ, i.e.,

1. High IQ population: top 15 percent (approximately: IQ>115)

2. Middle IQ population: middle 60 percent (approximately:

   85<IQ<115)

3. Low IQ population: bottom 15 percent (approximately:

   IQ<85)

In considering our results it should be borne in mind that we are working

with a non-institutionalized, English speaking population contacted and

interviewed in an NORC survey. Non-English speakers and, most probably,

individuals suffering from severe mental retardation would not appear in

this sample. Cronbach's coefficient of internal reliability for the IQ

scale used in this study is +0.78, which is quite high for an instrument

which used only ten test items.

Table 2.10 presents coefficients for the relevant occupational

and income[26] equations estimated for each of the three subpopulations

described above. Figure 2.5 illustrates the trend in the

coefficients representing the 'effect' of education upon socioeconomic

attainment and the degree of status inheritance in different segments

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[25]Symmetry prompted us to look at the Low IQ group; as will be
seen from our results, this was a fortunate choice.

[26]Following Griliches & Mason's (1975) analytic strategy we
have also estimated a semi-log form of the income equation in which the
dependent variable is the natural logarithm of personal income in the
year prior to the survey. This analyses does not produce markedly
different conclusions, and so we have chosen to present the results
for the untransformed equation. Estimates for the semi-log form of the
income function are presented Appendix Table A1.3.

Table 2.10a: Estimates of the Net Effect of Father's
Occupational Status, Education and IQ
Upon the Occupational Attainments of
American Men

Equation: $OCC = a_1 O_F + a_2 ED + a_3 IQ + C$

Independent Variable	coeff.	All Men	Low IQ[a] Men	Average IQ[b] Men	High IQ[c] Men
O_F: Father's Occupation [SIOPS metric]	STD	.109	.196	.118	.027 (ns)
	UNSTD	.127	.224	.135	.028 (ns)
	SE	.030	.088	.036	.067
ED: Education (in years)	STD	.371	.087 (ns)	.405	.575
	UNSTD	1.267	.234 (ns)	1.432	2.543
	SE	.104	.205	.118	.279
IQ: Thorndike-Lorge IQ	STD	.192	.001 (ns)	.114	.006 (ns)
	UNSTD	.149	.001 (ns)	.159	.022 (ns)
	SE	.023	.104	.046	.238
C		7.054	27.364	3.634	8.923
R^2		.293	.142	.248	.337
Sample Size		1152	168	805	178

Table 2.10b Estimates of the Net Effect of Father's
Occupational Status, Education and IQ
Upon the Annual Personal Income of
American Men

Equation: $Income = a_1 O_F + a_2 ED + a_3 IQ + C$

Independent Variable	coeff.	All Men	Low IQ[a] Men	Average IQ[b] Men	High IQ[c] Men
O_F: Father's Occupation [SIOPS metric]	STD	-.030	+.037	-.041	-.055
	UNSTD	-20.86	+24.49	-26.22	-42.12
	SE	22.08	71.91	25.21	55.86
ED: Education (in years)	STD	+.225	+.203	+.175	+.381
	UNSTD	445.52	320.04	386.62	779.85
	SE	75.26	169.04	92.73	150.71
IQ: Thorndike-Lorge IQ	STD	+.232	+.109	+.197	+.077
	UNSTD	107.88	118.91	147.28	175.77
	SE	17.65	117.05	31.05	182.77
C		-3749.71	-4555.88	-7058.17	-15978.16
R^2		.158	.055	.091	.153
Sample Size		870	86	616	168

Source: General Social Survey. Correlations between occupation and education variables are estimated from all available cases in 1973, 1974, 1975, 1976 surveys (total N = 5977); estimates of correlations involving IQ are derived from 1974 and 1976 surveys (total N = 2985). Final row of tables indicates minimum sample size used to estimate any correlation.

[a] Low IQ = bottom 15% of the population (IQ less than 85).

[b] Average IQ = middle 70% of the population ($85 \leq IQ \leq 115$)

[c] High IQ = top 15% of the population (IQ greater than 115)
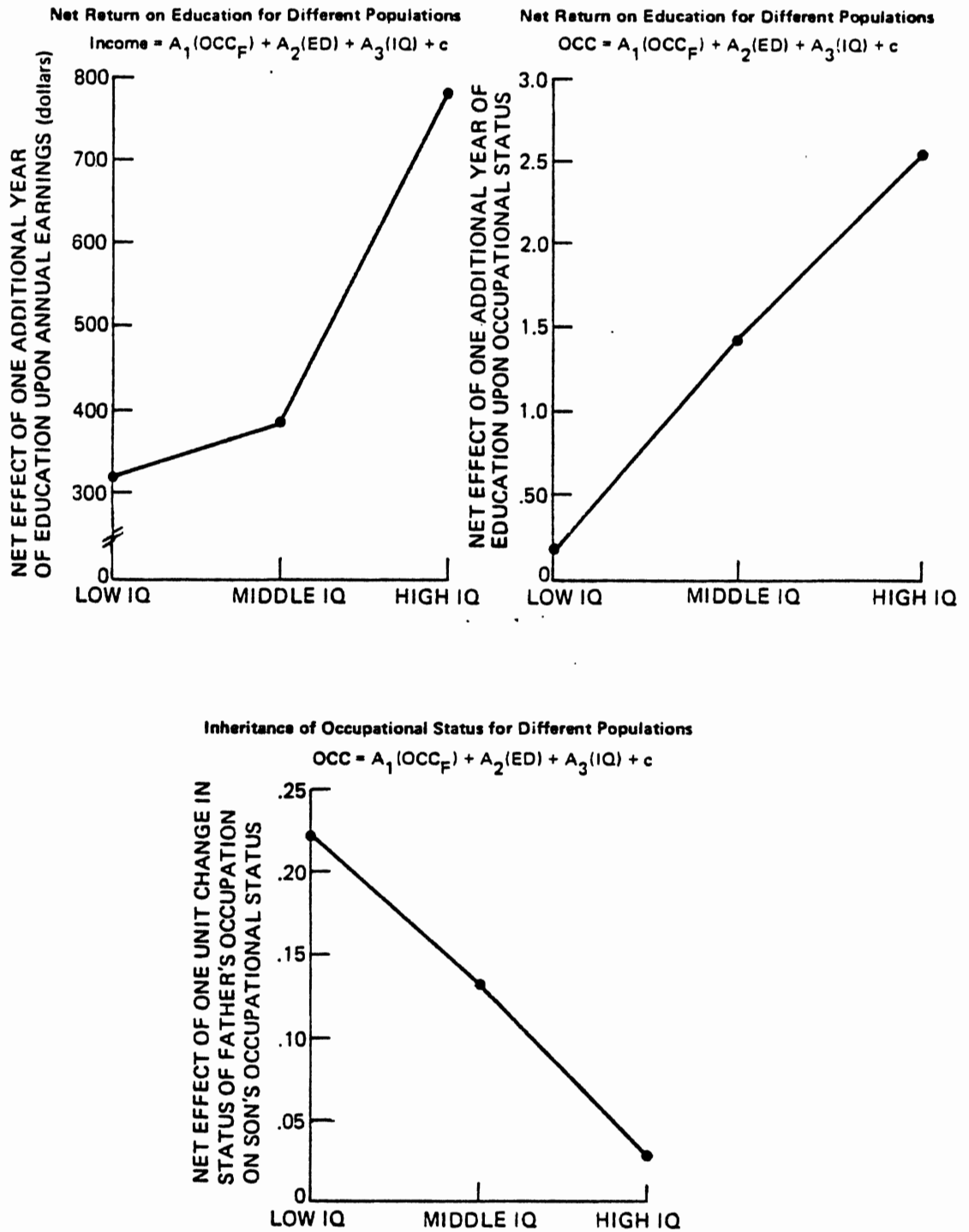
Figure 2.5: "Status inheritance" and "returns to education." coefficients estimated for populations differing in verbal ability (IQ).

of the IQ distribution. We note from these results that occupational and
economic consequences of education rise dramatically with the IQ of the
population. Indeed, for the bottom fifteen percent of the IQ distribution the
estimated "effect" of formal education upon occupational attainment is not
reliably different from zero (effect $\pm$ std. error = .235 $\pm$ .205).[27] Furthermore
the role of 'status inheritance' in occupational attainment decreases with
the IQ level of the population. Thus, while men in the Low IQ group inherit
a 20% advantage from the prestige of their father's occupations (net of IQ and
Education), the High IQ group shows no evidence of occupational inheritance
$\left[\text{net effect of inheritance } (b_{OO_f}) = +0.037 \pm .25\right]$. The latter results are
consistent with our evidence from Great Britain. It will be remembered that
occupational inheritance was attenuated at the top of the IQ distribution
in Britain (i.e., for grammar schoolboys).

Our findings regarding the role of education are particularly
provocative since they suggest that Education is not a universal facilitator of
occupational attainment. The returns to investment in education in the U.S.A.
appear to be moderated by the intellectual ability of the individual. This
occurs despite the fact that the role of social origins (i.e., O_F) in determining
educational attainment is constant across the subpopulations we are using
(cf. Appendix Table A1.4).

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[27]n.b., these standard errors are estimated under assumption
of simple random sampling. Convention suggests that NORC clustering dictates
inflating s.e. by 1.4.

These findings empirically falsify the fundamental assumptions upon which many recent stratification and human capital studies have been based. In particular they suggest that attention should be given to internal divisions in the labor market. We have seen that for one group of workers, i.e., those scoring low on our measure of intellectual aptitude, occupational inheritance is a potent factor in attainment while formal education is relatively unimportant. In contrast, for workers scoring high on our measure of ability, formal education is an overriding factor in determining occupational and economic attainment; occupational inheritance is virtually non-existant. These results suggest that universal models of socioeconomic attainment have oversimplified that process by ignoring important variations in the process itself and the functioning of the labor market. Our results also appear to strengthen recent critiques (cf. Cain, 1975; Bowles & Gintis, 1975; Boudcn, 1974) of the inadequacy of social structural and econometric models which claim that reductions in inequality of educational opportunity will significantly reduce occupational and economic inequalities.

A final speculation

In concluding this section on elementary models of status attainment, let us reconsider a central phenomenon treated . by these models i.e., the large correlation between education and occupational attainment. Figure 2.7 plots this relationship for the 1962 OCG data using first the straight line function ordinarily fitted to these data and then a broken plot consisting of a straight line which deviates little from the horizontal ($b \approx 0$) for one to eleven years of formal education and then is steeply sloped line for 12 to 20 years of education ($b \approx 6$). The point of inflection in
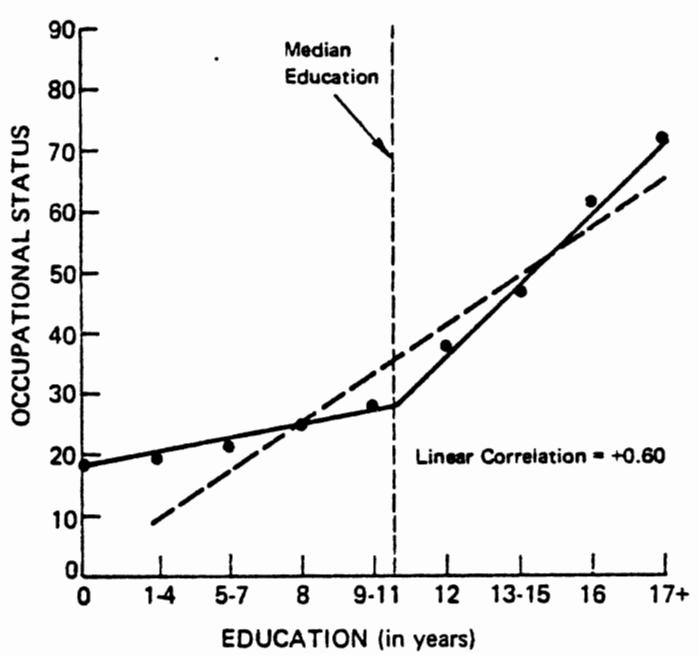
SOURCE: Occupational Changes in Generation Data (N = 20,700)

Figure 2.7: Relationship of educational attainment to socioeconomic status of occupation for American Males aged 25 to 64 (source data from Blau & Duncan, 1968).

the latter plot occurs at the median of the educational distribution. In

other words each plot describes the relationship between education and

occupation for approximately one-half of the male labor force. We note

further that the workforce itself was also split approximately 50-50 into

manual vs. non-manual workers in 1962 and that, to a very large degree,

these two divisions partition the workforce into identical subsets.[28] Thus,

one might argue that the nature of functional differences between the association

of education and occupational status which we have observed parallel

structural divisions in the labor force. Thus, for workers whose lower educational

attainment 'qualifies' them for manual work there is little association between

the status of the jobs they obtain (or advance to) and the level of their

education. However, for the half of the population which 'qualifies' for

non-manual employment there is a very considerable relationship between

formal education and occupational attainment.

If our speculation about the genesis of the inflection point in the

crossplot of education by occupational status is correct, then some testable

implications follow. Most importantly, we should be able to observe a shift

in the point of inflection as exogenous pressures bring about changes in the

distribution of occupations. Two decades ago when the American male labor

force consisted of only 32 percent non-manual workers, we would expect the

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[28] In 1959 only 17% of all male workers with less than 12 years of education were employed in "white collar" jobs, while 59% of those with 12+ years of education were classified as "white collar" workers (Source: U.S. Bureau of Labor Statistics, Special Labor Force Report: 1, 1959).

inflection point to be displaced so that it split the educational distribution
into a 32-68 dichotomy.[29]

Testing this hypothesis, unfortunately, requires data which are not
presently available. However, when public use samples of pre-1960 census
data become available, it will be possible to observe whether the inflection
point in the occupation-education function tracks the division of work force
into manual and non-manual workers. Until such data are available, however,
our interpretation remains only a post hoc speculation.

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[29]To some extent we might also expect similar relationships to
emerge in cross-national studies which use internationally standardized
occupational prestige scales, however, this implication could admit to
considerable exception. While we would expect to find such a phenomenon
where the intellectual attainments associated with various lengths of
schooling were not rigidly specified, we would not expect this result when
the educational system used fixed national exams which were intended to be set
standards that were relatively constant across time. In America, of course,
the intellectual competencies (such as literacy) which are signified by given
levels of education have undergone substantial redefinition over time.

To an indeterminate extent this redefinition of standards has
allowed the mass education movement in America to raise the educational
"attainments" of the population in terms of completed years of schooling, while
simultaneously providing flexibility so that educational programs could be
tailored to the perceived educational needs of new white collar professions
(e.g., computer programming, nuclear engineering, journalism, etc.). In
societies that have retained traditional methods of maintaining national
educational standards, one might expect that adaptation of the educational
system to changes in the occupational structure might be too complex to be
captured in any 'years of schooling' variable. Adaptation in this case might,
occur through the proliferation of alternative educational structures and/or
on-the-job training such as, the colleges of further education, polytechnics,
City & Guilds courses, chartered accountancy apprenticeships, etc. which
have developed in Britain.

Chapter 3

THE ROLE OF PERSONALITY IN SOCIOECONOMIC ATTAINMENT

"...neither parental status nor IQ scores explains most of the
variation in occupational status or income. Yet we find it
hard to believe that all of this variation is due to luck or
chance. Experience suggests that there are personality
differences between people who end up in high- and low-status
occupations, and also between people who have high or low
incomes. We believe, though we cannot prove, that these
noncognitive traits explain part of the variation in adult
success."

-Christopher Jencks et al., Inequality, 1972

"Of all the variables omitted in our analysis, we would judge
personality traits to be the most likely to bias our [model]
coefficients."

-Paul Taubman & Terence Wales, Higher Education
and Earnings: "The human capital approach
to higher education." (Ch. 5), 1974.

In the preceeding chapter we considered two elementary models of the process of socioeconomic achievement. In this chapter we expand the scope of these models to take account of individual variations in human personality. Thus, while the preceeding chapter subjected our data on attainment in Britain to analytic models whose properties have been extensively investigated by students of social mobility and labor economy (e.g., Blau & Duncan, 1967; Sewell & Hauser, 1975; Taubman & Wales, 1974), the present chapter attempts to break new ground by asking how psychology can contribute to our understanding of socioeconomic attainment. As we shall see in chapter five, this attempt to venture across disciplinary boundaries has advantages for our understanding of psychological--as well as socioeconomic--phenomena.

Given the availability of pre-attainment measures of personality, there are several important questions which are open to empirical analysis. These include: (1) the specification of the influence, if any, which personality has upon socioeconomic attainment; (2) the elaboration of the manner in which this influence is transmitted; and (3) the consideration of the role socioeconomic variables play in the shaping of human personality. The present chapter and chapter four considers the first two questions; chapter five considers the third question.

We have previously discussed (see, chapter one) the logic of our analytic strategy and the particular need for longitudinal data; we shall not repeat that discussion here. However, one point about the framing of the central questions of this chapter does deserve repetition. That point is the advantage we hope to derive from the inclusion of psychological variables in our analysis; these advantages include:

(1) That the inclusion of personality variables may improve our ability to account for individual variations in socioeconomic attainment;

(2) That the inclusion of such variables may help flesh-out our understanding of macro-social processes, such as status inheritance, by specifying the mechanisms which mediate such processes. For example, our analysis might tell us how (i.e., through what aspect of personality) a father's occupational status 'causes' variations in the socioeconomic achievement of his children.

(3) That a demonstration of the impact of personality variations upon macro-social processes would provide an example of the real-world relevance of basic research on the psychology of personality.

OVERVIEW OF ANALYSIS

Building upon the elementary models described in the preceeding chapter, we will commence our analysis by estimating a somewhat expanded model of socioeconomic attainment which incorporates both IQ and several "new" social background variables which we suspect influence

socioeconomic attainment. Using this model as a "baseline" for comparisons we will then expand this model to include one further stage representing the formation of adolescent personality. This latter stage, which antedates occupational attainment, will draw upon information available in the LSE database concerning the attitudes and personality of this sample at age 12-13. The remaining stages of our model represent the various dimensions of socioeconomic attainment (i.e., education, occupational status, and income) which are largely unchanged from chapter two. In estimating this expanded model we also consider measures of occupational attainment taken after age 24-5 (age 28-29 and age 32-33) in order to look at "delayed" effects of personality.

Our analysis seeks answers to three types of theoretical questions which have had relatively straightforward representations in our model. Specifically, we wish to know,

1) What contribution does the addition of adolescent attitude and personality variables make to the explanation of variations in adult attainment?

This question will be considered by expanding the "basic" sociological model to include such variables. The increments in R^2 for the structural equations representing the educational and occupational attainment process provide an index of the additional expanatory power afforded by these variables (cf. Cohen, 1968).

2) To what extent do personality and attitudes serve as mediators in the social process by which status is transmitted from parents to children?

Mediational hypotheses--of the general type proposed by Lefebvre (1968)[1]--predict that there will be a substantial causal path

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[1]"Tout l'individuel est deja social, mais a des niveaux successifs de sorte que l'interiorite reproduit et contribue ainsi a produire les profondeurs de la vie social (Lefebvre, 1968. 370)." [Individual psychology derives from the society (at an earlier stage) in a manner whereby the individual reproduces it (internally), and thus contributes to the maintenance of the bases of the society (our free translation).]

See also Moore (1969) for a systematic review of the literature on the interrelation of social structure and individual psychology.

between social background (X_i) and childhood measures of attitudes and personality (M_i), and that subsequently these attitude and personality variables will exert a strong determining influence upon adult attainment (Y). To investigate this hypothesis the path coefficients for such "indirect" effects $(P_{Y M_i} P_{M_i X_i})$ will be computed, the magnitude of these coefficients will provide an index of the relative importance of mediational (vs. direct) processes in the intergenerational transmission of status.

3) Lastly, what contribution do social background, childhood personality (and attitudes), and adult attainment, make to the shaping of adult personality and attitudes?

Although this type of question has not been studied by previous investigators, the appropriate analytic strategy is relatively straightforward. To confront this question we will expand the social-psychological model used in the first two analyses to a further stage in which the final outcome variables are psychological indicators (e.g., reported depression, extraversion, ambition, "satisfaction" with life situation). Path analysis can then be employed to estimate the direct and complexly mediated effects of such variables upon an individual's psychological state in adulthood. Analysis appropriate to this question will be presented in chapter five.

Given this agenda for our analyses, the first task is to estimate the parameters of an expanded sociological model of status attainment; this model will provide the foundation for our psychological inquiry. Having

estimated this baseline model, we will then describe the nature of the
personality variables to be included in our expansion of this model of
attainment.

A Baseline Model of Status Attainment

Longitudinal information on the LSE sample affords a large
universe of variables from which to construct a more complete multivariate
model of status attainment. In our expanded sociological model we
incorporate the following measures of social background, family structure,
and cognitive ability:

a) Father's occupation (O_f): coded, as before, on the

seven-point Hall-Jones scale of occupational prestige;

b) Family size (FS): number of children in the

household at age thirteen;

c) Parental education[2] (E_p): a dummy variable coded as

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[2]Ideally, one would wish to have a more finely-graded measure
of parental education; unfortunately none is available to us. Comparison
of correlations obtained with this measure and those reported by Kerckhoff
(1975) using a six-point scale of father's education in a British national
sample show considerably similarity, but it also suggests that the
restriction of range in our coding may have attenuated bivariate
correlations involving parents' education by approximately 35-40%. However,
since the two samples differ somewhat in the universe they represent, no
firm conclusions can be drawn from this comparison.

| Sample | Correlation With Parents' Education | | | |
	O_f	FS	IQ	ED (Yrs.)
Weighted LSE	.39	-.14	.19	.30
Kerckhoff	.53	-.19	.27	.43

"1" if either parent attended a "selective" (i.e.,
grammar or public) secondary school;

d) <u>Ordinal position</u> (OP): a dummy variable coded as "1"
if the subject was a firstborn child (n.b., only-children
are coded as "1");

e) <u>I.Q.</u>: subject's score at age eleven on aptitude scale
of secondary school placement test (i.e., the "eleven-plus
examination").

These five variables are introduced as exogenous variables in the
expanded model; they will be used to predict status attainment as
reflected in three endogenous variables: Education, Occupation, and
Income.

Table 3.1 presents the means, standard deviations, inter-
correlations and estimates of measurement reliability[3] for all variables
used in this chapter. An examination of the means for these variables
reveals further differences in the input characteristics of the two
educational subsystems. By comparison with the secondary modern

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Insert Table 3.1 About Here

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school, the grammar school sample is not only of higher ability, but
comes from more educated, higher status homes. The pupils are also
more likely to be first-born or only-children, and to come from
smaller families. As noted before, the "output" of the two subsystems also
differs. This differentiation in mean characteristics is consistent
with other findings for children of the same period (e.g., Douglas, 1968),
and will not concern us further. Instead, let us consider a multivariate
model interrelating these variables.

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[3]See Appendix 2.1 for a discussion of measurement reliability of
these variables.

Table 3.1: Intercorrelations, means and standard deviations for social and psychological variables used in the analyses of this chapter.

Note on reading: the original table is rotated on the page and the scan is of low quality. Correlations for the secondary modern school sample appear above the main diagonal; those for the grammar school sample appear below. Reliability estimates appear in parentheses on the main diagonal. Many off‑diagonal values are only partially legible; they are transcribed as best read.

Variable	O_f	OP	E_p	FS	IQ	E	O_1	O_2	O_3	I	FR	AD_1	AD_2	AD_3	AD_4	ASP	SEC. MODERN Mean	S.D.	N
O_f: Father's Occupation	(.89)	.05	-.28	-.16	.12	.31	.31	.20	.10	.07	-.05	.11	-.02	.13	-.04	.12	2.69	1.08	187
OP: Ordinal Position	-.04	(1.0)	.04	-.53	-.04	.15	.08	.19	.12	.01	.08	.15	-.11	.10	-.05	.11	0.41	0.49	187
E_p: Parents' Education	.52	.04	(.95)	-.18	.09	.25	.27	.14	.11	.09	.28	.01	.09	-.03	.07	-.12	0.14	0.35	187
FS: Family Size	-.05	-.53	-.18	(1.0)	-.12	-.18	-.23	-.23	-.13	-.10	.09	.14	-.10	.07	-.01	.09	3.06	1.50	187
IQ: IQ at age 11	-.04	-.16	.09	-.13	(.93)	.38	.26	.23	.25	.11	.21	.18	.14	-.06	.18	.17	97.61	12.15	187
E: Education	.17	.15	.25	-.18	.38	(.95)	.58	.63	.72	-.02	.12	.23	-.04	-.07	.20	.23	10.20	1.21	187
C_{33}: Occupation: 1970	.13	.08	.13	-.23	.26	.58	(.89)	.85	.87	.14	.10	.16	.19	.20	-.03	.17	3.29	1.20	187
O_{28}: Occupation: 1966	.20	.19	.14	-.23	.23	.63	.85	(.89)	.95	.19	.18	.23	.18	.20	-.04	.18	3.60	1.38	115
O_{24}: Occupation: 1962	.10	.12	.11	-.13	.25	.72	.79	.95	(.89)	.05	.07	.07	.03	.30	-.11	.10	4.04	1.51	78
I: Income: 1962	.07	.01	.09	-.19	.11	-.02	.10	.14	.19	(.85)	.14	.25	.07	.30	-.11	.10	806.13	177.64	187
FR: Family Relations	-.05	.08	.28	.09	.21	.12	.22	.16	.10	.14	(.75)	.15	-.08	-.05	.02	.10	4.67	1.78	187
AD_1: Achievement Or.	.11	.15	.01	.14	.18	.23	.16	.23	.16	.25	.15	(.75)	-.29	-.07	.07	.07	4.30	1.81	187
AD_2: Neuroticism	-.02	-.11	.09	-.10	.14	-.04	.19	.18	-.04	.07	-.08	-.29	(.75)	.06	.12	-.10	4.90	1.90	187
AD_3: Introversion	.13	.10	-.03	.07	-.06	-.07	.20	.20	-.07	.30	-.05	-.07	.06	(.75)	-.43	.06	4.83	1.33	187
AD_4: Conservatism	-.04	-.05	.07	-.01	.18	.20	-.03	-.04	-.11	-.11	.02	.07	.12	-.43	(.90)	-.22	5.38	1.91	187
ASP: Aspirations: 1962	.12	.11	-.12	.09	.17	.23	.17	.18	.10	.10	.10	.07	-.10	.06	-.22	(.90)	4.15	1.34	187
SS: Mean	3.59	.67	2.23		118.1	12.9	5.00	5.28	5.70	847.4	5.43	5.65	5.16	5.22	4.40	5.27			
Std. dev.	1.26	.47	1.10		6.72	1.99	1.28	1.28	1.12	165.7	2.00	1.93	2.04	1.92	1.96	0.96			
Sample Size	263	263	263		263	263	263	209	168	263	263	263	263	263	263	263			

Notes. Correlations for secondary modern school sample appear above the main diagonal of the table; those for the grammar school sample are below. Estimates of measurement reliability appear in parentheses in the main diagonal of the table; bivariate correlations have been corrected to adjust for attenuation arising from measurement unreliability as described in the text. A full set of uncorrected coefficients is presented in Appendix Table.

Our baseline model of the attainment process is presented as

a path diagram in Figure 3.1 The normal conventions for such a

representation (Duncan, 1966) have been followed. The time order of

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Insert Figure 3.1 Here

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the endogenous variables determined the direction of their presumed

causal linkages. Thus, while performance in school can influence

occupational attainment, the reverse is not plausible. The causal

model presented in Figure 3.1 is isomorphic with an exactly identified

system of equations consisting of,

(3.1) $\quad E = P_{EO_f}O_f + P_{EE_p}E_p + P_{E,FS}FS + P_{E,OP}OP + P_{E,IQ}IQ + P_{EU_1}U_1$

(3.2) $\quad O = P_{OO_f}O_f + P_{OE_p}E_p + P_{O,FS}FS + P_{O,OP}OP + P_{O,IQ}IQ + P_{OS}S + P_{OU_2}U_2$

(3.3) $\quad I = P_{IO_f}O_f + P_{IE_p}E_p + P_{I,FS}FS + P_{I,OP}OP + P_{I,IQ}IQ + P_{IE}E$

$\qquad\qquad + P_{IO}O + P_{IU_3}U_3$

together with equations specifying O_f, E_p, IQ, FS, and OP to be

exogenous variables. Within this model <u>educational attainment</u> is seen

to be a linear, additive function of the child's social background

and his intellectual ability. <u>Occupational attainment</u> at age 25 is

determined both by educational attainment (E), and by the subject's

IQ and social background. As before, <u>income</u> depends directly upon

one's present occupation, and education, and, in the expanded model,

it is also seen to depend upon the full set of other background variables.

Although most of the theory represented in this model is

straightforward (<u>cf</u>. Duncan <u>et al</u>., 1972), certain relationships require

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[4]Despite contrary claims in the literature (e.g., Treiman & Terrell, 1975), evidence from our analyses indicate that there are significant residual effects of family background upon income even when occupational status and educational level are controlled. For this reason, our 'baseline' model incorporates the full set of exogenous variables in the income equation.

For certain analyses we will drop from this equation the term representing "occupational prestige," the justification for this exclusion will be discussed in a later section of this chapter.
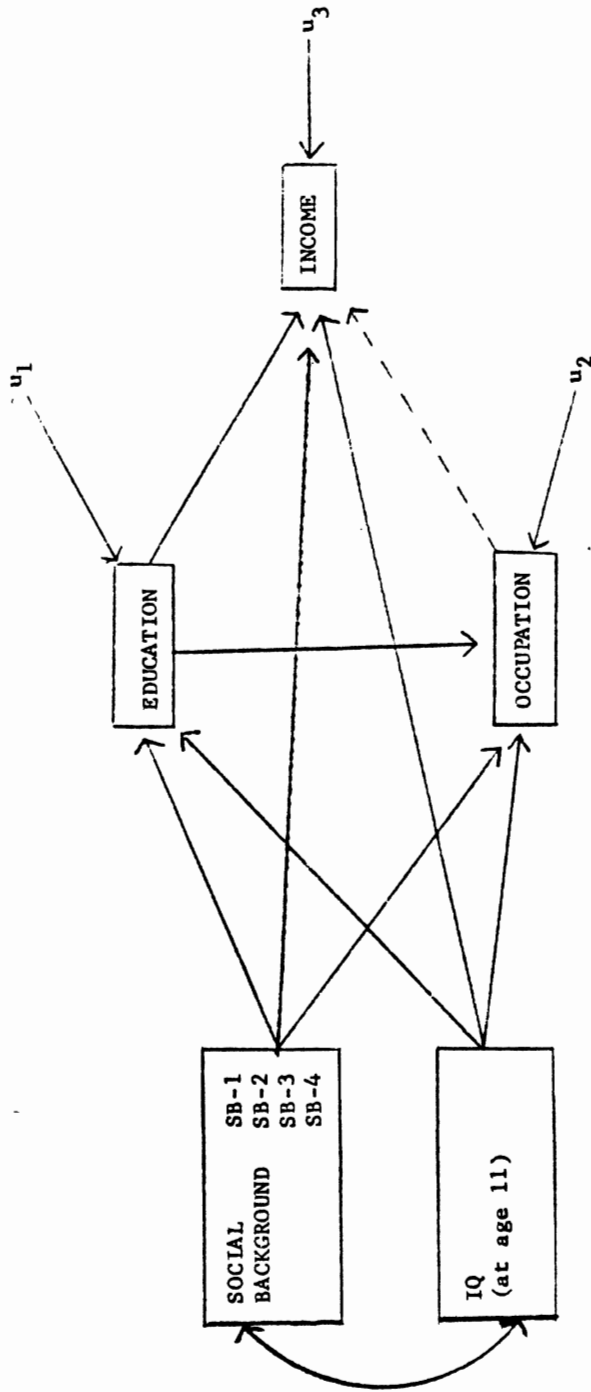
Figure 3.1: Schematic diagram of baseline model of socioeconomic attainment. To simplify presentation paths in income equation which will be eliminated in subsequent versions of model are shown with a dashed line. Social Background factors are (1) Father's Occupation, (2) Parents' education, (3) family size, and (4) ordinal position.

discussion. For instance, the role of family size and ordinal position as determinants of educational and occupational attainment reflects the fact that the number of children in a household determines how much of a family's finite resources will be available to each child. The identification of firstborn children allows some weight to be given to the sequencing of births which is of importance since, at least for a time, every firstborn child is an only-child. In addition to these considerations, the positioning of these variables in the model rests upon the idea (e.g., Zajonc & Markus, 1975, Schacter, 1959) that family size and birth order may determine patterns of childhood interaction which are of consequence in development. We conceive these effects to be independent of IQ and to have a sustained impact upon occupational and educational success.

With regard to these variables, Douglas et al. (1968, Tables 32, 33) has previously reported a positive association in Britain between reading test scores and being firstborn in a two-child family, and also between family size and staying-on at school (when IQ is controlled). Nonetheless, the direct impact of these factors upon occupational attainment (exclusive of the impact mediated by education) has never been estimated. Furthermore, Douglas et al's analysis of the relationship between family size and school-leaving (i.e., their Table 32) does not rule out the possibility of a spurious association arising from the correlation of social class and family size on one hand, and social class and school-leaving age on the other.

The remaining social background variables are thought to influence attainment in two ways. First, one of these variables, father's occupational status, may be taken as an indicator of the relative prosperity of the child's household, and thus it will reflect

the expansion or contraction of the economic resources available to the child. Furthermore, both parents' education and father's occupation might be thought to affect the attainment process by more indirect means such as the passing on of social skills, information, and values appropriate to attainment. For this reason our expanded model allows these variables to have a sustained impact upon attainment both in school and in later life (E,O,I).

Our allowance for the pervasive influence of intellectual ability (IQ) and the sequencing of the final attainment variables (E, O, I) require little discussion. These causal linkages are determined by the theoretically assumed importance of "intelligence" in attainment (viz. the prevalent use of IQ measures in placement decisions) and by the temporal ordering of the life cycle.

Estimating[5] this expanded model for each component of the British state school system, we derive the parameter estimates presented in Table 3.2. Standard form coefficients, which are esteemed for their metric free properties and are appropriate for intra-population analyses are presented together with estimates for the metric form coefficients which are appropriate for inter-population comparisons.

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[5] Unlike the estimates made in the preceeding chapter, we have not assumed here that independent variables are measured without error in all equations. Following a procedure described by Johnston (1963) and suggested for this purpose by Bowles & Gintis (1975) we have made our estimates after first adjusting the matrix of product moment correlations for the effects of random errors of measurement. Although these correlations will have relatively small impact upon the estimates presented in Table 3.2, they are crucial for an adequate treatment of the psychological variables which will be introduced later. For consistency all estimates in this chapter are made using identical techniques; a further explanation of these methods is provided in Appendix 3.1.

Table 3.2: Estimates of Standardized and Unstandardized Coefficients for Baseline Model of Socioeconomic Attainment.

INDEPENDENT VARIABLE	coeff.	DEPENDENT VARIABLE					
		Education		Occupation		Income	
		Gr.	S.M.	Gr.	S.M.	Gr.	S.M.
Father's Occupation	std.	.119	.207*	(-.045)	.100	.114	.155
	unstd.	.188	.233*	(-.046)	.111	14.961	25.??1*
	s.e.	.112	.077	(.051)	.069	8.535	12.438
Ordinal Position	std.	(.017)	(-.057)	(.004)	.104	.185*	-.117
	unstd.	(.072)	(-.140)	(.012)	.253	65.114*	-42.238
	s.e.	(.298)	(.187)	(.136)	.165	22.572	29.679
Parents' Education	std.	.084	.153*	(.029)	.105	-.093	(.040)
	unstd.	.348	.534*	(.078)	.362	-28.521	(20.339)
	s.e.	.292	.236	(.133)	.211	22.166	(38.025)
Family Size	std.	-.162*	-.117	-.073	-.107	.083	(-.051)
	unstd.	-.292*	-.094	-.085	-.086	12.547	(-9.555)
	s.e.	.128	.062	.059	.055	9.840	(9.955)
IQ at age 11	std.	(-.011)	.332*	(-.016)	(.040)	-.084	.111
	unstd.	(-.012)	.033	(-.003)	(.004)	-2.061	1.765
	s.e.	(.018)	.007	(.008)	(.006)	1.364	1.101
Education	std.	---	---	.718*	.488*	-.305*	-.325
	unstd.	---	---	.464*	.484*	-25.436*	-47.647
	s.e.	---	---	.028	.066	6.746	13.364
Occupation at age 24	std.	---	---	---	---	.610*	.327
	unstd.	---	---	---	---	78.742*	48.296
	s.e.	---	---	---	---	10.399	13.303
	CONSTANT	13.120	6.603	-.315	-2.222	910.277	935.609
	R^2	.064	.246	.538	.404	.235	.137

Notes. Asterisks denote coefficients which are two or more times the size of their standard errors; parentheses enclose sets of coefficients for which effects are smaller than standard errors.

From Table 3.2 we see that occupational attainment at age 24 is relatively well predicted by our expanded model (R^2 = 0.40 (SM); 0.54 (GS) 0, as is educational attainment for secondary modern but not grammar school students, [R^2 = 0.25 (SM); 0.06 (GS)]. Income at age 24, remains poorly explained [R^2 = 0.07 (SM); 0.14 (GS)]. These results are similar to those found in the preceeding chapter. Given the intent of the present chapter we will not dwell upon these estimates, but, we would point out that our previous characterization of the process of attainment in these two subpopulations (chapter two) is consistent with the estimates derived for our expanded model.

Having provided estimates for our "baseline" sociological model, we now proceed to assess the role personality plays in the attainment of socioeconomic status.

Adolescent Personality and Attitude Variables

Four variables representing the adolescent personality and attitudes of our sample will be used in the following analyses. These variables are: Neuroticism, Introversion, Achievement Orientation, and Social Conservatism. While the labels themselves convey some notion of the substance of each of these variables, their importance warrants a more detailed exposition of their content and measurement.

Measurement and Scaling.

Following the first and second waves of data collection, the original investigator undertook a series of studies concerned with the structure and scaling of the attitude and personality items which had been included in the surveys. This work stretched over the better part of two decades. The most comprehensive set of measurements which were developed from these data resulted from a two-step process akin to the construction of second-order factors from an original set of attitude items. After the initial wave of data collection in 1951, the investigator grouped together attitude items which were semantically similar or which were defined as unidimensional by the study's initial hypotheses. Likert scaling procedures were then employed to eliminate items which were uncorrelated with others in the group, thereby increasing the internal consistency of the resultant scales. It is only the Likert scales resulting from these procedures (together with the relevant documentation) which were available to the present author.[6]

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[6] Data on individual items appears to have been stored on punched cards which were damaged by the flooding of a basement storage room.

After the second wave of the study in 1962, the Likert scales constructed in the earlier phase of the study were subjected to factor analysis to extract a smaller number of meaningful personality and attitude dimensions. Using a principal factor solution applied to the entire set of Likert scales, eight factors were extracted accounting for 58 percent of the variance between scales. This solution was then rotated to achieve simple structure using the promax criterion (Hendrickson & White, 1964). This criterion does not impose orthogonality upon the resultant factor structure, however, the factors we will use were found to be uncorrelated. Composite scores representing the position of respondents on each factor were constructed (Phillips, 1970). Further details of these procedures are contained in Appendix 3.2.

The variables which we have selected for analysis from among the eight initial factors are,

1. <u>Introversion</u>: a measure of sociability, impulsiveness, social self-confidence and self esteem.

2. <u>Neuroticism</u>: a measure of the degree of anxiety, worry, and irritability reported by the respondent;

3. <u>Achievement Orientation</u>: a measure of the respondent's orientation toward academic achievement, and his aspirations for a demanding, non-manual job in adulthood.

In addition to these variables we also selected a measure of Social Conservatism from among the original Likert scales. The latter variable represents the degree to which respondents report resignation to the prevailing social order, particularly with regard to their own social position. Table 3.3 presents details of the items which compose each Likert scale, together with the loading of the various scales on each factor. Where available, measures of internal consistency for the

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Table J.3: Descriptions of Personality Variables used in Analyses

PERSONALITY DIMENSION	LOADING OF ONE-FACTOR SCALE	SCALE
INTROVERSION (& LOW SELF-CONFIDENCE)	-.69	Gregariousness (a = +.69)

- How many friends would you like to have? (0 vs. 1 or 2 vs. 3- or m
- Do you like to play games with other boys? (1 = cannot play well 2 = they don't want me to play; 3 = like to play fairly well; 4 = like to play a great deal; 5 = would rather play games than do anything else I know)
- Which do you like best (1) to go off by yourself to play or read, (2) to play with one or two others, (3) to play with a whole crowd?
- Do you have any good friends? (1 = none just now; 2 = one or two; 3 = a few; 4 = many)

| | -.86 | Overall Self-Evaluation (a = +0.69) |

Question: Below is a list of things. Compare yourself with boys of your age and say whether you are quite a lot better, a little better, the same, or a little worse or a lot worse?

- in being able to talk easily
- in taking a joke
- in getting on with other boys
- in being a good sport
- in fighting
- in sports
- in being able to write easily
- in helping around the home
- in being polite
- in being able to think clearly
- in getting on with girls
- in being able to talk easily

| | -.58 | Enjoyment of Adventure and Risk (a = +.53) |

- How much compared to other boys of your age do you like adventure and risks? (1 = Rather less than others; 2 = about the same as others; 3 = rather more than other boys)
- Self-description: (1) is courageous but does not care for dangerous adventures; (2) likes adventures even when they are rather dangerous.
- Evaluation of other boy: who was afraid of doing anything that grown-ups don't approve of. (1 = very good, 2 = good; 3 = not good or bad; 4 = bad; 5 = very bad)
- Evaluation of other boy: who cried when he fell down and bruised himself. (1 = very good; 2 = good; 3 = not good or bad; 4 = bad; 5 = very bad)
- Boys who are not afraid to do things are the most fun to be with (1 to 5: "strongly disagree" to "strongly agree")
- Self-Evaluation:
  (a) - in being able to stand up for yourself
  (b) - in having courage
  (c) in suggesting to other boys what things to do
  (for a-c: 1 = rather worse; 2 = average; 3 = rather better than other boys)

| NEUROTICISM | +.69 | Overall Worries and Anxiety |

Question: "Below is a list of problems which worry some boys, read each one carefully and tick the right column" (1 = does not worry me; 2 = worries me a little; 3 = worries me a lot)

- feeling anxious
- parents liking my brothers and sisters better than me
- feeling inferior
- parents not understanding me
(Overall score is sum of all items; Appendix 2 lists all 55 items included in worries scale)

| | +.79 | Overall Irritability |

Question: "Not every boy gets annoyed by the same things. Below is a list of things which annoy some boys. Put a tick in column 1 if it annoys you a lot, in column 2 if it annoys you a little, and in column 3 if it does not annoy at all.
- you cannot sleep
- a blaring wireless
- when boys talk about you behind your back
- people quarrelling
- etc.   of responses
(Overall score is sum of all items, Appendix 2 contains list of all items included in this scale)

PERSONALITY DIMENSION	LOADING OF ON-FACTOR 1 SCALE	SCALE
ACHIEVEMENT ORIENTATION	+.68	Academic Orientation (a = +0.65)

  - Spends about half his free time reading the other half playing games (vs. spends most of his free time playing games).
  - Likes to talk about books (vs. doesn't care to talk about books)
  - Puts his homework before other things (vs. has wide interests and therefore has little time left for studying).
  - Is better at classwork than at sports (vs. is better at sports than at classwork)
  - Thinks a boy caught playing truant from school should be punished
  - Everybody should have a chance to leave school as soon as he can find a job (1 = strongly agree...; 5 = strongly disagree)
  - It is all right to skip school once in a while (1 = strongly agree...; 5 = strongly disagree)
  - Suppose you planned to stay home one evening to work because you had an examination at school the next day. In the afternoon you heard that two friends who had been away for a long time had just come back and were giving a party. What would you do? (1 = go to the party and hope that you will know enough to pass the exam; 2 = study and not go to the party)
  - Evaluation of other boy: who went to the cinema when he should be working (1 = very good...; 5 = very bad)
  - If you could be especially good at either sport or classwork which would you choose (1 = sport; 2 = classwork)

| | +.58 | Preference for Friends With Academic Interests |

Question: "In choosing a friend you are asked to pick one (but only one) from each of the pairs of descriptions below. We are interested only in your own choice. Tick the one which you would really like and not the one which you think your parents or teachers would choose for you'

  - One who spends about half of his free time reading, the other half playing games (vs. one who spends most of his free time playing games).
  - One who likes to talk about books (vs. doesn't care to talk about books)
  - One who puts his homework above other things (vs. Has wide interests and therefore little time left for study).

| | +.57 | Type of Job Preferred in Adulthood |

(1 = manual occupation; 2 = non-manual occupation)

| | +.58 | Nature of Job Preferred |

  - One that is personally taxing (vs. one that is undemanding)

| CONSERVATISM | (a) | Endorsement of Status Quo (a = +0.54) |

  - It is best to be like others and not stand out from the rest
  - A person who is content with what he has will have a better life than one who is always trying to change his position
  - We are all born to our various social positions and it won't do to change them
  - The greatest source of happiness in life is to be satisfied with what you have
  - It is wrong for a person to be dissatisfied with his position in life. (all items in this scale are coded: 1 = strongly disagree, 2 = disagree somewhat, 3 = undecided; 4 = agree somewhat; 5 = agree strongly)

NOTE: Description is derived from LSE memo "Adolescent Summary Factors (f.1.1., 15.3.70; from FA73)," and archive table initialled f.1.1. dated: 3.5.70, and uninitialled tables dated June 16-19, 1969 and August 14, 1969. Where available, values for Cronbach's alpha are indicated for individual scales.

(a) n.b., Conservatism variable is Likert scale and not the result of factor analysis.

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original Likert scales are also presented.

Significance of These Personality Variables

Why select these variables? Since the present study was unique
in the range of pre-attainment personality measurements which were available
for analysis, it may be asked why we have chosen Introversion, Neuroticism,
Achievement Orientation, and Social Conservatism as the focal points of
our investigation. This is a reasonable question; it parallels a dilemma
which was faced when these data were made available for re-analysis
i.e., How do you decide which personality variables are 'worth' investigating?

Although one might wish to include every available measure in our
analyses, logical, methodological, and practical considerations argue against
such an indiscriminate approach. In selecting variables for this investigation
we have been guided by the following principles:

(1) Higher-order factors which account for responses to a
larger domain individual survey items are of greater
interest for our purposes than scales which cover a
smaller domain of items;

(2) Personality dimensions which have a significant history
in the psychological literature are of greater interest
in their own right because of the importance ascribed to
them by past research and theory;

(3) Variables which are strongly correlated with status
attainment are of greater interest than those which are
only weakly correlated or not correlated at all.

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[7] These technical details were derived from the available
documentation; in some instances the values of Cronbach's alpha are
missing from the documentation.

In the following pages we present a description of each variable included in our analyses and the reason for its selection.

Introversion. The first two variables selected for analysis --Introversion and Neuroticism--will be familiar to many readers because of their long history in the literature on personality and psychotherapy. Introversion, as a psychological concept, has been said (Eysenck, 1970) to date back to Galen's theory of the four bodily humors and their related temperaments (sanguine, melancholic, choleric, phlegmatic); it certainly is no more recent than the writings of Carl Jung. Jung begins the introduction to Psychologische Typen (1921) with the observation:

> In my practical medical work with nervous patients I
> have long been struck by the fact that besides the
> many individual differences in human psychology there
> are two typical differences. Two types especially
> become clear to me; I have termed them the
> introverted and the extraverted types (p. 3).

Jung was adamant in maintaining the centrality of this distinction to the study of human personality. Considering the most obvious objection to this typology he argued,

> One is naturally inclined, at first, to regard such
> differences as mere idiosyncracies of character peculiar
> to individuals. But anyone with a thorough knowledge of
> human nature will soon discover that the contrast is by no
> means a matter of isolated individual instances but of
> typical attitudes which are far more common than one
> with limited psychological experience would assume. Indeed
> it is a fundamental contrast, sometimes quite clear, sometimes
> obscured, but always apparent when one is dealing with individuals
> whose personality is in any way pronounced (p. 331).

According to Jung, this basic difference between the introverted and extraverted types arose from the nature of the orientation of the libido toward the exterior world. For the introvert, the primary focus of the libido was upon inner, subjective events, while for the extravert the primary orientation was toward the exterior world. This orientation, in turn, exerted a powerful influence upon general patterns of living and

interpersonal relations. In an earlier work,[8] Jung characterized the

extrovert as more outgoing, sociable, and pragmatic, while the introvert

was more ruminative, imaginative, and interested in ideas rather than people.

Research in the psychometric tradition (Guilford & Guilford, 1936;

Eysenck, 1947, 1967, 1969; Gorusch & Cattell, 1967; Cattell & Warburton, 1961)

has established a parallel dimension as a central aspect of human personality

(at least as reflected in contemporary personality inventories). A second-order

factor denoted Introversion-Extraversion by Eysenck and Exvia-Invia by

Cattell incorporates many aspects of Jung's analytic distinction. It

includes: sociability, social self-confidence, adventurousness, and

impulsiveness in social situations. Table 3.4b presents selected items

from the Eysenck and Cattell measures of Introversion.

Over the last two decades considerable energy has been

invested in attempts to identify physiological correlates of this personality

dimension. The major figure involved with this research, Hans Eysenck,

has argued that behavioral differences between introverted and extraverted

individuals arise from neurophysiological differences in the inhibition

and habituation of cortical arousal mediated by the reticular activating

formation (see Eysenck, 1967). Efforts have been made to integrate this line of

study with other research traditions deriving from the Pavlovian

typology of 'strong' and 'weak' nervous systems. While these efforts

have shown some interesting results--such as apparent differences in

conditionability between introverts and extroverts, and evidence of

trait heritability (cf. Dworkin et al., 1976; Eaves & Eysenck, 1975)-the

resolution of these issues is not crucial to our investigation.

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[8] In Psychologishe Typen, Jung does, however, argue against his
former identification of the introvert with thinking and the extravert
with 'feeling'. In his later work he assumes the position that one of the four
'basic psychological functions' (thinking, feeling, sensation and intuition)
predominates in each individual, and that it might characterize a type, which,
in turn, could be either introverted or extraverted.

Table 3.4: Selected Items from standard scales of Introversion
and Neuroticism.

3.4a: Neuroticism

Scale	direction [a]	ITEM (symptom)
G	+	-Mood swings
C	+	-Lack of concentration
E	+	-Mood frequently goes up and down
G	+	-Feeling that one is not as good or capable as others
C	+	-Mood of feeeling sorry for oneself
G	+	-Worries about awful things that might happen
G	+	-Apprehensiveness at not being popular
G	+	-Sleeplessness over troubles
G	+	-Undue dislike at persistant sounds
E	+	-Often troubled by feelings of guilt
E	+	-Often 'fed up'
E	+	-Often worry about things you should not have done or said
E	+	-Worry about awful things that might happen
C	+	-Restlessness
E	-	-Say that you are fairly self-confident
E	+	-Worry too long about an embarrassing experience
C	+	-Frustration tolerance
G	+	-Belief that often others dislike one
G	-	-Ability to relax
G	-	-Generally feel 'well and happy'
E	+	-Touchy about certain things
G	-	-Ability to stay happy even though one has problems

3.4b: Introversion

C	-	-Self rating on sociability
C	-	-Need for social stimulation
E	+	-Usually stay in the background at parties
E	-	-Like plenty of excitement and hustle around you
G	-	-A carefree attitude toward life
G	-	-Judgement of self as happy-go-lucky
E	+	-Like working alone
C	-	-Carefreeness
G	-	-Number of social outings
C	-	-Making one's point at all costs
E	+	-Rather be at home on your own than go to a boring party
G	-	Concern if deprived of having many friends & acquaintances
C	+	-Wariness of possible dangers in unfamilar surroundings
E	+	-Prefer reading to meeting people
G	-	-Wanting to do shooting sports
C	-	-Being considered eloquent
E	-	-Willing to do almost anything for a dare
C	-	-Prefers active vs. passive ways of getting things done
C	-	-Independence
E	-	-When people shout at you, you shout back
E	-	-Like mixing with people

NOTES: source of items is compilation by Eysenck & Eysenck, 1969. Sources
of scales are Guilford, Eysenck, and Cattell

(a)
    if the items is positive(+) then persons scoring high on dimension or
ar agreeing with statement(having symptom) are more intorverted or neurotic.
If item is negative(-) in direction then individual is less neurotic or intorverted
according to the scale.

For our purposes, it will suffice to say the the general distinction between introverted and extraverted types has considerable utility in explaining consistencies in human behavior. Judgements about the underlying processes which produce these consistencies are probably best treated with the cautionary advice of a principal figure in this research area,

> The success of these (research) efforts is still too doubtful and the work itself too recent to comment on it in any detail.

Comparing the introversion variable derived from factor analyses of the LSE data to the notions prevalent in the literature (e.g., Table 3.4b), we note considerable similarities. All of the items in the scale we employ involve either self-report of social interactions or self-descriptions involving social comparisons. Moreover, the content of the items includes three of the known dimensions of introversion: sociability, impulsiveness, and social self-confidence.

Neuroticism. The second personality variable included in our analysis, Neuroticism, also has a long history in the clinical and research literature on human personality. The variable we employ measures two intercorrelated aspects of neuroticism: anxiety (worries) and irritability.

Freudian theories of neuroses build upon notion that anxiety arises when 'id' impulses (loosely speaking, "primal urges") threaten to break through ego controls and cause behavior for which the individual will be punished, either by others or himself (superego). Although the Freudian notions are frequently challenged, they remain the core of commonly used definitions of psychoneurosis. Typically, such definitions (e.g., Coleman, 1964) include as symptoms of neurotic disturbance both patient reports of specific somatic and psychic distress

(e.g., hypochondriadiasis and depression) as well as general complaints of (1) anxiety and fearfulness, (2) low stress tolerance, and (3) tension and irritability. These elements of clinical nosology find parallels in factor analytic studies of questionnaire-type personality inventories.

Working with successive versions of a clinical inventory developed at Maudsley Hospital, Eysenck identified a second personality factor representing patients self-reports of a variety of neurotic symptoms including rapid mood swings, abnormal fatigue, insomnia, irritability, guilt, and worries. Subsequent re-analyses (cf. Eysenck and Eysenck, 1969) of personality inventories developed by Guilford (Guilford and Guilford, 1936) and Cattell (1957), and studies of the Minnesota Multiphasic Personality Inventory (Kassebau et al., 1959) reveal a pattern of intercorrelations between items in these inventories which is similar to that found by Eysenck with the Maudsley Personality Inventory. In particular, measures of self-reported neurotic symptoms show consistent correlations with measures of worry and general irritability. Table 3.4a presents selected elements of Neuroticism measures from these studies.

Our own neuroticism variable incompletely covers the domain of neurotic symptoms. In particular, while measures of irritability, worry, insomnia, and anxiety, and certain aspects of suspicion, and physical complaints are incorporated in our neuroticism variable, other aspects are not represented. For example, our variable does not include specific measurements of susceptability to "frequent mood swings" and 'dwelling in the past,' nor does it measure somatic complaints--except for insomnia. While other studies have shown that these elements form a correlated syndrome (and thus, might be indirectly included in our measurements), the inadequecy of our coverage of the range of neurotic symptoms should be borne in mind when interpreting findings (and non-findings) involving this personality variable.

Achievement Orientation. The third personality variable included
in our analyses measures   respondent's achievement orientation in
adolesence. Unlike the preceeding variables which were included because
of their prominence in contemporary theories of human personality,
Achievement Orientation was incorporated in our analyses because it is
widely believed among psychologists (e.g., McClelland et al., 1953) that
individual variations in the "motive and achieve" give rise to significant
variations in socioeconomic attainment.

Psychological research on "Achievement Motivation" was first initiated
by Murray (1938). Using the Thematic Apperception Test (TAT)--a series of pictures
designed to elicit stories from subjects--Murray developed a taxonomy of
personality 'needs' which included the 'need for achievement,' i.e.,

> "...the desire or tendency to do things as rapidly and/or
> as well as possible...to accomplish something difficult.
> To overcome obstacles and attain a high standard. To
> excell one's self. To increase self regard by the
> successful exercise of talent (Murray, 1938, p. 164)."

This formulation has generated a substantial body of theoretical and
empirical research. The two leading researchers in this area D. McClelland
and J. Atkinson, have published eight book-length volumes on the subject of
"achievement motivation" and its application to studies of national
economic growth, and managerial performance (Atkinson, 1958; 1964; Atkinson
and Feather, 1966; Atkinson and Birch, 1970; Atkinson and Raynor, 1974;
McClelland et al., 1953; McClelland, 1961; McClelland and Winter, 1969).
The popularity of this research topic is   reflected in the development
of at least 22 different instruments for the measurement of "achievement
motivation" (reviewed by Fineman, 1977).

The main theoretical framework for research in this area
derives from Atkinson's (e.g., 1957) work on motivation and behavior. He
proposed that an individual's tendency to engage in achievement-oriented

behavior (T_A) was a function of his motivation (M), the incentive value of the goal (I) and the probability (P) of a specific outcome (e.g., success). In this formulation, behaviors could be seen to result in two possible outcomes: success or failure. Thus, the tendency to engage in achievement oriented behavior was the difference between the product of motivation, incentive value, and probability for success and that for failure (indicated by the subscripts "s" and "f"), i.e.,

$$T_A = [(M_s) (P_s) (T_s)] - [(M_f) (P_f) (I_f)]$$

This formulation defines an approach-avoidance conflict that pits two antagonistic aspects of any situation against each other in determining an outcome (i.e., the tendency to seek success vs. the tendency to avoid failure).

Measurements of the motive to succeed (M_s) were initially derived from the Thematic Apperception Test; content analysis of stories written by subjects in achievement arousing contexts were used to define the initial coding categories. It was theorized that in neutral contexts people who viewed ambiguous stimuli in a manner similar to others who had their 'achievement motive' experimentally aroused[9] were higher in their "baseline" level of achievement motivation (M_s). Research in this tradition has generally concentrated on the motive to succeed. Explicit measures of the motive to 'avoid failure' were not ordinarily made (Fineman, 1977).

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[9] E.g., by telling Ss that they would subsequently be taking a test which had been used to identify men who were of unusual intelligence and leadership potential.

This initial TAT measure of the Achievement Motive has been
supplemented in recent years by no less than twenty-two other tests.
These include five projective tests,[10] five
scales incorporated in comprehensive personality inventories, and eleven
questionnaire-type tests designed specifically to assess achievement
motivation. A careful analysis (Fineman, 1977) of this vast array of
different tests indicates that there is very little agreement between
them when they are applied to the same population; the median inter-scale
correlation reported in the literature is only +0.12. Moreover, internal
analyses indicate that the projective tests do not have high internal homogeneity
The median value of Cronbach's alpha for the most common projective test,
the TAT, is only +0.32.

However, the internal reliability of questionnaire-type measurements of
'achievement motivation' have been found to be considerably higher, e.g., +.50
to +.60. Analysis of the criterion validity of questionnaire measures also indicate
that these measures (e.g., Gough (1964), Jackson (1967), Mehrabian (1968, 1969))
do occasionally show good prediction of criterion achievements such as
perseverance in problem solving and school grades. In explaining these
findings Fineman (1977) suggests that TAT responses do not scale the
intensity but rather extensity of achievement concerns, (i.e., they
indicate the range of stimuli which will elicit achievement-
related stories). The more focused nature of the questionnaire measures

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[10] Including one measure (Aronson, 1958) based upon the
transcription of doodle patterns and another (Knapp, 1958) based upon
respondents' preference for tartans of different colors (High need
achievement is said to be indicated by preference for blue in a tartan,
low by red).

may account for both their superior internal reliability and greater criterion validity.

The measure which we will use is derived from a series of questions having to do with achievement in two contexts: school and work. This variable measures the boys desire for a demanding job in adulthood, as well as his orientation toward academic success in adolescence. Thus, this variable taps the two achievement orientations which are of particular concern to us.

Social Conservatism. The final adolescent personality measure incorporated in our study assesses a dimension we have called "social conservatism." This variable is not derived from factor analyses, but rather it is one of the original Likert scales. It was chosen for inclusion in our analyses on the (admittedly opportunistic) grounds that it showed a high correlation with educational attainment (r = -0.21 (GS); -0.32 (SM)). This variable measures the extent to which a boy was unwilling to question the social order as it related to himself, unwilling 'to stand out from the rest,' and resigned to his social position.

While this variable seems to involve some achievement related concepts, it also appears to tap more traditional measures of political conservatism. Table 3.5 presents zero-correlations between this measure of social conservatism and various political beliefs.

Empirical Relevance of These Variables. As a preliminary test of the "explanatory power" of these variables, we computed the zero-order correlations between each of these measures and our attainment variables, and we contrasted these correlations to those for the other higher-order factors extracted from the pool of scales derived from the 1951 survey. It will be seen from Table 3.6 that the variables we selected have a higher mean correlation (r = +0.17) with socioeconomic attainment than those which we excluded (median r = +0.10). Furthermore, when we control for the variables in our expanded model and the personality factors selected for analysis the partial correlation between attainment and the excluded personality variables becomes insubstantial (r = 0.06) in magnitude.

Table 3.5: Correlations between social conservatism in adolesence and other social and political attitudes.

Attitude Item (& age measured)	Correlation with Social Conservatism (age 12/13)
1. Personal goal is 'to make world a better place' (age 24/25)	-.12
2. Personal goal is 'to have a house of my own' (age 24/25)	+.23
3. Personal goal is 'to lead a quiet life' (age 24/25)	+.21
4. Children must always do as their parents tell them. (age 12/13)	+.19
5. Capital punishment should be abolished. (age 24/25)	-.20
6. A good employer should be strict with his employees to gain their respect. (age 24/25)	+.17
7. The way they are run now, the Trade Unions do more harm than good. (age 24/25)	+.20
8. Parents these days allow their children too much freedom. (age 24/25)	+.20
9. The government must restrict immigration from the commonwealth and the colonies [i.e., non-white immigration] (age 24/25)	+.31
10. If you give them an inch, they take amile might well apply to immigrants in this country (age 24/25)	+.27
11. We are all born to our various class positions and it won't do to change them.	+.24
12. It is best not to marry someone from a different kind of home (age 12/13)	+.12

Note. As in the rest of the chapter, we treat conservatism scale as having a measurement reliability of 0.75; we make a similar assumption for the individual attitude items. Correlations are estimated under the assumption that estimates are attenuated by random errors of measurement of this magnitude.

Table 3.6: Mean correlations between attainment and personality
variables included and excluded from our analyses.

| Variables | type of correlation | Mean Correlation[a] with | | | OVERALL MEAN |
		Education	Occupation	Income	
Four Personality Variables (included in model)	bivariate	.23	.20	.07	.17
Five Personality Variables (excluded from model)	bivariate	.15	.12	.04	.10
(same as above)	partial[b]	.06	.08	.04	.06

[a]
    Correlations between each attainment and personality variable were computed
separately for grammar and secondary modern school samples; entries assume that
observed correlations reflect random measurement error (reliability of measurement
$(r_{ii'})$ of 0.75.   Means are mean absolute value of correlations.

[b]
    controlling   social structural and personality variables included in model
equations (3.1, 3.2 and 3.3)

Analyses I: the Contribution of Personality

to Socioeconomic Attainment

Bivariate Relationships. Although we do not wish to dwell at
length upon the bivariate relationships between personality and attainment
variables, the existence of such relationships and the adequacy of linearity
as an assumption for their representation is crucial to our subsequent work.
In figures 3.2 and 3.3 the relation of each personality variable to
educational and occupational attainment is plotted. It will be seen from
these plots that several of the personality variables included in our
analyses have a strong linear association with attainment; in particular,

1. Introverted adolescents stay in school longer, and
leave school with better credentials;

2. Adolescents who evidence high achievement motivation
stay in school longer and obtain higher level occupations;

3. Adolescents who are accepting of the prevailing social
order and their own position in it (i.e., who are socially
conservative) are less successful in school and in
their occupational careers.

There is, however, virtually no relationship between Neuroticism and
educational or occupational attainment.

Given the existence of some systematic relationships
between personality variables and attainment, the next question we pose
has to do with the proper functional form for representing these
relationships. Considering the bivariate relations, we wish to know if
these relations are linear, i.e., are they adequately represented by a
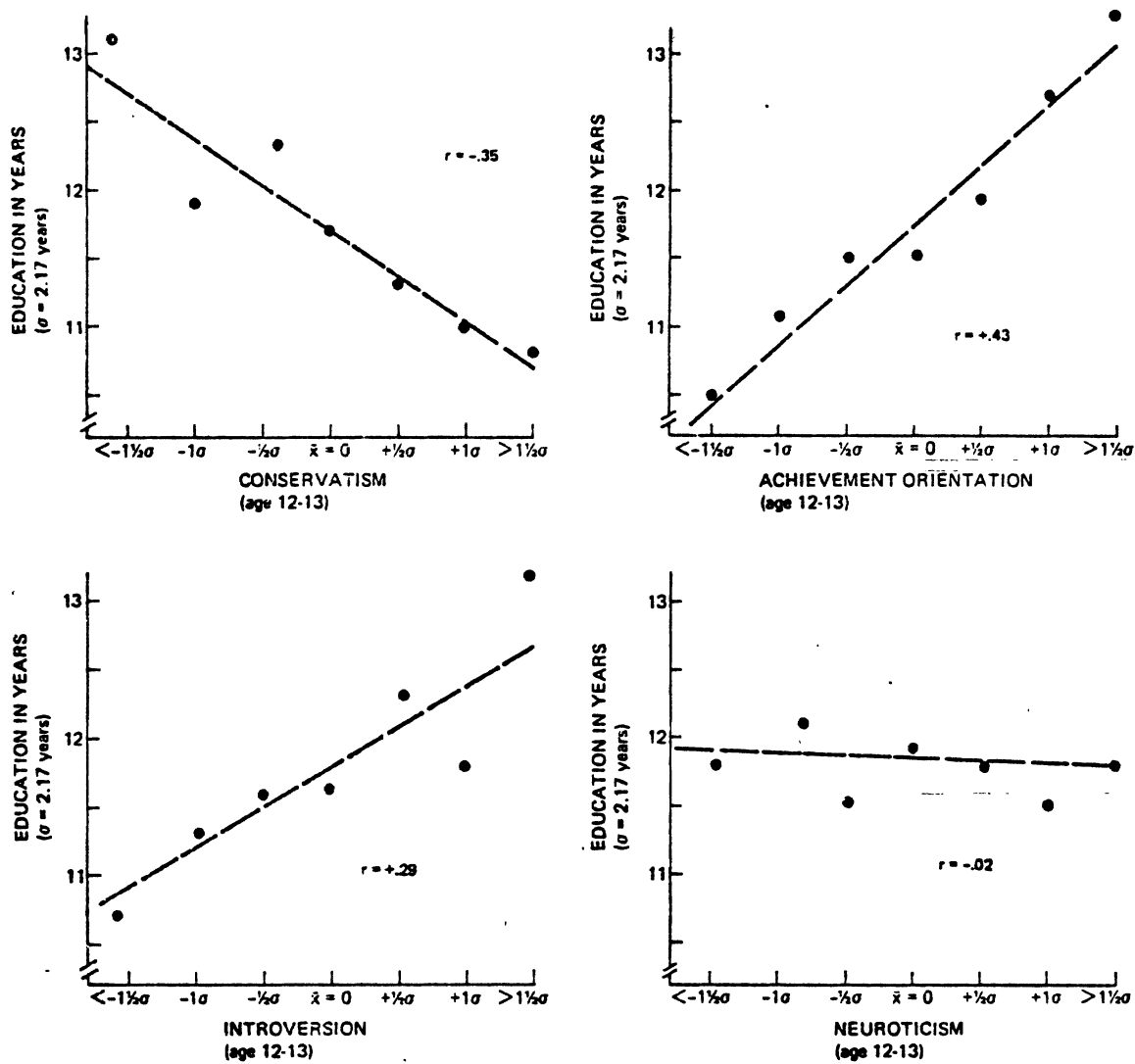straight line?

Figure 3.2. Relationship of personality variable (measured at age 12-13) to final educational attainment (through age 24-25).
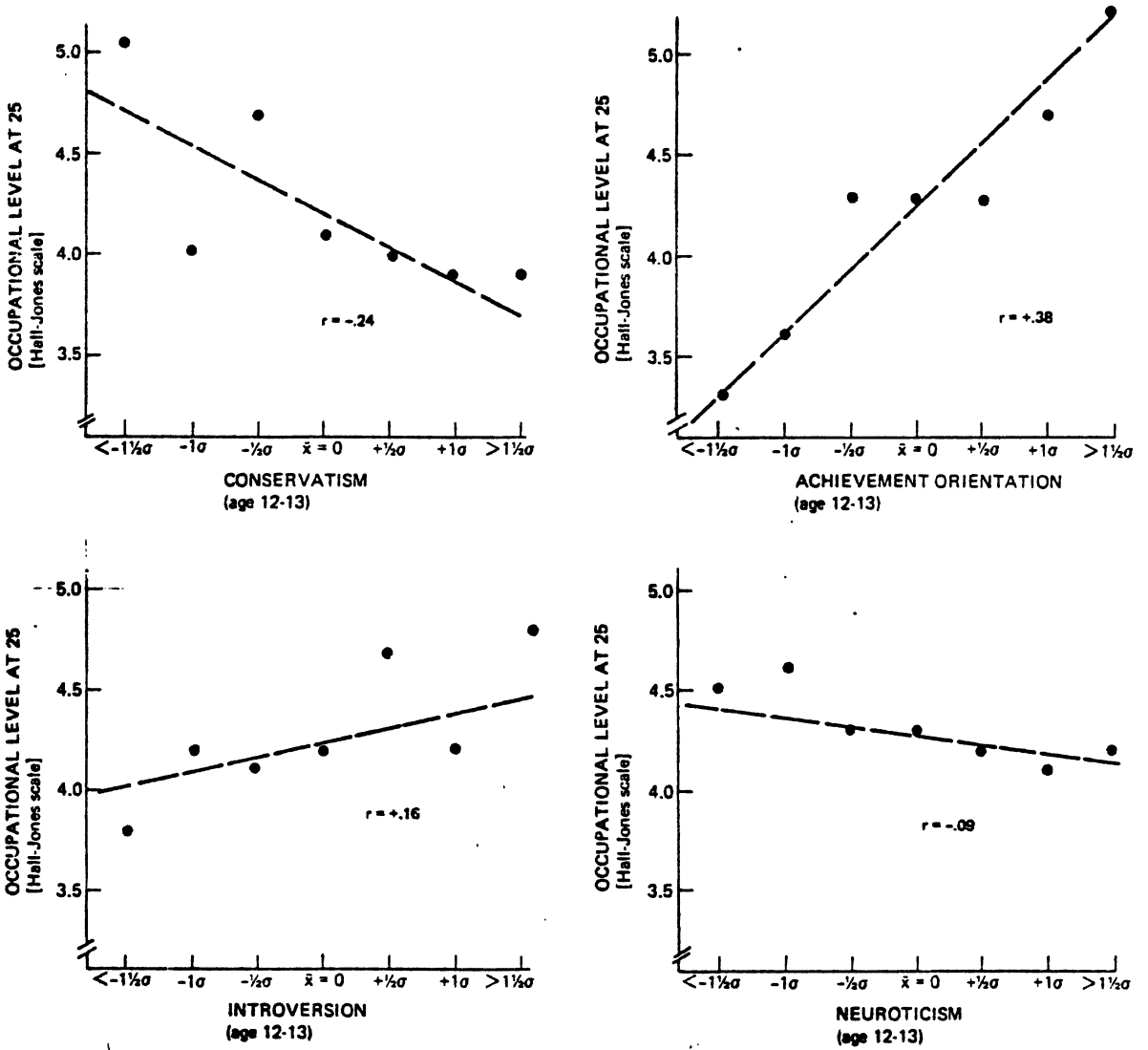
Figure 3.3. Relationship of personality variables (measured at age 12-13) to occupational attainment at age 25.

While in certain plots some suggestive non-linearities do appear, we find, in general, that the majority of relationships are rather well represented by straight lines. To provide a formal demonstration, we have compared the proportion of variation in each attainment variable which is accounted for under the assumption of linearity to the variance explained when we relax this assumption by assuming that each variable has 9 discrete (nominal) categories.[11] For occupational and educational attainment we found the increment in explained variance (R^2) obtained by relaxing the linearity assumption was statistically insignificant[12] in seven of eight instances.

The only significantly non-linear relationship we found was between Social Conservatism and Occupational Attainment; this non-linearity is difficult to interpret. While the most successful group ($\bar{X}$ = 5.5, n = 27) in the sample was two or more standard deviations below the mean, there was also another, larger group which was considerably more successful than average (group $\bar{X}$ = 4.72, n = 93; sample $\bar{X}$ = 4.29). This group, however was situated in the <u>middle</u> of the distribution of Social Conservatism scores. Given the continuous nature of the distribution of Conservatism scores, and the fact that the overall relationship between Conservatism and Occupational attainment shows a modest correlation in an interpretatively meaningful direction ($\underline{r}$ = -0.25), there is, we believe, little justification for recoding this variable to accomodate the observed non-linearity. In taking this position, we impose a restriction which will cause our model to <u>underrepresent</u> (by about 50%) the degree of empirical association between this personality variable and occupational attainment.

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[11] Representing ½ s.d. segments of the distribution of the personality variable.

[12] Appendix 1 presents further details of these computations.

A Model of Attainment Which Includes Personality. Analysis of
the bivariate relationships between personality and attainment variables are
a necessary preliminary step, since we must have relationships worthy of
more extended consideration. However this analysis cannot, in itself,
answer the questions we have posed. Most importantly, it does not tell
us whether the addition of personality variables increases out ability to
account for variations in socioeconomic attainment in adulthood. To
answer this requires multivariate analyses which take full account of the
explanatory power of our 'baseline' sociological model.

The technique we employ in our analyses involves the addition of
a further stage to the "baseline" model. As before, causal relations
between model stages are fully recursive; that is to say, the state
of a variable in any given stage is assumed to depend upon the state of
variables in all preceding stages. Figure 3.3 presents a schematic
representation of our social psychological model of attainment. The first
stage of this model includes those social characteristics which might be
considered fixed at birth such as the social status of the child's
parents, and birth order. This stage also incorporates three
other exogenous variables: family size, IQ, and family relations.
We take this group of variables as a
starting point; we make no assumptions about the causal ordering of
specific variables in this initial set. As in our sociological baseline
model these variables are thought to influence the level of our
three attainment variables: education, occupation and income. To this
extent, our social-psychological model replicates the baseline model.

However, besides including 'family relations' as an exogenous
variable, the social-psychological model also incorporates the four
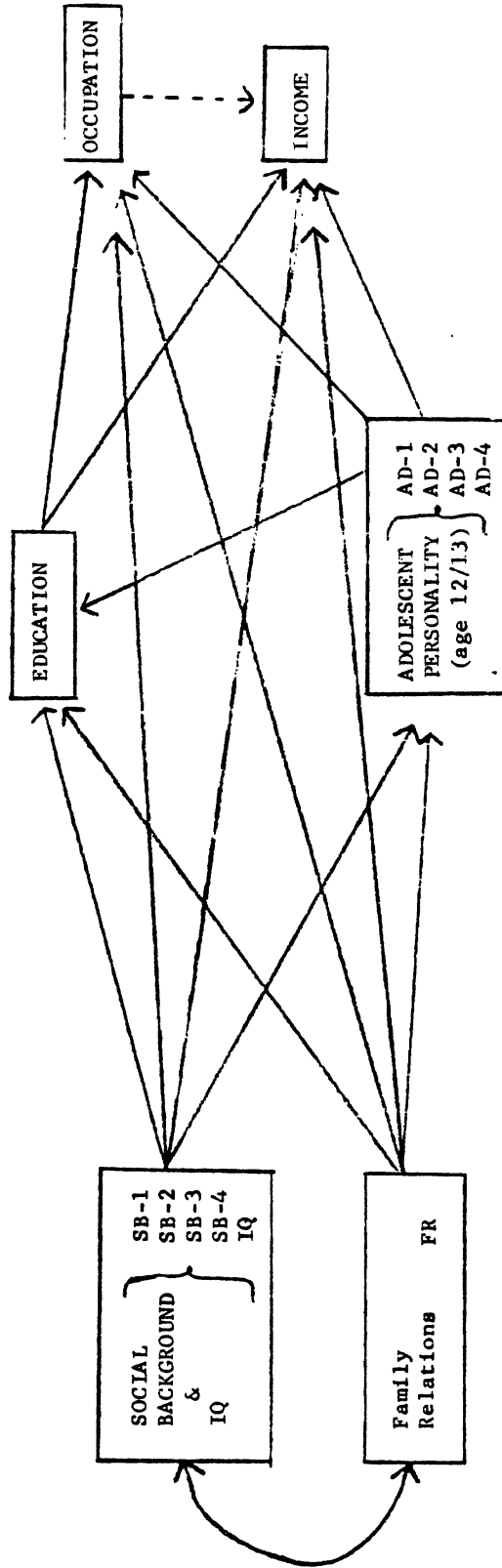
Figure 3.3: Schematic Model of status attainment process. For the sake of simplicity, residual terms (U_i) are omitted from diagram and the alternate model of income attainment by using dashed line to indicate the paths from occupation to income which is eliminated in the alternate form of the model.

personality variables at a stage intermediate between birth and attainment.
These variables are seen as (determined, in part, by social and family
background factors) and they are thought, in turn, to exert a causal
influence upon attainment. As can be seen in figure 3.3, our model allows
each personality variable to play a mediating role in the attainment process,
that is, these variables can serve as links in a causal chain which transmits the
influence of social background upon adult attainment. This might be reflected,
for example, in the existence of a large positive coefficient representing
the influence of father's occupation upon his son's achievement orientation and
a similar coefficient representing the subsequent influence of achievement
orientation upon adult attainment.

Although the form of our model is relatively self-explanatory,
certain technical points deserve clarification. First, we have assumed
that all relations between variables are linear and additive. Our
analysis of the bivariate distributions between all pairs of variables included in
our model (see Appendix 1) shows these relationships to be well-described by
linear functions. Non-additivity, as always, is a bedevilling problem for
which there is no accepted prophylaxis. In the present case we have used
a novel approach in investigating the impact of the assumption of additivity upon
our results. After estimating our model under the assumption that all
relations were additive and linear, we subjected the residuals from our
model's predictions (i.e., the difference between predicted and actual
values for each dependent variable) to further analysis using a procedure
designed to build prediction functions without assuming either linearity
or additivity (cf. Sonquist et al, 1973). This analysis indicated that
our assumptions did not substantially decrease our ability to account for
individual variations in attainment. Appendix 3.4 presents
details of this analysis.

Contribution of the Psychological Variables. The first question
we seek to answer concerns the net impact of psychological variables upon
status attainment. In particular we wish to discover whether a model which
includes a representation of the alleged influences of our personality
variables does a more adequate job of predicting individual variations in
adult status attainment than a model which ignores these variables. It
should be remembered, that all of our analyses we use personality measures
which are uncontaminated by the effects of adult attainment (i.e., personality
variables were measured at age 12-13). Thus, the causal interpretation of
our results is more assured than in previous research (e.g., Duncan et al.,
1972) which has had to rely upon cross-sectional data.

To answer our initial question we compare the amount of variance
explained by our baseline model which includes only social structural
variables to that explained by our expanded model which allosw for the
influence of four personality variables (Introversion, Neuroticism, Achievement
Orientation, Social Conservatism). Table 3.8 presents this comparison; it will
be seen from this table that in every instance the expanded model does a
better job of predicting status attainment than the baseline sociological model.
On the average the expanded model increases the relative amount of explained
variance by 49 percent. Not surprisingly, we find that the advantage of
the social psychological model is greatest where the social structural model
was least adequate. Thus, in the grammar school sample, we find that the
expanded model almost triples our ability to account for   observed
variations in educational attainment. For occupational attainment, which is
already quite well explained by the baseline model (mean R^2 = 0.47), the
addition of our psychological variable increases our ability to account

Table 3.8: Analysis of Predictive Power of Model Including Social Structural Variables vs. Social Psychological Model

		DEPENDENT VARIABLE								
		Education		Occupation age 24/25		Occupation age 28/29		Occupation age 32/33		Income age 24/25
SAMPLE:		GS	SM	GS	SM	GS	SM	GS	SM	GS	SM
1.	R^2 for model including only social structural variables and IQ (a)	.064	.246	.538	.401	.424	.421	.433	.521	.063	.074
2.	R^2 for model including both social, structural & psychological variables (a)	.235	.306	.579	.509	.498	.445	.522	.654	.106	.099
3.	Relative Improvement in R^2 (b)	267%	24%	8%	26%	17%	6%	21%	25%	68%	24%
4.	F ratio for Improvement (c)	11.4	3.0	4.9	7.5	5.8	0.9	5.8	4.7	2.4	0.9
5.	df:	5/252	5/176	5/251	5/175	5/197	5/103	5/156	5/66	5/251	5/175
6.	p:	<.001	<.05	<.001	<.001	<.001	ns	<.001	<.001	<.05	ns

NOTES: (a) Social structural variables are: father's occupation, ordinal position, family size, parents' education and son's education; psychological variables included in model (line 2) are introversion, neuroticism, conservatism, family relations and achievement orientation. For the purpose of these analyses, occupational level was not included in the equation predicting income attainment; had it been included, the R^2 values for the prediction of income would have been: social structural = 0.235 (gs); 0.137 (sm) and social psychological = 0.266 (gs); 0.162 (sm). R^2 estimates are derived from analysis of correlation matrix which has been adjusted for the presumed effects of random measurement errors.

(b) Relative improvement is (100) $\left[\dfrac{R_2^2 - R_1^2}{R_1^2} \right]$ where subscripts denote models referred to in table (i.e., line 1 & 2).

(c) F ratio tests the hypothesis that the increment in explained variance obtained by adding the additional psychological variables to the model could have arisen from random sampling fluctuations (see Cohen, 1968 for treatment of test). Probability values apply to case of a simple random sample from a known population; since this assumption is not met by these data, the interpretation of these results should not rest heavily upon precise "p" values.

for individual variations in attainment by an average of 17% (i.e., from
$R^2 = 0.47$; to $R^2 = 0.54$).

Since some improvement in explained variance would be expected
by adding a random variable to a prediction equation, it is important to
make some estimation of the reliability of these results. $\underline{F}$ ratios for
these increments have been computed using procedures suggested by Cohen,
(1968). The generally large values of these $\underline{F}$ ratios engenders
confidence in the conclusion that personality makes a substantial independent
contribution to the determination of socioeconomic achievement. A detailed
treatment of the nature of these effects follows.

Common and Unique Variance Components. The foregoing analysis
is adequate to support an affirmative answer to the question of whether
personality influences socioeconomic attainment. However, there are
alternate, and perhaps more informative ways of looking at these data.
In Table 3.8 we partitioned the explained variance (R^2) in socioeconomic
attainment into two components; we first attributed to our sociological
baseline model all of the variance explained by its model equations, and
then we attributed to personality factors only the difference between the
variance explained by the expanded and baseline models. Some would
suggest that this analytic strategy smacks of sociological imperialism.

Our procedure could, of course, be inverted; that is, we could analyze the
contribution to R^2 which results from including social structural variables
in a "psychological model" of attainment. On its own, this analysis would be
fatuous. However, by combining this procedure with the former analysis, we can
derive a meaningful breakdown of the unique and shared components of explained
variance attributable to personality and social structural variables.
Table 3.9 presents this decomposition.

It will be seen from the decomposition that, in addition to the unique explanatory power of the psychological variables, approximately 13 percent of the variance explained by our models can be attributed either to social structural or psychological factors.

The Mediational Hypothesis. The second question of interest to us involves the hypothesis that psychological variables serve as mediators in the transmission of social status from generation to generation.

Conceptually, this hypothesis does not depend upon the demonstration that personality variables make an independent contribution to the explanation of variations in socioeconomic attainment. It would be possible for a mediational mechanism to exist without there being any independent contribution of personality to status attainment; this might happen, for example, if the entire correlation between social background and attainment arose because differences in social background engendered subsequent differences in personality, and that it was the latter differences alone which produced variations in attainment.

To test the mediational hypothesis we can contrast the magnitude of the coefficients which represent the independent influence of each background variable upon each status attainment variable in (1) the baseline model, and (2) the expanded model which incorporates controls for each personality variable. If the mediational hypothesis were correct we would expect to find in the expanded model (vs. the baseline model) a substantial reduction in the magnitude of the estimated direct effect of the social structural variables upon attainment. In the ideal case [12a], we would expect the magnitude of the coefficients representing the direct effect of the social structural variables to be reduced to zero.

Table 3.10 presents a comparison of the relevant coefficients for each model. It will be seen from this comparison that there is little support

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[12a]
    i.e., where the mediational model was 'correct' and we had included all relevenat mediators and estimated model coefficients without measurement or sampling error.

Table 3.9: Partitioning of components of explanatory power of social psychological model

Dependent Variable	Sample	Proportion of Total Variance Explained by Model (R^2)	Unique Contribution of		Common Contribution
			Base-line Model	5 Psychological Variables	
Educational Attainment	GS	.235	12%	73%	15%
	SM	.300	45%	18%	37%
Occupation, age 24	GS	.579	84%	7%	9%
	SM	.509	70%	21%	9%
Occupation, age 28	GS	.498	73%	15%	12%
	SM	.445	82%	5%	12%
Occupation, age 32	GS	.522	78%	17%	5%
	SM	.654	69%	20%	11%
Income, age 24 (A)	GS	.106	59%	35%	6%
	SM	.098	62%	24%	13%

NOTE. Denoting the set of social structural variables and IQ (i.e., O_F, OP, FS, E_p, E, IQ) as S, and the set of five psychological variables (N, I, A, C, FR) as P, the contribution each set to the prediction of variance in a dependent variable may be represented as a Venn diagram, i.e.,
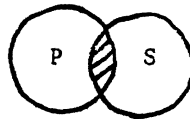
where the intersection of the sets (shaded) represents the non-unique portion of the explained variance. Algebraically the unique contributions of each set [U (R_i^2)] are

$$U(R_P^2) = R_{PS}^2 - R_S^2$$

$$U(R_S^2) = R_{PS}^2 - R_P^2$$

The portion of explained variance which is common to both sets [C(R_{ij}^2)] is

$$C(R_{PS}^2) = -R_{PS}^2 - [U(R_P^2) + U(R_S^2)]$$

(A) n.b., Occupation is not included as independent variable.

Table 3.10: Standardized Coefficients Representing Net Effects of Social
Structural Variables Upon Attainment in Baseline and Expanded Models

Independent Variable	Dependent Variable	SAMPLE & MODEL			
		Grammar		Sec. Modern	
		Baseline Model	Expanded Model	Baseline Model	Expanded Model
Father's Occupation	Education	.12	.10	.21*	.20*
	Occupation	(-.05)	(-.05)	.10	.06
	Income[a]	.09	.11	.19*	.16*
Parents Education	Education	(.08)	(.02)	.15*	.11
	Occupation	(.03)	(.04)	.10	.07
	Income[a]	-.07	-.08	(.07)	.11
Family Size	Education	-.16*	-.11	-.12	-.11
	Occupation	-.07	-.11*	-.11	-.11
	Income[a]	(.04)	(.05)	-.12	-.10
Ordinal Position	Education	(.02)	(.02)	(-.06)	(-.05)
	Occupation	(.00)	(.02)	.10	(.04)
	Income[a]	.19*	.19*	(-.08)	(-.08)

NOTES. Coefficient estimates derived from analyses of attenuation corrected correlation
matrix. Coefficients in parentheses are smaller than the standard errors of
their estimates; asterisks denote coefficients whose absolute value exceed
twice their standard errors.

(a) Income equations exclude Occupation of respondent as an independent
variable.

for the mediational hypothesis. Overall the mean absolute value of the coefficients for the social structural effects in the baseline model was approximately 0.09 (standardized). Thus, on the average, if we increased the value of each social background factor by one standard deviation--while holding constant other model variables--we would increase the expected level of attainment (for the average attainment variable) by approximately +0.36 standard deviations. When we introduced controls for our five psychological variables we reduced the mean value of the estimated independent effects of the social structural variables by approximately ten percent. Thus, the net direct effect upon attainment of a one standard deviation change in each social background variable, was reduced from +0.36 to +0.33 s.d. This result suggests that the psychological variables employed in our expanded model play an insubstantial role in transmitting social status from generation to generation.

At the outset of this research, we hoped that the inclusion of these personality variables would provide an identifiable set of 'transmitters' which would further our understanding of the manner in which social background affects adult occupational attainment. Given that the development of path analytic procedures was first undertaken in a field, Mendelian genetics, where the mechanics of causation have been independently verified, the poverty of our understanding of the social analog to genetic transmission is a major deficiency of path analytic studies of status attainment. Unfortunately, the remedy we have sought in psychology has not proved effective. The variables which we selected for analysis do not appear to contribute substantially to the intergenerational transmission of socioeconomic inequality.

We should, however, note that this analyses have used only a small set of psychological variables from a large domain of potential candidates. Although there were good reasons for selecting these variables for study, there may, of course, be other psychological variables which do play a mediating role in the intergenerational transmission of status inequalities.

Detailed Analysis of Influence of Personality·Through Age 24

While we have undertaken tests of our basic hypotheses, very little has been said so far about the substance of the relationships we discovered between the personality variables and socioeconomic attainment. To inform such a discussion, Table 3.11 presents the model coefficients for each attainment equation estimated in the two samples.

Table 3.11 contains twenty coefficients representing the individual influences of each personality variable (and family relations) upon educational and occupational attainment. Eight of these coefficients are sufficiently large to be considered reliable (i.e., two or more times the standard errors of their estimates), and only five coefficients are of completely insignificant magnitude (i.e., smaller than standard errors of estimate). In only one instance do we find marked reversal of the role of a personality variable upon attainment in the two samples. That exception is the case of the influence of introversion upon occupational attainment.

Introversion. For grammar school students, introversion has a marked debilitating effect (net of the influence of education and other variables). an increase of one standard deviation in the introversion of grammar school boys causes their predicted occupational attainment to decline by 0.21 standard deviations. However, for secondary modern school students, the effect of introversion on occupational attainment is of equivalent magnitude, but

Table 3.11: Estimates of Standardized and Unstandardized Coefficients for Expanded Model of Socioeconomic Attainment

| | | DEPENDENT VARIABLES | | | | | |
Independent Variable	Coeff.	Education Gr.	SM	Occupation Gr.	SM	Income Gr.	SM
Father's Occupation	STD	.103	.203*	(-.048)	.060	.137*	.141
	UNSTD	.162	.228*	(-.049)	.067	17.94*	23.23
	SE	.103	.078	.050	.066	8.54	12.92
Ordinal Position	STD	(.017)	(-.051)	(-.022)	(.042)	.205*	-.099
	UNSTD	(.073)	(-.124)	(-.060)	(.102)	72.11	-35.58
	SE	.276	.188	.132	.157	22.62	30.56
Parent's Education	STD	(.019)	.111	(.041)	.090	-.107	(.275)
	UNSTD	(.077)	.387	(.108)	.312	-36.84	(36.56)
	SE	.273	.241	.131	.202	22.37	39.57
Family Size	STD	-.106	-.106	-.111*	-.135*	.123	-.052
	UNSTD	-.192	-.086	-.129*	-.108*	18.55	-6.19
	SE	.121	.062	.059	.051	10.12	10.16
IQ at age 11	STD	-.057	.265*	(.002)	.061	-.111	-.096
	UNSTD	-.017	.026	(.000)	.006	2.72	1.40
	SE	.017	.007	.008	.006	1.38	1.17
Family Relations in Childhood	STD	.195*	(.005)	-.083	.146*	.071	(.043)
	UNSTD	.194	(.003)	-.053	.099*	5.91	(4.29)
	SE	.059	.049	.029	.041	4.97	8.18
Achievement Orientation at age 12	STD	.195*	.133	.093*	(-.031)	(-.051)	-.119
	UNSTD	.201	.089	.062*	(-.021)	(-4.35)	-11.70
	SE	.063	.048	.031	.041	5.31	7.89
Neuroticism at age 12	STD	(.012)	-.113	(.037)	.215*	-.121*	(-.003)
	UNSTD	(.012)	-.072	(.023)	.135*	-9.84*	(-.321)
	SE	.055	.042	.026	.036	4.53	7.19
Introversion at age 12	STD	.297*	.076	-.207*	.215*	(-.049)	-.119
	UNSTD	.307	.051	-.139*	.142*	(-4.31)	-11.55
	SE	.062	.049	.031	.041	5.51	8.23
Conservatism at age 12	STD	(-.053)	-.142	(-.009)	.274*	-.097	-.098
	UNSTD	(-.055)	-.090	(-.006)	.172*	-8.18	-9.13
	SE	.063	.048	.030	.041	5.13	8.31
Education	STD	--	--	.763*	.540*	-.306*	-.320*
	UNSTD	--	--	.492	.535*	-25.47	-46.89*
	SE	--	--	.030	.063	7.41	14.50
Occupation at age 24/25	STD	--	--	--	--	.616*	.360*
	UNSTD	--	--	--	--	79.52*	53.17*
	SE	--	--	--	--	10.78	14.64
constant (c)		11.06	7.46	-.371	-5.33	1061.35	1075.40
% variance explained (R^2 x 100)		23.5%	30.6%	57.9%	50.9%	26.6%	16.2%

NOTES. Asterisks denote coefficients which are two or more times larger than the standard errors of their estimates; parentheses enclose coefficients indicating effects which are smaller than the standard errors of their estimate.

opposite direction (P_{OI} = 0.22).[13] This reversal may arise from the rather different distributions of occupational attainments in the two samples; Table 3.12 presents a breakdown of the occupational attainments of each sample. From this tabulation it will be seen that Hall-Jones catagory 4 which consists of lower echelon Non-Manual occupations form an approximate upper bound for the occupational attainments of the secondary modern sample at age 24, while they are an approximate lower bound for the attainments of the man who attended grammar school. Only 13 percent of grammar school men fall below this level, while only 16 percent of secondary modern men rise above this level at age 24. Thus, in substance, the reversal we have found suggests that introverted men from secondary modern schools are more likely to gain entry into lower echelon white collar occupations than their extraverted schoolmates, while for the grammar school students, who are already predestined for non-manual occupations, introversion is a handicap in reaching top-level executive and professional positions. Thus, in both instances, the data indicate that high levels of introversion are associated with a greater probability of placement in low-level white collar occupations.

Overall, introversion had the strongest influence on socioeconomic attainment of any of the personality variables. It had an effect upon educational attainment which was positive in both samples and particularly significant in the grammar school sample. Other things being equal, the net difference between the educational attainment of grammar school boys ranking in the 5th vs. 95th percentile on Introversion is almost one standard deviation (i.e., two years of schooling). Controlling for IQ, family social status, and other personality and social structural variables, we found that introverted boys not only stay in school longer, but obtain better

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[13] For simplicity of presentation we use standardized coefficients for this comparison. Since the standard deviations of the introverzation and occupational attainment distributions are equivalent in the two samples, a similar result is found when the unstandardized coefficients are analyzed (b = -.14 vs. +.14).

credentials than other boys.[14] However, when it comes time to enter the job
market, introversion is a liability for grammar school boys. Introverts hold
jobs at age 24 which are of lower status than the jobs held by extraverted
boys of similar educational level, IQ, social origins, etc. (P_{OI} = -0.207).
Further analyses using measures of occupational attainment obtained in 1966
and 1970 indicate that this liability does not disappear, but increases in
magnitude over time. For secondary modern school boys, we find, as previously
noted, that introversion has only a marginal influence upon the educational
attainment in secondary modern schools, but it does significantly increase
the likelihood that a boy will enter a non-manual (vs. manual) occupation.

Family Relations. The role of family relations in status attainment
shows a somewhat similar pattern, although the effects are not as pronounced.
Generally speaking, grammar schoolboys who report their home life to "warm"
and "trusting," tend to stay in school longer ($P_{E,FR}$ = 0.195), however, these
boys also appear, other things being equal, to do slightly worse in the
job market ($P_{O,FR}$ = -0.083). For secondary modern schoolboys, we find
that self-reports of good family relations are not associated with educational
attainment, but do have a positive net effect on occupational attainment
($P_{O,FR}$ = 0.146).

Adolescent Achievement Orientation behaves in the manner expected.
In both samples, we find that boys who evidence a higher degree of achievement
orientation at age 13 tend to show superior academic achievement (P_{EA} = 0.133
(sm); 0.195 (sm)). The independent effect of achievement orientation

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[14]Re-estimating Model Equation 3.5 using the scale of educational
qualification described in Chapter 2 as dependent variable yields a highly
similar estimate of the net influence of introversion.

upon   occupational attainment emerges, however, only for the grammar
school sample (P_{OA} = 0.093). There is no significant difference between the
expected occupations of men with equal secondary modern educations but different
levels of adolescent achievement orientation.

Neuroticism and Conservatism. The impact of Neuroticism and Social
Conservatism upon attainment are sufficiently similar that they can be
discussed together. Neither of these variables had any demonstrable influence
upon the educational or occupational attainment of the grammar school sample.
The relevant coefficients are all smaller than the standard errors of their
estimates. However, for boys who were assigned to secondary modern schools,
Neuroticism and Social Conservatism marginally depress educational attainment,
but have a substantial ameliorative effect upon occupational attainment.
Broadly speaking, it appears as if secondary modern students who evidence
higher levels of worry, irritability, and resignation to the prevailing social
conditions, are more successful than other students in the labor market.
Controlling for the effects of other variables in our models, the expected
difference between the occupational attainments of boys who are in the 5th
vs. 95th percentile on both Neuroticism and Conservatism is +1.23 units on
a scale that uses only seven points to cover the entire occupational
distribution. This result is particularly impressive when we consider that
access to Managerial (level six) and Professional (level seven) occupations is
virtually precluded by attendance at secondary modern school.

Personality and Occupational Attainment in Mid-Career. Given
successive waves of information upon occupational attainment after age 24,
it is possible to investigate two further questions of theoretical interest.
First, we would like to know if the personality effects we have seen
produce differences in attainment only in the early career, or whether

Table 3.12: Distribution of Occupations for Grammar and Secondary Modern
School Samples

Hall-Jones Occupational Class	Year [a]	SAMPLE	
		Grammar	Sec. Modern
1. Unskilled Manual	1962	0%	5.3%
	1966	0.5%	3.5%
	1970	0%	1.3%
2. Semi-Skilled Manual	1962	2.3%	16.0%
	1966	2.4%	19.1%
	1970	0%	10.3%
3. Skilled Manual & Routine Non-Manual	1962	11.8%	44.9%
	1966	5.7%	29.6%
	1970	5.4%	38.5%
4. Inspectional, Supervisory & Other Non-Manual (lower grade)	1962	20.5%	17.6%
	1966	15.3%	20.9%
	1970	7.1%	9.0%
5. Inspectional, Supervisory & Other Non Manual (higher grade)	1962	27.0%	11.8%
	1966	32.1%	19.1%
	1970	28.6%	23.1%
6. Managerial & Executive	1962	25.9%	2.7%
	1966	24.4%	4.3%
	1970	30.4%	10.3%
7. Professional & High Administrative	1962	12.5%	1.6%
	1966	19.6%	3.5%
	1970	28.6%	7.7%

NOTE. In 1962 the sample was aged 24 to 25.

these effects _persist_ in later life. Secondly, we are also interested in knowing whether the effect of personality upon occupational attainment involves not only initial differences at the point of entry into occupational careers but also systematic advantages or disadvantages in the _rate_ of career progress.

To answer these questions we have employed two complementary strategies. First, we re-estimated our model equation .for occupational attainment using alternate measures representing the men's occupations at age 24, 23, and 32.[15]

Figure 3.4 plots the net effect on a one standard deviation increment in each psychological variable upon occupational attainment at ages 24, 28, and 32. Overall, we find these effect to be stable, particularly in the grammar school sample. Results for 1966, however, do show some marked variations in the secondary modern school sample -- both from the values obtained at age 24 and at age 32. Moreover, there does appear modest evidence in the secondary modern school sample that the influence of these variables may increase over time. Table 3.13a presents standardised coefficients and standard error estimates for the analysis shown in Figure 3.4.

Do these results support the notion that personality exerts an influence upon career _progress?_ To test this hypothesis we have employed a modified form of our model equation for occupational attainment. This revised form uses occupation in 1970 as the dependent variable and introduces, as an independent variable, occupational level in 1962. The coefficients for the personality variables in this modified equation provide an index of the extent to which differential career advancement after 1962 is

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[15]Since sampling loss after 1962 poses additional problems in these analyses, we have also investigated the sensitivity of our conclusions to artifacts arising from differential sampling loss. The results of these analyses suggest that our major conclusions are probably not substantially affected.
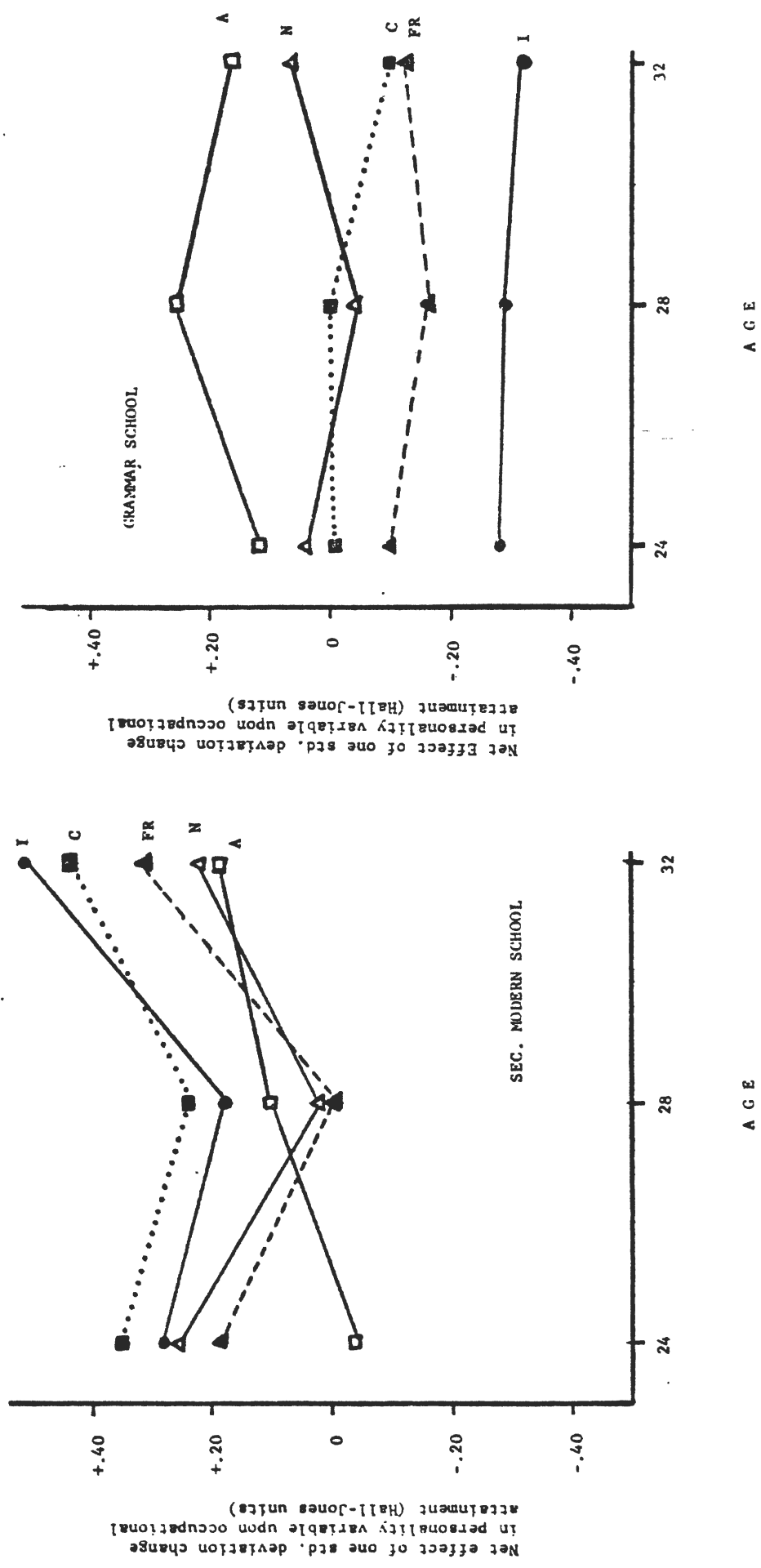
Figure 3.4: Net effects of one standard deviation increment in each psychological variable included in model upon occupational attainment at different ages. Occupational level is measured on 7-point Hall-Jones scale. Psychological variables are: Introversion(I), Neuroticism (N), Achievement Orientation(A), Social Conservatism(C), and self-reported family relation(FR). Estimated effects control for all social and psychological variables incorporated in model.

Table 3.13: Net effects of personality variables upon overall occupational attainment at ages 24, 28, and 32 (Panel A) and upon occupational <u>advancement</u> after age 24 (Panel B).

A. Personality Effects Net of Social Background, IQ, & Education

Personality-Psychological Variables	Coeff. age =	Grammar			Sec. Modern		
		24	28	32	24	28	32
Introversion at 12	STD	-.207*	-.280*	-.217*	.215*	.119	.313*
	UNSTD	-.139*	-.163*	-.144*	.142*	.090	.258*
	SE	.031	.037	.038	.041	.065	.071
Neuroticism at 12	STD	(.037)	.072	(-.034)	.215*	(.008)	.139
	UNSTD	(.023)	.039	(-.021)	.142*	(.005)	.111
	SE	.026	.031	.033	.041	.057	.061
Achievement Orientation at 12	STD	.093*	.137*	.218*	(-.031)	(.079)	.115
	UNSTD	.062*	.086*	.143*	(-.021)	(.060)	.095
	SE	.031	.036	.037	.041	.065	.069
Conservatism at 12	STD	(-.009)	-.080	(.002)	.274*	.172	.288*
	UNSTD	(-.006)	-.049	(.001)	.172*	.123	.226
	SE	.036	.035	.037	.041	.065	.070
Family Relations in childhood	STD	-.083	-.118	-.132*	.146*	(-.023)	.200*
	UNSTD	-.053	-.066	-.084*	.099*	(-.018)	.169*
	SE	.029	.034	.036	.041	.066	.071

B. Personality Effects Net of Social Background, IQ, Education and Occupation at age 2[4]

	Grammar		Sec. Modern	
	28	32	28	32
Introversion at 12 STD	(-.040)	-.149*	-.070	.191*
UNSTD	(-.027)	-.085	-.053	.157*
SE	.025	.031	.038	.054
Neuroticism at 12 STD	-.066	.048	-.181*	(.017)
UNSTD	-.041	.026	-.132*	(.014)
SE	.021	.025	.033	.047
Achievement Orientation at 12 STD	.139*	.079	.106*	.132*
UNSTD	.092*	.045	.081*	.110*
SE	.024	.029	.036	.052
Conservatism at 12 STD	(.009)	-.080	-.069	.133
UNSTD	(.006)	-.087	-.049	.105
SE	.023	.031	.038	.055
Family Relations in childhood STD	-.061	-.065	-.104*	.118
UNSTD	-.039	-.036	-.081*	.100
SE	.022	.027	.038	.054

NOTE. Asterisks denote coefficients which exceed twice the standard error of their estimates; parentheses surround coefficients which are smaller than the standard error of their estimate.

influenced by personality factors. In simple terms, the coefficients for the personality variables in this equation provide a measure of the difference in the rate of career progress for men of differing personalities who start off at the same occupational level at age 24. The coefficients estimated in this analysis are presented in panel $\underline{b}$ of Table 3.13.

These coefficients reveal a small number of substantial relationship between personality variables and occupational advancement. The strongest of these involve introversion. Between the ages of 24 and 32, introverts in our grammar school sample were markedly less successful than their extroverted schoolmates ($p_{032,I}$ = -0.149); the reverse holds true for the secondary modern sample ($p_{032,I}$ = +0.191). This pattern of findings exactly parallels that of our earlier analysis of initial occupational attainment (i.e., at age 24). Introversion appears to depress both the level of entry into the occupational world and subsequent advancements from that level for our elite grammar school sample, however, it has precisely the opposite effect upon men coming out of the secondary modern school system.

The other strong effects revealed in table 3.13b involve achievement orientation. For both samples at both ages 28 and 32, this variable has substantial and (in three of four cases) reliable effects upon occupational advancement (--net of initial occupational level, education IQ, social background, etc.) This result, together with our earlier findings lend considerable support to implications drawn from previous laboratory and (cross-sectional) survey research. Although not overwhelming, this variable does have discernible effects upon occupational attainment.

Personality and Income. We have deferred consideration of the
earnings equation until last, since it requires us to reopen a discussion
which was broached in the opening pages of this chapter. In forming our
income equation we have followed the traditional practice in the sociological
literature (e.g., see Sewell & Hauser, 1975, ch. 3; Duncan et al., ch. 3;
Treiman & Terrell, 1975) in specifying annual earnings to be a function of
individual characteristics (educational attainment, personality, social
background) and occupational status. Theoretically, this approach postulates
that occupational status is causally prior to earnings, or to put it
another way, that variations in occupational status produce
individual variations in income (rather than vice versa).

While we have estimated an equation consistent with this traditional
view, we have substantial misgivings about this approach. In particular, it
is not clear how one deduces any causal ordering concerning the relations
between occupational status, as ordinarily measured, and earnings. The
occupational status variable used in this (and most other) studies represents
a scaling of the responses obtained when a sample of the population was
asked to rate the 'general standing' of a set of occupations. We suspect
that raters approach such questions, in part, by reference to the incomes
typically paid in different occupations. If this is correct,
regression analyses using the traditional earnings equation does not
provide substantive evidence upon the causal role of occupational
status in generating earnings, but rather it tells us something about
the nature of the criteria people use to produce ratings of the general
desirability of occupations.[16]

This argument suggests that a more informative analysis would
result from the exclusion of occupational status from the income equation.

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[16]Independent support for this view is found in Goldthorpe and
Hope's investigations of the multidimensional structure of occupational
prestige judgements.

In this form, the coefficients estimated for our personality variables will tell us the return (in income) which accrues to a specific personality trait (net of the effects of education, IQ and social background). [16a] In its more traditional form (i.e., including occupational status in the equation) the coefficients for the personality variables represent the net return to each personality variable over that which would be expected given the level of occupation a man was employed at. To some extent, the latter formulation provides a measure of the extent to which personality traits are associated with employment in more and less well-paid jobs of similar occupational status (e.g., university lecturer vs. business executive) as well as the effects of differential pay within the same occupation.

The results presented in Table 3.14 indicate that introversion tends to depress earnings. This is particularly true for grammar school students when we use the functional form that does not incorporate occupational status as an independent variable. This result parallels our finding using the same set of independent variables and occupational status, itself, as the dependent variable. Overall, introverted grammar school students earn less at age 24 than their extraverted schoolmates with similar education, IQ, and social background. The difference between the expected earnings of men scoring in the 5th vs. 95th percentile on introversion is approximately 60 pounds (i.e., 7%) per year. Although modest, this difference is reliable.

Overall, the remaining differences are even more modest and less reliable. Worthy of brief note, are the lower earnings of secondary modern school students with high achievement motivation ($b = -12.79$, $se_b = 8.16$), and of grammar school students who score high on the neuroticism scale ($b = -7.98$, $se_b = 4.98$). These latter results appear

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[16a] This approach is the common one in econometric studies of earnings.

Table 3.14: Estimated Coefficients for Alternate Formulations of Income Equation

Independent Variable	Coeff.	Grammar		Sec. Modern	
		Model Without Occupation	Model With Occupation	Model Without Occupation	Model With Occupation
Father's Occupation	STD	.107	.137*	.163*	.141
	UNSTD	14.02	17.94*	26.79*	23.23
	SE	9.39	8.54	13.32	12.92
Ordinal Position	STD	.191*	.205*	(-.084)	-.099
	UNSTD	67.34*	72.11	(-30.22)	-35.53
	SE	24.90	22.62	31.58	30.55
Parent's Education	STD	-.082	-.107	.108	(.075)
	UNSTD	-28.22	-36.84	55.16	(38.53)
	SE	24.60	22.37	40.65	39.57
Family Size	STD	(.055)	.123	-.101	-.052
	UNSTD	(8.24)	18.55	-11.93	-6.19
	SE	11.03	10.12	10.38	10.16
IQ at age 11	STD	-.109	-.111	.118	-.036
	UNSTD	-2.69	2.72	1.72	1.49
	SE	1.52	1.38	1.22	1.17
Family Relations	STD	(.020)	.07	.096	(.043)
	UNSTD	(1.65)	5.91	9.53	(4.29)
	SE	5.43	4.97	8.33	8.75
Achievement Orientation (age 12)	STD	(.006)	(-.051)	-.130	-.119
	UNSTD	(0.55)	(-4.35)	-12.79	-11.70
	SE	5.80	5.31	8.16	7.89
Neuroticism (age 12)	STD	-.098	-.121*	(.073)	(-.003)
	UNSTD	7.984	-9.84*	(6.90)	(-.321)
	SE	4.98	4.53	7.15	7.19
Introversion (age 12)	STD	-.177*	(-.049)	(-.041)	-.119
	UNSTD	-15.33	(-4.31)	(-4.02)	-11.55
	SE	5.84	5.51	8.24	8.23
Conservatism (age 12)	STD	-.102	-.097	(.00)	-.098
	UNSTD	-8.65	-8.18	(0.01)	-9.13
	SE	5.65	5.13	8.20	8.31
Education	STD	.165*	-.306*	-.126	-.320*
	UNSTD	13.72*	-25.47	-18.50	-46.89*
	SE	5.68	7.41	12.62	14.0
Occupation (age 24)	STD	--	.616	--	.360*
	UNSTD	--	79.52*	--	53.17*
	SE	--	10.76	--	14.64
Constant (C)		1031.88	1061.35	791.73	1075.40
% variance explained		10.6%	26.6%	9.8%	16.2%

NOTE. Asterisks denote coefficients which exceed twice the standard error of their estimate error of their estimate; parentheses surround coefficients which do not exceed the standard error of their estimates.

to represent differences in earnings which are independent of occupational attainment; thus, these coefficients remain virtually unchanged when occupational status is introduced as an independent variable in the earnings equation.

In interpreting these findings, particularly those for achievement orientation, it should be kept in mind that they may reflect factors other than differential attainment. For example, it is possible that the lower earnings of men with high achievement orientation represents personal investments in on-the-job training. Such investments could be represented by earnings which were foregone in the anticipation of accelerated increases in earnings in later years (e.g., the case of a man who accepts a cut in pay as a shop foreman to take a management trainee position).

Summary and Conclusions

This chapter has been concerned with two basic questions: first, does personality systematically influence socioeconomic attainment, and secondly, do personality variables serve as mediators in the transmission of status from one generation to the next. In answering the first question we took the conservative approach of first fitting a baseline model which allowed for the influence of a wide range of sociological factors. We subsequently compared these results to those for a model which incorporated measures of four personality variables which were of significance in past studies of human personality, or in past research on socioeconomic attainment. The results of this analysis indicates that, on the average, the inclusion of these personality variables increased our ability to account for individual variations in educational attainment by over 100 percent, in occupational attainment by 19 percent, and in earnings by 57 percent. These results are both substantial and significant; the personality variables we have selected do have a systematic relationship to socioeconomic

attainment. These variables account for variations in individual attainment which are unexplained in traditional social structural models of attainment.

However, our results do not provide evidence in support of the notion that these personality variables serve to transmit social inequality from generation to generation. The introduction of these variables into our models does not substantially affect estimates of the direct transmission of a status from fathers to sons. The reason for this is not that personality factors are ineffectual in explaining adult attainment, but rather that these personality dimensions appear to be independent of social background. By and large, the variations in personality which we observed were idiosyncratic; (i.e., the differences in personality between men who came from the same social class equalled the differences in personality between men of different social classes).

While this result cannot speak to the question of the impact of the entire universe of potentially relevant personality dimensions, it does suggest that two of the variables which have been central to past discussion of human personality--Neuroticism and Introversion--and one variable which has long been included in discussions of socioeconomic attainment--achievement motivation--do not serve as intergenerational transmitters of social inequality.

As to specifics, we found that the influence of personality varied by school system and consequently by the sectors of the labor market the samples entered. Among secondary modern school students, whose education was designed to prepare them for manual and lower-level, white-collar occupations, we found that personality variables had little independent effect upon educational attainment. While there was some indication that secondary modern boys who showed higher levels of Achievement Orientation and Neuroticism at age 12 tended to stay in school longer, the major influences

determining their educational attainment were socioeconomic (e.g., parents educational level and father's occupation). Occupational attainment among this sample was, however, substantially influenced by personality. Men in this sample who, at age 12, were more introverted, socially conservative, achievement oriented and who reported more favorably upon their relations with their family, tended to obtain more prestigious jobs at age 24. Given the nature of the distribution of the occupations in which these men were employed, this finding might be interpreted as a reflection of their differential placement in lower-level white (vs. blue) collar jobs.

For the grammar school sample who were selected at age 11 to be prepared for elite status, a rather different picture emerges. For this group personality plays the major role in determining individual differences in educational attainment ur sociological baseline model explains only 6.4% of the variation in this sample's educational attainment; addition of measures of adolescent personality increases the predictive power of the model to 23.5 percent. In the grammar school sample, we found that boys who were more introverted, achievement oriented, and who reported more favorably on their relations with their families tended to stay in school longer and obtain better credentials. When this sample entered the working world, however, a somewhat different set of influences operated to determine occupational attainment. Most saliently, introversion which had facilitated educational attainment, proved to be a major disadvantage in the occupational marketplace. Achievement orientation, however, continued to exert a positive determining influence (net of the influences of education and other variables) upon occupational attainment.

Overall, our analysis of the determinants of earnings produces less impressive results. Our model equation for earnings explained a considerably smaller

proportion of individual variation in annual income. While adolescent

personality does add to our weak ability to predict earning at age 24,

the variations around the estimates made by our model equation are still

quite large ; only about ten percent of the variance in earnings was explained.

Given the results discussed in Chapter 2, we might expect this result

to change at a later point in the men's careers, however the appropriate

data are not available to us.

Chapter Four

AN EXPERIMENTAL PERSPECTIVE ON THE MICROSTRUCTURE

OF SOCIOECONOMIC ATTAINMENT:

the influence of ascribed status and
personality upon the occupational placement
decisions of personnel administrators

- The personnel decisionmaker must implicitly be an
amateur psychologist. He must first decide which
personality characteristics are required by a
particular job. More demanidingly, he must decide
which behaviors of a management candidate can be
taken as an indication of whether the candidate
possesses these characteritics...
Upon what evidence do managers base their
assessments of a candidate's personality? Some
managers cited, for example, the importance of
a candidate's "moral capacity". When asked what
they meant by "moral capacity", one gave as an
illustration a poor credit rating, and a second
cited a candidate's use of"cuss words". In other
cases, alcoholism was regarded as symptomatic of
whether a candidate was "unethical", and unmarried
men were regarded, ipso facto, as less "responsible"
than those who were married. Each of these examples
represents an aspect of an implicit theory of pers-
onality held by the managers ... To date, these
implicit theories have seldom been discussed, let
alone studied.

- R. Quinn et al. (1968)
The decision to discriminate: a study
of executive selection.

Although the multi-causal analysis of longitudinal data in chapters two and three   is appropriate for charting the influence of personality and social status variables upon attainment, it does not identify the real-world mechanisms through which the observed causal effects are transmitted. Thus such research is mute to a type of question which asks, for example, "How is it that extroverts or the children of the upper classes gain an advantage in the job market relative to other workers of similar intelligence, education, and ability?" Although such questions are basic to our understanding of the relationship of individual psychology to societal structure and functioning, they have not previously been the subject of experimental social psychological analysis.

The lack of interest in such questions among social psychologists is attributable not only to the past focii of theoretical interest in social psychology (e.g., attitude change and group dynamics), but also to the limitations imposed by the economics of subject recruitment which makes research requiring "normal" populations unattractive. Over the last decades experimental studies using college students have become the norm in social psychology (cf., Christie, 1959; Smart, 1966; Higbee & Wells, 1972), although criticism of this stereotype has been increasing (e.g., Ring, 1967; McGuire, 1973; Borgatta & Bohrenstedt, 1974). One example of the potential pitfalls resulting from this norm for social psychological research is provided by recent research on interpersonal manipulation (i.e., "Machiavellianism).   Consistent with past laboratory studies of student populations (cf. Christie & Geis, 1970), it has been found that, for men with some college education, there is a positive association between

"Machiavellianism" and socioeconomic attainment (controlling Age, Education, Race, and social class of father). However, for men who had not attended college, a relationship of equal magnitude but opposite direction is found. Contrary to extrapolations from past laboratory studies, high Machiavellianism is associated with lower socioeconomic achievement in this half of the population (cf., Touhey, 1973; Turner & Martinez, 1977). This interaction phenomenon was overlooked in previous investigations which almost invariably used college students as subjects

Although there is one study (Dipboye et al., 1975)[1] which reports finding no difference between professional personnel interviewers and college students in their ranking of job candidates, generalizations from the laboratory behaviors of student subjects to the real-world behaviors of personnel managers are necessarily tenuous. To provide a valid experimental perspective upon the manner in which social status, gender, and personality influence occupational attainment, the present chapter presents data on the decisionmaking of over two thousand real-world personnel managers. These "subjects" were asked to select occupations appropriate for candidates described in "biographical and interview" summaries whose characteristics were experimentally manipulated (the distribution of resume characteristics--e.g., sex, social class, neuroticism--was matched to those of "normal" populations). The rationale for this experiment is relatively uncomplicated and follows directly from our survey analyses.

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[1] The Implications of Diboye et al's study is limited because it only involved a single job (head of a retail furniture department) and compared the judgements of students of industrial management at Purdue University to young professional personnel interviewers who were interviewing students at Purdue; the median experience of the personnel interviewers was only two years.

Our general approach was to study experimentally those microsocial situations which serve a "gatekeeping" function by controlling access to real-world attainments. To the extent that such situations provide a stage upon which social and psychological variables can influence status passage, they offer concrete (micro-social) explanations of <u>how</u> the causal influences documented (at the macro-social level) by our survey analysis are transmitted through the social system. In the next section we briefly outline a program of experimental research which was designed to complement our survey analysis of occupational attainment; in the remainder of this chapter we report upon the results of this phase of our research.

<u>Hypothetical Causal Mechanisms.</u>

A number of plausible hypotheses may be invoked to explain the influence of personality and status variables upon occupational attainment. Proceeding with our examplary variable--extroversion--we may posit any (or all) of the following mechanisms to account for our survey findings:

1) extroverts evidence greater achievement because organizational "gatekeepers" (e.g., vocational counselors, personnel officers, etc.) generally believe such men to more qualified for high-status positions than introverts with similar qualifications;

2) or, in interview situations such men may be more effective in displaying their competencies, and thus have a higher probability of securing a given position than similarly-qualified introverts. (Self-presentation in interview situations is widely recognized (Guion, 1967) to be a crucial element in occupational placement. Its centrality is reflected by the recent funding of programs to train the "disadvantaged" in the skills required for successful self-presentation in placement interviews (e.g., Barbee & Keil, 1973)).

3) or, within a given occupational setting, extroverts may be perceived
    as more meritorious of advancement on the basis of their behavior in
    the work group;

4) or finally, there may simply be differential tendencies for extroverts
    and introverts to obtain information concerning job opportunities, to
    make application for positions for which they qualify, and to remain
    in a work situation long enough to obtain promotion.

Parallel hypotheses may be proposed for the other psychological and social
background variables found (by survey analyses) to have a direct influence
upon occupational attainment.

Some information indirectly relevant to the two final hypothesis
is available from the comprehensive occupational histories obtained in the
LSE longitudinal data. For example, by reestimating our structural
equation for occupational attainment using occupation at age 32 as the
dependent variable and introducing occupational level at age 24 as an
independent variable, we learned that men who have different
personalities and status characteristics, but who start off at the same
occupational level advance at somewhat different rates.

Similarly, analysis of the correlations between status and
personality variables on one hand, and the frequency with which men
changed occupations and/or jobs on the other, provides some insight into
the mechanisms suggested by the fourth hypothesis. These analyses outlined
above have been performed (see Appendix 4.1); and while the data are quite
meager in their coverage of the postulated causal mechanisms, it does
seem unlikely that these hypotheses can provide a complete accounting for
the effects of status and personality variables upon socioeconomic attainment.
This, in turn, suggests that the first two hypotheses are deserving of study.

Testing of the first two hypotheses requires experimental

investigation. It is the first hypothesis which is the subject of the

present chapter.

Employment bias as a function of ascribed status and personality.

Following Heider's (1958) observation that, regardless

of their validity, attributions of causality have import for interpersonal

relations,[2] we undertook an investigation of the proposition that evaluations

of the fitness of candidates for prestigious occupations vary with the

personality, social origins, and attitudes ascribed to them. In undertaking

this   investigation we were particularly interested in discovering the

extent to which bias in the "naive psychology" of organizational "gate-

keepers" could account for the findings of our survey analysis. Given our

concern with status attainment, a dependent variable of primary interest

for us is the prestige score[3] as well as the type of occupation selected

for candidates.

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[2] "Common sense psychology is of value for the scientific under-
standing of interpersonal relations...Since (it) guides our behavior toward
other people, it is an essential part of the phenomenon in which we are
interested..."Native psychology"...gives us the principles we use to build
up our picture of the social environment and guides our reactions to it.
An explanation of behavior, therefore, must deal with common sense
psychology regardless of whether its assumptions and principles prove
valid under scientific scrutiny. If a person believes that the lines in
his palm foretell (the) future, this belief must be taken into account
in explaining...his actions (Heider, 1958)".

[3] To facilitate cross-cultural replication, Treiman's (1977)
Standard International Occupational Prestige Scale will be used.

Overview of Experiment

This experiment employs a bogus evaluation technique in which
judges are required to make occupational placement decisions about alleged
"job candidates." To isolate the ascriptive (as opposed to dynamic) influence
of attitudes and personality upon decision making, we employed written
descriptions of the candidates. Vignettes were prepared so as to
systematically vary the attitudes, personality, and social origins
attributed to "candidates." This procedure has the unique advantage of
permitting orthogonal variations of psychological, cognitive, and social
origin variables; such controlled variations are not easily arranged using
flesh-and-blood candidates. [See Sampson & Rossi (1975) for an example
of the procedure's flexibility.]

Four psychological variables were used in our experiment:
Extroversion, Neuroticism, Conservatism, and Machiavellianism. The first
three variables were selected because they had significant effects
upon occupational attainment in our preliminary analysis of the longitudinal
study; the final personality variable, Machiavellianism, was included since
it has been shown (Turner & Martinez, 1977) to have substantial effects
upon the social mobility of a representative sample of the American
population (N = 1482), and also upon other attainments in a wide variety
of laboratory settings (Christie & Geis, 1970). Finally, to test for the
existence of social class and sex discrimination, two status variables--
ascribed social origin and gender--were incorporated in our experiments,
in addition to measures of educational level and IQ.

Our experimental design orthogonally varies all of the independent
variables, except education and IQ. The latter variables are permitted to
covary in a manner which reproduces the intercorrelation found (r = 0.65;

cf. Jencks et al., 1972) in representative national populations. Failure
to allow for this correlation in the experimental design would result
in numerous "unrealistic" descriptions (e.g., Ph.D.s with IQs of 80).

Subjects, i.e., personnel managers, were randomly assigned one resume
describing an applicant for employment; the resume described
educational and family background and IQ, and reproduced a variety of
statements alleged to have been made by the job candidate during an
employment interview. The latter statements were actually derived from
the scales used to measure our four personality traits, and the subjects
statements were selected to generate a particular score on each scale. Thus,
the personnel managers saw the personality traits of the workers not in
terms of a "score," but rather as a particular set of statements which
the applicant used to describe him- or herself. These statements, in
turn, described a particular percentile score on the personality scales
used in our survey research. In order to protect ourselves against
unusually extreme caricatures of the workers being described in the
experiment, the level of all independent (i.e., manipulated) variables was
continuously varied with their means and standard deviations matched to those
of a "normal" population.

Subsequently, subjects were required to select an occupation for
which the alleged candidate would be best suited. Variations in the mean
prestige level of the recommended occupations permits us to assess whether
ascriptive biases exist and the extent to which they could account for the findings
of the longitudinal study. During the course of the experiment some
additional data were also collected. For example, while eliciting judgements of
the occupation for which a candidate was best suited, we also requested
a prediction of the occupation which the job candidate was "likely to

acquire". These two judgements (i.e., "appropriate" vs. "expected")
can be contrasted to derive an estimate of the subjects'
belief in the efficiency and equity of the status attainment

process. During the course of the experiment, information on interpersonal
attraction was also obtained; specifically, subjects were asked to rate
their interest in "getting to know as a personal friend" the candidates
described in the interview summaries. While the latter material is not
central to our hypotheses, it does provide some insight into the non-
attainment effects of ascribed personality traits upon the person
perception process.

<center>DETAILS OF METHOD</center>

Subjects (Ss)

Recruitment of Professional Organizations. For the reasons
discussed above it was thought appropriate that subjects in this experiment
be men and women actually involved in personnel decisionmaking. The most
adequate way of obtaining a broadly constituted pool of personnel
administrators to serve as subjects was through the relevant professional
organizations.

In the United States two associations provide organizational
representation for professional personnel officers; they are the American
Society for Personnel Administration (ASPA) and the personnel division
of the American Management Association (AMA).[4] According to informants
inside of these organizations, there is considerable overlap in the
membership of ASPA and the AMA personnel division. During the period
between October 1, 1975 and January 15, 1976, a complicated and frustrating
series of negotiations were held with both organizations to obtain their
cooperation in this study. The American Management Association ultimately

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[4]ASPA membership includes 16 thousand individuals and 7 thousand
corporations. The AMA personnel division has 10 thousand individual members
and 3 thousand corporate members.

refused cooperation on the grounds that it makes frequent mailings to its
members for organizational and commercial purposes (e.g., marketing seminars,
publications, etc.), and they did not wish to add to this burden with our
solicitation of subjects. Fortunately, however, after negotiations with
society officers, management, and two separate committees on research
activities, the American Society for Personnel Administration agreed to
cooperate in our study.

In the United Kingdom, there is a single organization of professional
personnel administrators (the Institute for Personnel Management: IPM); this
organization has a quasi-official status and administers a widely-used
examination and credentialling scheme for personnel officers. IPM has over
19 thousand members and affiliates on its rolls; its membership is divided
into six different grades depending upon the level of their examination
qualifications [Companion, Fellow, Member, Associate, Student (4 subgrades),
and non-member subscriber on affiliates]. The Institute provides both
organisational representation and professional certification and training for
professional personnel administrators in the United Kingdom; IPM qualifications
are a frequent prerequisite for upper-level personnel positions in industry.

With the assistance of Dr. Gun Semin of Sussex University, the
cooperation of IPM in this study was secured. Final arrangements for their
participation were made in March of 1976. Thus, all in all, the
negotiations to secure appropriate organizational sources of subjects
for this experiment in the U.S.A. and U.K. took almost six months to
complete. The length and frustrations of these negotiations provided our
first lesson in the difficulty of doing social psychological experiments
with real world subjects.

Recruitment of Individual Subjects. During the second week of
March (in the U.S.A.) and the first week of April, 1976 (in U.K.) individual

subjects were recruited from among the membership of ASPA and IPM. Letters were sent to every other name on the ASPA mailing list, excluding "corporate" members and members residing in foreign countries. The letter described the background of the study, and encouraged members to participate. Experimental materials (see below) were enclosed together with postage paid envelopes for reply.

The U.K. subjects were recruited in a similar manner; however due to financial restrictions and the higher postage costs in the U.K. only one IPM member in eleven was solicited to serve as a subject in this experiment. The letter of solicitation followed the same basic form as that used in the U.S.A., however, the letter was signed by the director of IPM rather than by the investigators. Copies of the letters of solicitation are contained in appendix 4.2.

Our mail solicitation produced 2021 subjects; of the people we contacted, approximately one person in five agreed to participate as a subject in this experiment.[5]

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[5]The degree to which the membership of these organizations agreed to cooperate in our experiment was rather greater than expected, especially in the U.S.A. According to ASPA, the last official membership census which the organization conducted had a response rate of only 32 percent, even though the census was designed to elicit comments and complaints about the organization and biographical information about the membership. The experience of commercial firms which have surveyed this group to obtain information upon employment practices is considerably worse; Prentice-Hall, for example, reports reply rates of about 10 percent for its series on contemporary labor practices (Jeffery, personal communication). Inaddition, response to our solicitation in the U.K. seemed to be artificially depressed by two practical mishaps. Seven percent of the responses we received in the U.K. indicated that subjects had received an envelope from IPM which contained incomplete materials (e.g., no letter of solicitation, resume, etc.) Although there was no way of telling we suspect that the rate of 'incomplete materials' was a good deal higher among people who did not respond at all. Similarly, unbeknownst to the investigators, the IPM directorate inserted a sentence in the letter of solicitation asking that replies be made no later than 14 April; this left members one week, at best, to reply. Indeed several respondents wrote to say that they had received their materials after this deadline.

Characteristics of the Subjects. The overwhelming majority of

subjects in both the American and British portions of the study were personnel

decisionmakers. When asked,

> "Are you now, or were you previously involved as a professional
> in personnel-hiring or promotion decisions?"

ninety-eight percent of the subjects in the U.S.A. and eighty-four percent

of the U.K. subjects replied, "yes." The exceptions to this pattern

consisted mainly of university teachers and students; it should be noted that

the inclusion of student members in IPM causes the British sample to have

a somewhat lower percentage of active personnel decisionmakers.

In addition to being asked about their participation in personnel

decisionmaking, subjects were also asked to describe (in their own words)

the title of their occupation. The distribution of responses to this

question are shown in Table 4.1; it will be seen from this tabulation that

three-quarters of the American subjects and two-thirds of the British

subjects had administrative or supervisory roles in personnel departments

(e.g., personnel managers or directors, personnel officers, salary

administrators, etc.). Furthermore, approximately nine percent of the

subjects reported holding positions as corporate officers or business

owners. Only one respondent in ten reported a job title that did not

involve personnel work in industry (e.g., student, teacher, etc.).

Although specific information was not obtained in our study, data collected

by ASPA indicate that thirty percent of their membership hold personnel

positions in firms employing more than 1000 workers, and eighty percent

of their members are college graduates.

From the demographic information (age, sex, region of country)

collected from our experimental Ss, it appears that they are equally

drawn from all areas of the membership of ASPA and IPM. Table 4.2

presents the age distributions for the experimental Ss and the membership

Table 4.1: Job Titles (Self-Described) of Subjects in Experiment

Subject's Job Title	USA Sample	UK Sample
Personnel Manager or Director	47%	31%
Director of Industrial/Employee Relations	15	6
Personnel Officer	2	26
Salary and/or Benefits Administrator	4	2
Personnel Supervisor	5	--
Assistant Personnel Manager	4	--
Personnel Assistant, etc. (A)	3	6
Personnel Consultant	3	5
Corporate Ass't Vice President	1	5
Corporate Vice President	6	--
Corporate Officer	1	1
Plant Manager	2	1
Owner/Manager of Firm	1	1
Other Miscellaneous (B)	8	15

NOTES. Five percent of respondents in each sample did not provide a job title on their answer sheets.

(A) Including "personnel interviewer," "personnel clerk," etc.

(B) E.g., university teacher, salesperson, student, retired (no previous title given), etc.

of the two organizations. Except for a five percent overrepresentation of
the 18-29 year-old group in the U.S.A. and a commensurate underrepresentation
of 40-44 year olds, the age distribution of our experimental subjects
perfectly matches (i.e., $\pm$ 1%) that of IPM and ASPA. The ratio of males
to females among our subjects is roughly 5 to 1, and that closely reflects
the preponderance of males in the personnel field (approximately 7 to 1).

Postmarks indicated that our American subjects were drawn from
all 50 states of the U.S.A. and the most populous American possessions,
e.g., Puerto Rico. Table 4.3 presents the relevant geographical breakdowns.
Overall we note a considerable similarity between the subject and membership
distributions, although the Northeast and South seem to be slightly
underrepresented (4 to 6 percent), and the West, Southwest and Central
regions seem to be slightly overrepresented (2 to 5 percent). Unfortunately,
equally precise comparisons are not possible for the British portion of the
experiment, but the distribution does show our subject population to be
concentrated in England (vs. Wales, Scotland, & Ireland), which is
consistent with data from IPM's membership registry.

Manipulation of Independent Variables: Resume Construction. Every
subject in the experiment received one resume describing a young worker.
The resume was constructed so that certain parts of it were invariable
from subject to subject, and certain parts of the resume were systematically
altered. The standard parts included the description of the worker as 24
years old and born in New York City (for U.S.A. sample) or London (U.K.
sample), and the fact that

> "At present, because of his/her youth and limited work experience,
> (this worker) is not firmly committed to any particular career.
> S/he is presently searching for an occupation which would best
> suit her/him, and in which s/he could perform most competently."

Other material supplied in the resume was variable.

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Table 4.2: Age and Sex Distributions of Experimental Subjects (vs. all members of professional personnel organizations).

Age	% of ASPA	% of exp. Ss	Deviation
18-29	10.3%	15.6%	+ 5.3%
30-34	19.0%	19.3%	+ .3%
35-39	17.0%	15.9%	- 1.1%
40-44	17.4%	13.0%	- 4.4%
45-49	14.6%	14.2%	- 0.4%
50-54	11.6%	10.4%	- 1.2%
55-59	7.1%	7.7%	- 0.6%
60+	2.8%	3.8%	+ 1.0%

Sex	% of ASPA	% of exp. Ss	Deviation
Female	11.2%	16.6%	5.4%
Male	87.2%	83.4%	

NOTE. Characteristics of ASPA membership are derived from November, 1973 membership survey (ASPA, Membership Profile Survey, 1974).

Age	% of IPM (A)	% of exp. Ss	Deviation
20-29	} 60%	32% } 59%	1%
30-39		27% }	
40-49	} 40%	24% } 41%	1%
50-59		15% }	
60+		2%	

Sex	% of IPM	% of exp. Ss	Deviation
Female	(na)	20%	
Male	(na)	80%	

NOTE. Characteristics of IPM membership are derived from 1974 membership survey (IPM Digest, January, 1975).

(A) According to report of membership survey: "Almost 60% of (members) are less than 40 years old and the greatest single proportion are in the 25-29 age bracket (11%, 1975, p. 3)."

Table 4.3 Geographical Distribution of Subjects in Experiment and Membership
of Professional Organization of Personnel Administrators

U.S.A. Sample

REGION	% Experimental Subjects	% ASPA Membership
Northeast (incl. CT, ME, MA, NH, RI, VT, NJ, NY, DE, DC, MD, PA)	14.2%	18.6% (A)
South (incl. VA, WV, NC, SC, AL, GA, FL, PR, JA, KY, TN, AR, LA, MS)	19.2%	26.1%
Central (incl. OH, MI, IL, IN, MN, ND, SD, WI, IA, KS, MO, NE, ID, MT, WY)	35.6%	32.9%
Southwest (incl. AZ, CO, NM, UT, OK, TX, & Mexico)	10.5%	7.6%
West (incl. AK, OR, WA, CA, HI, NV, British Columbia)	20.5%(A)	14.8

NOTES. While the ASPA Membership includes a small number of personnel administrators
in Latin America and Canada, these members were not included among the people
we solicited to take part in our study.

A
  The suspiciously low number of members (N = 2) reporting mailing addresses
in the District of Columbia suggests that there may have been a mistake made in
coding the acronyms for Washington state and Washington, D.C.

BRITISH SAMPLE

REGION	% Experimental Subjects
London (postal district)	20%
Rest of England	70%
Wales	3%
Scotland	5%
Ireland (North & South)	2%

Both demographic and personality information was varied in the resumes we designed. The demographic variables were,

(1) <u>Name & Gender</u>: to assess the role of gender in personnel decisionmaking, one-half of all resumes had a female name, while the others had a male name. The names themselves were randomly selected from among 10 family names whose frequency of occurrence ranks from 45th to 54th in the U.S.A.[6] The ten most common first names for male and female babies 'announced' in the New York Times were used as first names.[7] Every possible combination of names was used an equal number of times. All names were Anglo-Saxon and our lists did not include the common pseudoanonymous names (John Smith, etc.). The prefixes Mr. and Ms. were used to further stress the worker's gender.

The names generated using this technique were <u>completely</u> randomized with respect to other variables except that for each

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[6] Derived from count of names of all individuals (152 million) listed in files of Social Security Administration in 1964 (source: Smith, 1969). The family names chosen were held by 250 to 300 thousand individuals.

The names were: Edwards, Morris, Peterson, Cook, Rogers, Stewart, Morgan, Cooper, Reed, Bell.

[7] These names were derived from a study (Kolatch, 1967) of the most common children's first names listed in the Birth Announcements of the <u>New York Times</u> between August, 1943 and August, 1945.

The names were: Michael, Robert, Richard, David, Alan, Stephen, Peter, Jeffery, Steven, Mark, Ellen, Susan, Jane, Ann, Barbara, Carol, Joan, Nancy, Linda, and Judith.

'male' resume a 'female' resume was also generated with exactly the same characteristics except for the worker's name and I.D. number.

(2) <u>Educational Attainment</u>: For the U.S.A. sample, each worker was described as having completed a given grade in high school, or a specific number of years of undergraduate or postgraduate study. For example,

"Ms. Stewart left school after completing the 11th grade"

or,

"Mr. Morris left school after graduating from high school"

or,

"Ms. Peterson attended college and completed three years of study majoring in (English).

Workers who had attended college were assigned a randomly selected major from among the following: Social science, business, engineering, education, biological science, English, or mathematics and physics. Assignment of majors was done in rough agreement with the national distribution of college degrees awarded in these fields.[8] The assignment of a given educational level (<u>i.e.</u>, years of education completed) to a resume was made by random selection from a normal distribution having a mean of 13.2 and a standard deviation of 1.7 years.

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[8] In 1971, sixty percent of all bachelors degrees were awarded in these fields (<u>cf</u>. NCES, 1973). Other fields (e.g., nursing, library science, theology, fine arts) were not included in our list because they either had relatively few students, or were very closely connected to a specific occupation.

Majors were randomly assigned in the following proportions: social science (4/15), business (4/15), engineering (2/15), education (2/15), biology (1/15), English (1/15), and math-physics (1/15).

This distribution of educational attainments was matched to the median for 18 to 24 year olds in the U.S.A., with the standard deviation matched to that for Sewell and Hauser's sample of 25-year ols in Wisconsin.[9]

The procedure used for the U.K. sample was similar to that used for the U.S.A. sample, however, the education descriptions and distribution of attainments was matched to the English system. Using the weighted estimates of educational attainment for the LSE sample as parameters for the distribution in this experiment (mean =10.4, sd =1.1) the various years of educational attainment were described as,

> "Ms. Peterson attended a comprehensive school and left school at age 15"

or,

> "Ms. Peterson attended a comprehensive school and subsequently completed a one year polytechnic course in _____

or,

> "Ms. Peterson attended a comprehensive school and subsequently completed a University degree in

_____

Indication of fields of study was done in the same manner as in the U.S.A. portion of the study.

(3) IQ. The IQs ascribed to individual workers were also varied, however the distribution of individual IQs was constrained so that the product moment correlation between IQ and educational attainment across resumes was +0.65. The resumes read,

> Mr/Ms. _____ was given a conventional intelligence test (Wechsler Adult Intelligence Scale), and s/he was found to be of (below average) (average) (above average) ability. Her/his IQ was estimated to be _____ which corresponds to _____ percentile in the IQ distribution.

9
    Since the Wisconsin sample did not include men who had dropped out of school in 11th grade or earlier, the standard deviation of this distribution is somewhat attenuated.

The distribution of IQs across resumes was standardized to have a mean of 100 and a standard deviation of 15; this is the common distribution for 'normal' populations. IQ scores were constructed for individual subjects as a function of ascribed Educational level; as z-scores the functional relationship can be expressed as,

$$Z(IQ) = [Z(ED) + e] [1.169]^{-1}$$

where 'e' is a normally distributed random variable with a mean of zero and a standard deviation of 1.169.[9]

IQs below 90 were labelled "below average," those in the range 90-110 were called "average," and those above 110 were termed "above average." Percentile equivalents of the IQ scores were also provided in the resume.

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[9] When the assumption of homoscedasticity holds, i.e., $\sigma^2_{Y|X} = k$, then the variance in a dependent variable(Y) may be decomposed into two components; one component represents the variance <u>explained</u> by the independent variable(x),

$$r^2 \Sigma(Y - \bar{Y})^2$$

and the other component represents the residual or unexplained variance $(N\sigma^2_e)$ around the regression line,

$$Y = aX + c$$

We assume of course that the bivariate relationship is linear and the distribution of variable is normal (by construction, these assumptions are built into the experimental design). The product moment correlation between Y and X (i.e., r_{YX}) can thus be expressed as a function of the standard deviations of X and the 'error' term, e. This relationship allows us to generate correlated distributions of IQ and Education in the present case, and enables our later work with the personality variables.

In general, it can be shown that, when the above assumptions hold and X and Y are expressed in normalized form that,

$$r^2_{YX} = \frac{\sigma^2_X}{\sigma^2_X + \sigma^2_\varepsilon}$$

or, alternatively,

$$\sigma^2_\varepsilon = \frac{\sigma^2_X(1 - r^2_{YX})}{r^2_{YX}}$$

(4) <u>Social Class of Origin</u>. To investigate the ascriptive biases,
if any, which social origins have upon personnel decsions,
each resume contained information upon the family background
of the respondent. Resumes read,

> S/he comes from a <u>(lower class) (working class) (lower middle)</u>
> <u>(middle) (upper middle) (upper)</u> class family background; his/
> her father was employed as a _____.

The social class of origin was determined independently of
other variables; a random number representing the prestige of
the fathers occupation for the U.S. sample was selected from a
normal distribution having a mean of 40 and a standard
deviation of 11. The values of this distribution matched that
for the American population (Treiman & Terrell, 1975). Having
randomly selected a prestige level, a specific father's
occupation at the appropriate level was selected from a list
of seventy occupations chosen at random from each prestige decile
in   Treiman's (1977) master list of occupations. Class
designations were made as follows,

CLASS LABEL	PRESTIGE	EXEMPLARY OCCUPATIONS
working	0-29	porter, taxi driver, launderer
lower middle	30-37	sales clerk, barber, miner
middle	38-52	union official, customs inspector
upper middle	53-68	airline pilot, social worker
upper	69+	judge, architect

For the British sample an identical procedure was used, except the prestige distribution of father's occupation was matched to those for England rather than the U.S.A. (i.e., mean = 38, s.d. = 11; see Treiman & Terrell, 1975).

(5) <u>Personality Variables</u>. Four personality variables were independently varied in the resumes; they were ascribed Introversion, Conservatism, Machiavellianism, and Neuroticism.

Rather than informing personnel managers that workers were particularly Introverted, the procedure we employed was to ascribe to workers those statements which defined an 'introvert' in our survey scales. So, for example, rather than saying that Ms. Barbara King was extremely introverted, our resume might indicate that during the course of an interview she made the following statements

1. She generally likes to go off by herself rather than be with other people.

2. She reports having one or two good friends.

The resume introduced these statements by noting that, "During the course of a personal interview the following information was gathered about the personality and attitudes of _____."

In selecting statements to define each personality variable, a three-stage procedure was followed. First, "global" z-scores for each of the four personality variables were randomly selected from a normal distribution. Thus, each "worker" was assigned "global" profile, <u>e.g.</u>, +1.0z Introversion, +0.4z Machiavellian,

+0.1z Neurotic, -0.83z Conservative. Secondly, for the two personality variables--Introversion and Neuroticism--which were derived as second-order factors, scores for each <u>subscale</u> of the variable were generated, (e.g., for a given global score of +1.0z on Neuroticism, subscale scores for Worries and Irritability had to be generated). The latter subscale scores were produced using the procedure described previously (see footnote 7) so that the correlations between global and subscale z-scores matched the factor loading of the subscales in our survey analyses. Finally, specific attitude statements were selected for each scale. Alleged responses to individual items were generated so that the overall distribution of item responses reproduced the item means and standard deviations from the survey data and the average item-to-scale correlations were consistent with the available reliability estimates.

Thus, our resumes built in variation for the global independent variables, as well as allowing for <u>incomplete</u> correlation between subscale components of each personality factor. Furthermore, a realistic amount of 'error' variance was built into the items themselves, so that responses to individual items were realistically inconsistent. The latter procedure was thought appropriate, since perfect consistency would produce obviously phony portraits of workers, <u>e.g.</u>, respondents who uniformly answered "disagree somewhat" to all positive Machiavellian items and consistently "agreed somewhat" with all negatively worded Mach items.

Figure 4.1 presents an exemplary resume. Invariant information in the resumes is underlined . Selection of individual personality items and the ordering of the major sections and individual items within sections was fully randomized. The demographic information, however, always preceeded the personality items.

I.D. #0000

Abbreviated Biographic & Interview Summary...Mr. Mark Morris

Mr. Morris is 24 years of age; he was born in New York City and has lived there all his life. He comes from a middle class family background; his father was employed as an electrical fitter. Mr. Morris left school after completing the 11-th grade. His school record reveals that he was a rather solid "B" student. At a preliminary screening Mr. Morris was given a conventional intelligence test (Wechsler Adult Intelligence Scale), and he was found to be of average ability. His IQ was estimated to be 96 which corresponds to 40-percentile in the IQ distribution. During the course of a personal interview the following information was gathered about the personality and attitudes of Mr. Morris.

Attitude Toward Adventure & Risk

1. He considers himself better than others in being able to stand up for self.
2. He enjoys adventure and risk more than other people.

Attitudes Toward Interpersonal Relations, etc.

1. He believes that it is wise to flatter important people.
2. He disagrees with those who believe that most people are brave.
3. He strongly believes that Barnum was probably right when he said that there's at least one sucker born every minute.
4. He disagrees with those who believe that it is safest to assume that all people have a vicious streak and it will come out if they are given a chance.
5. He disagrees with those who believe that anyone who completely trusts anyone else is asking for trouble.

Attitudes Toward Authority and Change

1. He agrees that it is best to be like others and not stand out from the rest.
2. He strongly believes that a person who is content with what he has will have a better life than one who is always trying to change his position.
3. He strongly believes that we are all born to our various social positions and we shouldn't try to change them.
4. He agrees that the greatest source of happiness is to be satisfied with whatever you have.
5. He agrees that it is wrong for a person to be dissatisfied with his position in life.

Self Evaluation, etc.
Compared to others the same age Mr. Morris considers himself
1. About the same at being able to get along with men.
2. About the same at being able to think clearly.

Sociability

1. He generally likes to be with 1 or 2 others (rather than alone or with a crowd).
2. He reports having a few good friends.

Worries and Irritability

During the course of the interview, Mr. Morris was asked a series of questions concerning the problems which worried him, and his tolerance of a variety of everyday situations. His responses indicated that he was less worried than the average person. In particular, he reported worrying about:

1. Not mixing well with the opposite sex
2. Being unsure of what to do in company

His answers also indicated that he was no more or less irritable than the average person. In particular he reported being annoyed by:

1. Being told how much better others are at doing things
2. When someone does not listen to what he is saying
3. When people talk about him behind his back

***NOTE. To insure confidentiality a pseudonym has been used in the above summary. Please be sure to copy the candidate I.D. Number #0000 on to your answer sheet.

Figure 4.1: Example of resume for experimental study. Underlined portions were the same for all subjects; other sections of the resume were experimentally manipulated. Ordering of attitude statements was randomly varied across resumes.
Personal pronouns, of course, were altered for female "workers", and the resumes used in the British portion of the study described workers who were "born in London".

The full set of personality items used in the construction of the resume together with the computer program used to construct the resumes, are included in Appendix 5.3. While we attempted to use all items from the LSE survey, certain items had to be excluded or slightly altered because they were appropriate to 13- but not 24-year olds. Also, since the Worries and Irritability subscales were originally scored by summing the number of items checked from a list of fixed length, we also found it necessary to include some indication of the general level of worries and irritability shown by the worker (vis a vis a 'normal' population). Thus, for these two subscales, the lead-in to the items read,

> "During the course of the interview Mr. _____
> was asked a series of questions concerning the
> problems which worried him and his tolerance of a
> variety of everyday situations. His responses
> indicated that he was _____ worried than the
> average person."

The missing text was either: "considerably less," "less," "no more or less," "more," or "considerably more" worried than the average person. A similar lead-in was used with the irritability items.

Measurement of Dependent Variables. Subjects in this experiment were required to make three types of judgements concerning the workers described in their resume. First, they were asked to choose an occupation which they thought would be most appropriate for the worker. Three alternative occupations were requested in order of appropriateness; subjects were told that they might select any occupation they wished. A list of 125 occupations randomly selected from Treiman's master list was provided to assist subjects in this task. The occupational lists (125 titles each) supplied were not the same for all respondents; twenty separate random lists were used to insure that the entire occupational distribution was covered. Distribution of occupation lists was completely random, and subjects' choices were not restricted to occupations on these lists.

In addition to the selection of three appropriate occupations, subjects were also asked to predict the occupation which the worker would have at ages 25, 35, 50, and to indicate their personal feelings toward this worker. In particular they were asked to judge whether,

> "If you were 25 years old today, would you want to get to
> know this worker as a personal friend? (definitely YES/
> probably YES/probably NO/definitely NO)

Subjects in Britain, were also asked to suggest appropriate incomes. All subjects were subsequently asked four questions concerning their personal background (sex, age) and experience in the personnel field.

Participation in the experiment was totally anonymous. Subjects completed their response forms and mailed them back to offices in New York and London. Subjects provided no identifying information about themselves; responses were matched to records describing the characteristics of experimental resumes by I.D. numbers only. A copy of the response sheet used in the experiment is presented in figure 4.2.

Results and Analyses

Subjects completed the response sheets shown in figure 5.2, and subsequently full records of the experiment were created by merging subjects' answers with coded information describing the experimental resume they had responded to. In addition to data on the independent variables used in the resumes, ISCO codes for each occupation mentioned and the corresponding prestige scores were also obtained for analysis.[10]

In conducting our analyses we will deal both with the prestige levels of the jobs selected and the general nature of the occupations (e.g., administrative, clerical, production, etc.). We begin our analyses by considering, in turn, each of the independent variables which was experimentally manipulated in the construction of the resumes (i.e., Gender, Education-IQ,

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[10] The International Labor Office's coding scheme (ISCO: International Standard Codes for Occupations) together with Treiman's (1977) prestige scores were used.

QUESTION SHEET (Please return in envelope provided)

At present, because of her youth and limited work experience, the worker described in the accompanying description is not firmly committed to any particular career. She is presently searching for an occupation which would best suit her, and in which she could perform most competently.

Your task is to consider all the available information and to select those occupations which would be most suitable for her. In an ordinary situation, further information might be desirable; for example we might ordinarily wish to know her employment history. However, to realize the goals of the present research, we wish your decision to be free from biases arising from the type of work that she has previously done. Let it suffice to say that she has been regularly employed since finishing school, but she is not content in her present position. Her employers consider her a competent worker, and are satisfied with her performance, although they too recognize that her present position does not fully suit her abilities.

What we would like you to do is to carefully consider all aspects of the available information about this woman, and then to select three occupations for which she would be best suited. The list of occupations printed on the reverse side of this page are presented for your assistance. This list has been constructed from an international dictionary of occupational titles, and so you should not be concerned if some titles seem alien to an industrial society. We would prefer that you select occupations from this list; however, should some other occupation(s) seem more appropriate, you may write them down instead. Please be sure that the job titles are specific (for example, not "banker", but rather "bank manager", "bank teller", etc.).

Please use the postage-paid return envelope to return the answer sheet to us.

QUESTIONS

1. Please copy the worker ID number from the top of the summary sheet: _____ (Note: your responses are totally anonymous, the code number identifies only the worker description)

2. List three occupations (and code numbers if taken from list) for which this worker would be best suited, and an appropriate salary.

    1) Most appropriate: _____ code _____ salary _____

    2) 2nd most appropriate: _____ code _____ salary _____

    3) 3rd most appropriate: _____ code _____ salary _____

3. Obviously, people do not always obtain the jobs for which they are best suited. If you had to guess, what would you say this woman's most probable occupation would be

    1) at 25 years of age _____ code _____

    2) at 35 years of age _____ code _____

    3) at 50 years of age _____ code _____

4. If you were 25 years old today, would you want to get to know this worker as a personal friend? (check one)

    ____definitely YES ____probably YES ____probably NO ____definitely NO

Information about Yourself

5. How old are you? _____ years. 6. Sex: Male_____ Female_____

7. Are you now, or were you previously involved as a professional in personnel-hiring or promotion decisions? YES _____ NO _____

8. What title would you use to describe your present occupation and position?

    _____

9. Your grade of membership. _____

Figure 4.2: Example of Response sheet used in experimental study; form used with resumes describing male "workers" incorporated appropriate changes in personal pronouns. In the American phase of the study, salary and membership grade were not requested.

Social Class of Origin, Personality). Since our analyses will be largely correlational and since, by design, our independent variables are uncorrelated (except for IQ & Education), it should be remembered that all zero-order correlations between an independent and a dependent variable are _equivalent_ to the corresponding partial correlation which "controls" for the effects of other independent variables, i.e.,

$$r_{YX_1} = r_{YX_1 \cdot X_2 X_3} \cdots$$

This identity follows directly from the fact that the correlation _between_ our independent variables $(r_{X_i X_j})$ was contrained to be 0.0.

Cross-National Variation

A first topic of considerable relevance to the remainder of our analysis concerns variations in the behavior of personnel managers in the United States and the Great Britain. Considering the mean prestige level of the occupations assigned to the various occupations _no_ significant differences were found. Table 4.4 presents an analysis of the data for judgements of 'appropriate' and 'expected' occupations by the two groups of subjects.

The Effect of Gender in the Selection of Occupations

Of all the variables manipulated in the construction of the resumes, worker's gender had the most significant impact upon the _type_ of occupation which was selected. In this regard, it is important to remember that duplicate sets of resumes were used in this experiment, one set with a male name, and one set with a female name.[11] Thus, the characteristics of the male and female resumes are completely equivalent, except for gender.

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[11] Non-responses to our solicitation, however, causes many female resumes to lack their male replicate, and _vice versa_. However, the mean levels of all variables are identical for the two sets of returned resumes, and an analysis restricted to completed male-female sets yields similar evidence of sex bias.

Table 4.4: Variation in prestige levels of occupations selected by
subjects in the U.S.A. and Great Britain.

Judgement	Sample	Prestige		t	n
		Mean	s.d.		
"most appropriate" occupation	U.K.	44.8	14.2	0.44 (ns)	287
	U.S.A.	45.2	13.8		1673
occupation "expected at age 25"	U.K.	39.6	12.1	1.72 (ns)	274
	U.S.A.	38.1	14.3		1601
occupation "expected at age 35"	U.K.	44.2	14.2	0.39 (ns)	255
	U.S.A.	44.6	14.7		1544
occupation "expected at age 50"	U.K.	46.7	14.7	1.28 (ns)	258
	U.S.A.	48.0	15.6		1521
Mean for 3 "appropriate" occupations	U.K.	43.2	11.0	1.60 (ns)	291
	U.S.A.	44.4	11.7		1689
Mean for 3 "expected" occupations	U.K.	43.1	12.1	0.31 (ns)	280
	U.S.A.	43.3	12.8		1627

Figure 4.3 presents a comparison of the <u>type</u> of occupations judged to be most "appropriate" for male and female workers in our experiment together with the actual distribution of male and female workers in the American labor force.   It will be seen that the two occupational categories (Clerical and Production/Transport) which have highly uneven sex balances in the workforce, are similarly "unbalanced" in the judgements of our subjects. To assess the degree to which the distribution of male and female workers in our experiment is sex biased we have computed the chi-square statistic for the distribution of males and females across these occupational categories.[12] The very large value of this statistic ($\underline{x}^2 = 114$, df = 5, p< .0001) indicates that the placement   of workers depends heavily upon the gender ascribed to them. To provide a standard for comparison, we have also generated an 'expected' distribution for a sample of 1720 workers (half male-half female) from the 1970 census figures; computing the chi-square for the relevant table we obtained a value of 127. Using the chi-square value as an index of sex discrimination, these results indicate that the placement decisions made by personnel officers in our experiment were as sex biased as the <u>actual</u> distribution of men and women in the American labor force in 1970. Interestingly, when subjects were asked to <u>predict</u> the type of job which the workers would hold at age 25, their judgements showed a level of sex bias ($x^2 = 201$) which was both higher than that existing in the actual labor force and which also showed a level of sex bias which was greater than their judgements about 'appropriate' occupations. Table 4.4 presents the distribution of predicted occupations for the U.S.A. sample at ages 25, 35 and 50; data for the later ages, however, does indicate considerable attenuation in bias with the age of the worker (age 35: $x^2 = 121$; age 50: $x^2 = 113$).

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[12]Figure 5.3 excludes occupations in the "Military" category, and our chi-square computations exclude "agricultural" jobs because of the very low frequency (2%) of their selection.

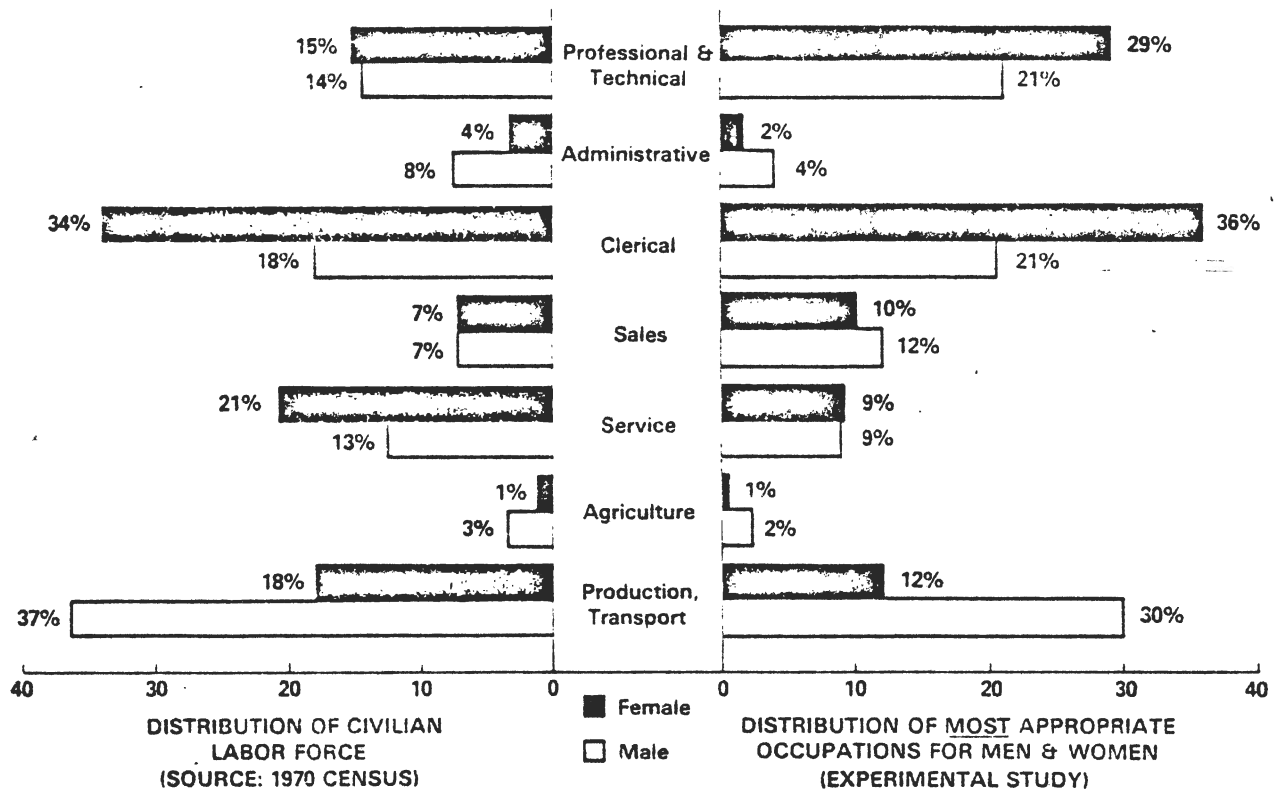|	DISTRIBUTION OF CIVILIAN LABOR FORCE (SOURCE: 1970 CENSUS)		DISTRIBUTION OF MOST APPROPRIATE OCCUPATIONS FOR MEN & WOMEN (EXPERIMENTAL STUDY)	
Professional & Technical	15%	14%	29%	21%
Administrative	4%	8%	2%	4%
Clerical	34%	18%	36%	21%
Sales	7%	7%	10%	12%
Service	21%	13%	9%	9%
Agriculture	1%	3%	1%	2%
Production, Transport	18%	37%	12%	30%

■ Female
□ Male

Figure 4.3: Distribution of male and female workers in (1) U.S. Labor force in 1970, and (2) experimental study of placement decisions ("most appropriate occupation").

Table 4.4b. Types of Jobs "Expected" for Male and Female Workers
in American Experiment

| Type of Occupation | Expected at Age | | | | | |
| | 25 | | 35 | | 50 | |
	M	F	M	F	M	F
Professional and Technical	15%	15%	16%	18%	14%	17%
Administrative	1%	1%	7%	6%	20%	14%
Clerical	23%	52%	20%	40%	15%	33%
Sales	10%	9%	9%	9%	10%	8%
Service	8%	9%	7%	9%	9%	12%
Production and Transport	43%	15%	40%	19%	32%	16%
x^2:	200		121		113	
df:	5		5		5	
P<	.0001		.0001		.0001	

Parallel data for Britain are presented in Table 4.5; while the British data show a substantial deviation from the national distribution in the overall proportion of clerical and production jobs selected, the general pattern of sex bias evident in the national data is reproduced in the judgements of our British subjects. In the British data, however, the selection of "appropriate" occupation produced a distribution which evidenced less sex-bias (see $\underline{X}^2$ values) than actually exists in the British labor force.

Although there were very substantial differences in the types of jobs selected for male and female workers, there was no substantial difference between the mean prestige level of jobs selected for male and female workers. If anything, the data suggest that the prestige level of the jobs selected for women were marginally higher than those selected for men; Table 4.6 presents the relevant data. Although some of this effect arises from the more frequent assignment of females to the relatively more prestigious clerical positions (e.g., typist = 45) rather than manufacturing jobs (e.g., welder = 39), the tendency for females to be chosen for more prestigious jobs was found at every level of educational qualification. Figure 4.4 plots the mean prestige levels of occupations selected for male and female workers as a function of education. It will be seen from this plot that this "reverse" discrimination is quite pronounced at the low end of the educational distribution, but, among college graduates, female workers were assigned only slightly more prestigious occupations.

While our finding no apparent discrimination in the 'prestige' of selected occupations may seem anomalous, it is consistent with a recent study of the occupational attainments of men and women in the 30 to 44 year old cohort of the National Longitudinal Survey. Analysing these data, it has been found that,

> 'Women tend to be concentrated in jobs which pay poorly relative to their educational requirements. But there is little evidence that women are concentrated in jobs which have low status in other respects. As the data...make clear, women and men work at jobs which have virtually equal prestige. (Treiman & Terrell, 1975, p. 181)."

Table 4.5: Types of jobs assigned to male and female workers by British subjects and actual distribution in labor force.

OCCUPATIONAL CATEGORY	ACTUAL DISTRIBUTION		"PREDICTED"[b]		"APPROPRIATE"[b]	
	male	female	male	female	male	female
Professional & technical	13%	14%	8%	11%	17%	31%
Administrative	6%	1%	1%	0%	3%	3%
Clerical	9%	31%	37%	63%	29%	42%
Sales	4%	9%	12%	8%	11%	7%
Service	4%	21%	7%	8%	16%	10%
Production & Transport	62%	25%	36%	11%	25%	7%
x^2	68		75.1		27	
df	5		5		5	
P	(C)		.0001		.0001	

[a]Source: New Earnings Survey, April, 1971 [Great Britain, Office of Manpower Economics, Equal Pay. HMSO, 1972]

[b]Experimental study; jobs selected as "most appropriate" for candidate, and job most likely candidate would actually be doing at age 25.

[c]Expected x^2 for distribution generated by assuming a sample of 300 (50% female) whose occupational distribution matched that of New Earnings Survey. Probability values would not be meaningful in this context.

Table 4.6 Mean prestige for jobs assigned to male and female workers

Occupational Choice	Sample	Sex	Mean	SD	t	N
Average "Appropriate" Occupation	U.S.A.	Male	43.2	12.5	3.7*	8C)
		Female	45.3	10.8		8S9
	U.K.	Male	42.4	11.7	1.25	15+
		Female	44.1	10.1		15⁻
Average "Expected" Occupation	U.S.A.	Male	42.1	13.9	5.9*	7⁻5
		Female	44.5	11.6		852
	U.K.	Male	43.2	12.9	1.3	149
		Female	43.0	11.0		151

*P $<$ .001
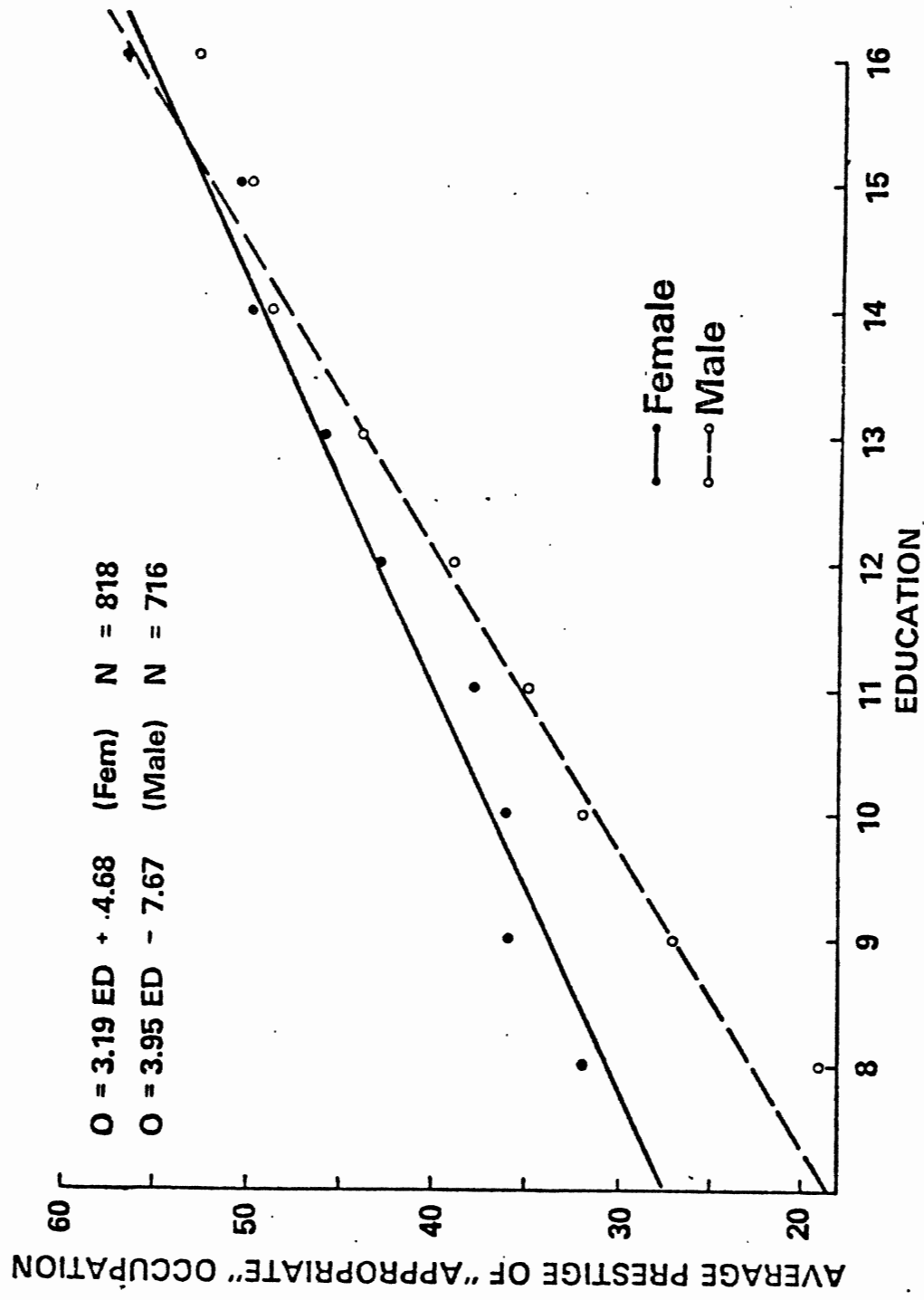
Figure 4.4: Mean prestige level of occupations assigned to male and female "workers" as a function of ascribed educational attainment.

Analysis of the income data collected in the British phase of the experiment lend support to this interpretation. Overall, the distribution of incomes ranged from 800 to 8000 pounds sterling[13] with a mean of 2706 pounds (sd = 858). Our data indicate that there was an eleven percent (295 pounds) difference between the salaries thought appropriate for male and female workers. Even though our British sample is rather small, a difference of this magnitude is unlikely (p$<$ .005) to have arisen from random sampling fluctuations.

In addition to simple sex discrimination, there are several other plausible interpretations for our finding with respect to income. It may be that:

1. Salary differentials arose solely from the non-uniform assignment of males and females to different sectors of the work force (i.e., salaries were equal for men and women within occupational categories, but differences in mean salaries arose from differences in the occupational distribution of men and women);

2. This difference reflects variations in the way in which "student" evaluators assign salaries (n.b., our returns indicated that student members of IPM received a disproportionate number of female vignettes);

3. Or, this difference may arise from some peculiarity in the pay scales used in different regions of England (n.b., there is a "London weighing" scheme incorporated in the pay scales of government and large institutions to compensate employees posted to London).

To control for these alternative explanations the salary of each worker was estimated as a linear additive function of a series of dichotomous variables

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[13]At the time of the study, the exchange rate for the pound was approximately $2.10.

representing (1-5) the various occupational categories, (6) whether the evaluator was a student member of IPM, (7) whether the evaluator was London based, and (8) whether the evaluated worker was female. The coefficient estimates for this income prediction equation are presented in Table 4.7 These results indicate that higher salaries were assigned to workers in the professional and managerial classes (vis a vis production-transport workers), and there were unreliably lower salaries assigned to workers in the service and sales occupations). However, neither these results, nor the fact that London-based evaluators paid higher wages, can account for the strong tendency of respondents to assign lower salaries to female workers. Controlling for these variables, there is still a reliable 338 pound difference (s.e.$_b$ = 121, t = 2.8, p< .01) between the salaries assigned male and female workers by our British personnel managers.

Furthermore, if we expand our earnings function to include the actual prestige level of the occupation assigned, this result remains virtually unchanged. Panel B of Table 4.7 presents estimates for an expanded earnings function which includes the prestige of the assigned occupation, the "worker's" ascribed education, IQ, and social origins, as well as the variables used in our previous analyses. By including occupational prestige in this equation, we are able to interpret the coefficient for sex as the net difference in the average salary assigned men and women doing work of equal prestige in the same sector of the workforce--controlling for the (linear) effects of IQ, education, social origin, London weighting, and student evaluator biases. In this formulation we find the net difference in salaries to be 294 pounds (se$_b$ = 113, p <.05). Although it is not the point of the present analysis, we should also note that the results presented in Table 4.7b indicate that among workers doing the "same work", those with higher ascribed IQs are paid more, but there are no net differences due to education or social origins (over and above their effects upon the type and prestige of occupations assigned).

Table 4.7: Estimated Coefficients for Equation Predicting Assigned Salaries

equation: salary $= \sum_i a_i X_i + c$

A. Model One

Independent Variables (X_i)	Estimate for Unstd. Coefficient (a_i)	Std. Error of Estimate	Beta Weights	p
1. job assigned: professional or technical	389.84	168.87	.19	.05
2. job assigned: managerial	1038.60	335.75	.20	.005
3. job assigned: clerical	-145.45	151.20	-.08	ns
4. job assigned: sales	-210.74	207.56	-.07	ns
5. job assigned: service	-220.95	187.13	-.09	ns
6. student respondent	148.21	139.68	.07	ns
7. London-based respondent	277.76	136.41	.13	.05
8. female worker	-338.62	121.37	-.20	.01
C = Constant	2726.66			
Variance Explained =	16% (F=5.45, df= 8/238, p<.0005)			

B. Model Two

	Estimate for Unstd. Coefficient (a_i)	Std. Error of Estimate	Beta Weights	p
1. job assigned: professional or technical	-329.65	200.35	-.16	ns
2. job assigned: managerial	34.17	351.89	.01	ns
3. job assigned: clerical	-472.51	158.41	-.26	.01
4. job assigned: sales	-351.64	198.39	-.12	ns
5. job assigned: service	-262.94	178.55	-.10	ns
6. student respondent	58.74	131.02	.03	ns
7. London-based respondent	293.86	127.10	.13	.05
8. female worker	-294.56	113.24	-.17	.01
9. prestige of assigned job (SIOPS)	23.25	4.93	.39	.01
10. ascribed IQ level (WISC)	14.06	4.07	.24	.01
11. ascribed Educational level (years)	-56.93	54.19	-.07	ns
12. ascribed social origins (SIOPS)	-2.92	4.22	-.04	ns
C = Constant	1332.46			
Variance Explained =	29% (f= 7.77, df= 12/233, p<.0005)			

Notes. -Salary is in pounds sterling (£ = 2.10 at time of study).

ˮ All Variables 1-8 are dummy variables coded "1" if respondent fell into specified category in table, coded zero otherwise. The residual class against which the comparisons are being made are the salaries assigned to male workers in production-transport occupations when rated by a non-student, non-London evaluator.

A similar pattern of results is obtained when the dependent variable is the natural log of the assigned salary.

The Influence of Ascribed Education and IQ

Of all of the variables manipulated in the construction of the resumes, none had a greater impact upon prestige level of the jobs chosen than education and IQ. Overall, the zero order correlations[14] between the education ascribed to a worker and the status of jobs judged to be appropriate for him or her was +0.50 in the American portion of the study, and +0.42 in Britain. The correlation between ascribed IQ and the prestige of the occupation judged appropriate for a worker was equally high (r = +0.49 in U.S.A.; r = 0.44 in U.K.). Alternatively considering the jobs our subjects predicted that the workers would hold during their careers, we find an equally high level of correlation (r = +0.48 in U.S.A.; and r = +0.42 in U.K.).

We have analyzed differences in the correlation between the education and the IQ ascribed to a worker and the prestige level of the jobs selected for male and female workers. These analysis (see Table 4.8) indicate that while there is little difference in judgements of "appropriate" occupations, there is a significant[15] tendency for education and IQ to be less correlated with the prestige of "predicted" jobs when the worker in question is described as a female [overall, r_{OE} = +0.54 (USA-M) vs. +0.45 (USA-F); and +0.30 (UK-M) vs. +0.25 (UK-F); while $r_{O,IQ}$ = +0.46 (USA-M) vs. +0.38 (USA-F); and +0.34 (UK-M) vs. +0.28 (UK-F)].

Comparison of the level of correlation between IQ, education, and occupational level in our experimental study and levels typically found in surveys of the labor force reveal remarkable similarities. Panel B of Table 4.8 presents parallel data from a variety of sources on the intercorrelation of these variables in national surveys. Although there is considerable

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[14] Since the distribution of the education and IQ variables have identical standard deviations for the male and female resumes, and since the standard deviation of the occupational distributions are effectively equal as well, differences in the correlation coefficients reflect true differences in 'slope' of the plots of Education (or IQ) by occupational prestige.

[15] Testing the differences between correlations for male and female workers we find that those for the American portion of the study are significantly larger when the workers are described as males (with Education: z = + 2.36; p .05; with IQ: z = 1.92, p .06). Correlations for the U.K. part of the study show a similar pattern and the differences are of equal magnitude, however, they do not reach significance due to the considerably smaller size of the sample in the U.K. (i.e., N = 1721 vs. 300).

Table 4.8: Correlations of prestige of assigned occupations in experimental study with ascribed educational attainment and IQ, and representative correlations between occupational prestige, education and IQ in surveys of the employed civilian labor force.

A. EXPERIMENTAL STUDY

		Correlation Between Occupational Prestige and					
		EDUCATION					IQ
JUDGMENT	SAMPLE						
Average of 3 'appropriate' occupations	USA-M+F	.50					.49
	USA-M	.33					.49
	USA-F	.49					.47
	UK-M+F	.42					.44
	UK-M	.34					.44
	UK-F	.53					.44
Average of 3 'predicted' occupations	USA-M+F	.48					.42
	USA-M	.54					.46
	USA-F	.45					.38
	UK-M+F	.27					.32
	UK-M	.30					.34
	UK-F	.35					.28

Occupation 'predicted' at given age:	AGE:	25	35	50	25	35	50
	USA-M+F	.46	.40	.39	.32	.37	.38
	USA-M	.50	.46	.45	.36	.40	.43
	USA-F	.41	.37	.35	.28	.34	.34
	UK-M+F	.26	.21	.28	.23	.29	.32
	UK-M	.31	.22	.29	.27	.32	.31
	UK-F	.19	.20	.27	.18	.25	.35

B. NATIONAL SURVEY DATA

		Correlation Between Occupational Prestige and	
		EDUCATION	IQ
SAMPLE			
General Social Survey, (1974 & 1976)	all respondents	.53	.44
	all males	.50	.45
	all females	.57	.18
	males, 20-29	.57	.66
	males, 30-39	.57	—
	males, 40-59	.61	.60
	females, 20-29	.53	.54
	females, 30-39	.60	.60
	females, 40-59	.58	.46
Occupational Changes in Generation I: (1962)	all males 20-64	.56 (b)	—
	males, 25-34	.65	—
	males, 35-44	.64	—
	males, 45-54	.59	—
	males, 55-64	.56	—
Occupational Changes in Generation II: (1973)	all males (spouse present)	.56	—
	all females (spouse present)	.57	—
National Longitudinal Survey: (1966)	White Males, 30-44	.57	—
	White Females, 30-44	.54	—
Wisconsin Survey; men, 25 years old in 1965		.62	.38
United Kingdom, Men 25-64 in 1962		.45-.61(a)	—
World War II enlistees (Harrel & Harrel, 1945)		—	.42
World War II enlistees (Stewart, 1947)		—	.45
U.S. Bureau of Employment Security (1962) sample of occupations		—	.55
Current Population Survey, 1964 (Duncan,1968); Men 20+		.64	.45

NOTES. All data from the experimental study is coded as years of education and prestige scores are derived from Treiman's (1977) Standard International Occupational Prestige Scale. Data from other studies is frequently coded in other ways. Although modest alterations in the coding of education (e.g., the use of an 8 point scale in the OCG studies) make little difference in observed correlations, the same is not necessarily true of the use of alternate methods of scaling prestige. The two OCG studies, the Harrel & Harrel, Stewart, and U.S. Bureau of Employment Security studies use Duncan's socioeconomic status scale; the General Social Survey computations use prestige scores from Siegel et al (1977, in press), and the data for the United Kingdom and from the National Longitudinal Survey employ Treiman's prestige scores. This variation in the scoring of occupational prestige can be expected to have a modest influence upon the observed correlations; Treiman (1977) reports an overall correlation of +0.84 between his scale and the Duncan SES scale. In particular it should be remembered that Duncan used educational level to interpolate status scores for occupations not included in the original survey, thus, it is generally the case the correlations between education (and correlated variables) and occupational status will be higher when Duncan SES scores are used.

Analyses of the OCG-I survey (cf. Hauser & Featherman, 1977) suggest that use of Treiman's SIOPS metric in the scaling of occupational status deflates the correlation between education and occupational status by approximately 21 percent (vs. correlation obtained using Duncan's socioeconomic index).

(a) Smaller value is correlation obtained when school-leaving age is used as education measure; the larger correlation estimate is an upperbound value obtained by use of an effect proportional scale designed to maximize the linear correlation between occupational status and education.

(b) Value shown is that obtained when occupational status is coded using Duncan's socioeconomic index; when the data are recoded into Treiman's SIOPS metric this correlation declines to 0.44, while this comparison suggests that use of the SIOPS metric attenuates the relationship between ...

variability between individual studies, all of the reported values for the correlation between Education and Occupational status lie within the range +0.45 to +0.63; and almost all of the values for the correlation between IQ and occupational status lie within the range +0.40 to +0.60. Thus, the _average_ correlations produced by subjects in our experiments are remarkably similar in magnitude.[16] to those found in surveys of the labor force.

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[16]In passing, it should also be noted that the relationship between education and IQ on one hand, and occupational prestige on the other, was found to be essentially linear in our experimental data. Contrasting the variance explained in a linear analysis (i.e., R^2), to that explained by treating each level of education or IQ as a nominal category (eta^2), we find little difference.

		Proportion of Variance		
Independent and Dependent Variable	Explained by Linear Function (R^2)	Increment due to non-linearity (eta^2 – R^2)	F	df
– Education and Prestige of Avg. Appropriate Occupation (USA)	.247	.003	1.31	1/5
(UK)	.180	.008	0.88	1/3
– IQ and Prestige of Avg. Appropriate Occupation (USA)	.238	.004	2.15	1/4
(UK)	.208	.033	2.94	1/4
– Education and Prestige of Avg. Predicted Occupation (USA)	.226	.003	1.06	1/5
(UK)	.075	.006	0.54	1/3
– IQ and Prestige of Avg. Predicted Occupation (USA)	.179	.003	1.66	1/4
(UK)	.108	.020	1.54	1/4

NOTE. IQ was polychotomized into 6 deciles for these analyses.

To assess the relative impact of IQ and education we have undertaken
further analysis. First, we have estimated a linear equation of the type dis-
cussed in chapters two and three. This equation specifies the prestige of
the selected occupations as a linear, additive function of the IQ and educa-
tion ascribed to a worker in the resume; i.e.,

$$O = a_1 (ED) + a_2 (IQ) + c$$

Estimates of the coefficients representing the 'effects' produced by exper-
imentally manipulating IQ and education (i.e., a_1 and a_2) were then derived
from the experimental data. These estimates, which assume the relationship
between the three variables to be linear and additive, provide an indication
of the impact of ascribed education upon the prestige level of the occupation
selected holding constant IQ, and _vice versa_. It will be remembered that our
resumes were constructed to reproduce the observed correlation between IQ
and Education ($r_{E,IQ}$ = 0.65), and thus the effects of IQ and education are
not independent. Table 4.9 displays the coefficients for this equation
estimated from our experimental data. The unstandardized coefficients,
which permit across equation comparisons, indicate the increment in prestige,
(n.b. scale range = 0 - 99)   associated with a one year change in
ascribed educational attainment or a one point change in ascribed IQ. The
standardized coefficients in this table permit _within_ _equation_ comparisons
of the relative   effects of the two variables as standard
deviation changes in occupational prestige associated with a one standard
deviation change in IQ holding education constant (and _vice_ _versa_.)

It can be seen from the estimates presented in panel A of Table
4.9 that education played a more important role in determining the occupa-
tions selected for workers in the United States than IQ. Overall, the
standardized coefficient representing the effect of education upon the average

Table 4.9: Effects of ascribed educational attainment and IQ upon the prestige level of occupations assigned to workers in Experimental Study and comparative data upon the effects of education and IQ upon occupational attainment in national survey data.

A. ESTIMATES DERIVED FROM EXPERIMENT

Judgement	Sample and Worker Gender	Effect of Education STD	Education UNSTD	IQ STD	IQ UNSTD	Constant	% Variance Explained
Average "Predicted" Occ. (ages 25, 35, and 50)	USA-M	.38	2.81	.30	.25	-17.9	35%
	USA-F	.34	2.37	.19	.15	- 0.2	22%
	UK-M	.17	2.07	.26	.22	- 0.5	14%
	UK-F	(.12)	(1.23)	.21	.17	+12.6	9%
Average "Appropriate" Occ. (at age 21)	USA-M	.42	3.46	.24	.22	-24.2	33%
	USA-F	.33	2.12	.29	.21	- 2.8	30%
	UK-M	.17	1.06	.35	.35	-4.61	21%
	UK-F	.41	3.78	.20	.15	-10.41	31%
Predicted Occ. age 25	USA-M	.43	4.06	.13	.14	-30.3	26%
	USA-F	.37	2.05	.07	.06	-2.21	17%
	UK-M	.24	2.83	.15	.13	-3.7	11%
	UK-F	(.13)	(1.30)	(.10)	(.08)	+18.7	4%
Predicted Occ. age 35	USA-M	.35	3.24	.21	.23	-20.9	24%
	USA-F	.26	2.16	.19	.18	-0.5	16%
	UK-M	.09	1.20	.28	.28	+3.79	11%
	UK-F	(.08)	(0.90)	.21	.20	+14.98	7%
Predicted Occ. age 50	USA-M	.31	3.07	.26	.30	-21.4	25%
	USA-F	.23	2.10	.21	.21	+1.3	15%
	UK-M	.18	2.59	.22	.22	-2.29	12%
	UK-F	(.10)	(1.25)	.29	.30	+3.05	13%

B. NATIONAL SURVEY ESTIMATES

Population		Effect of Education STD	Education UNSTD	IQ STD	IQ UNSTD	Constant	% Variance Explained
USA 1973-1976[a] aged 18-65	Males	.43	1.60	.19	.15	7.80	31%
	Females	.47	2.05	.20	.16	0.57	35%
Wisconsin: 1964[b] aged 24	Males	.45	3.70	.09	.10	-11.28	25%
USA[a] aged 18-24[c]	Males	.32	2.50	.10[d]	.10	0.53	14%
aged 20-29	Males	.42	2.23	.18	.15	-3.04	28%
	Females	.41	2.04	.21	.17	-0.43	31%
aged 30-39	Males	.44	1.64	.19	.15	7.3	34%
	Females	.47	2.33	.18	.21	-4.6	33%
aged 40-60	Males	.58	1.94	.06	.05	15.30	38%
	Females	.49	2.05	.19	.15	2.02	37%

NOTES. Basic correlation matrix from experimental study was estimated using all available data for each sample and pairwise deletion of missing data elements. The over-all sample size for the experiment was 1721 subjects in the U.S.A. and 300 subjects in the United Kingdom. For approximately one-half of the subjects in each sample, the workers were described as females. On the average about four percent of the cases contained incomplete information (i.e., in estimating a bivariate correlation).

Estimates for national surveys result from analyses of new survey data (e.g., General Social Survey) and re-analyses of data from previously published sources (e.g., OCC-I). When necessary, data from published sources has been adjusted to the SIOPS metric using information derived from the rescoring of OCC-I by Hauser and Featherman(1977). To allow for the fact that the OCC rescoring showed SIOPS occupational measures to attenuate correlations between education and occupation by 21 percent, all bivariate correlations (for both education and IQ)which involved translations of Duncan SEI metric into SIOPS were deflated by 21 percent.

(a)   Unless otherwise indicated, U.S.A. estimates were derived from a data file containing all cases from the 1973, 1974, 1975 and 1976 General Social Surveys of the National Opinion Research Center; the total sample for this database numbers 5997 individuals. Since IQ measurements (Thorndike-Lorge Vocabulary measure- 10 items; alpha for combined 1974-76 surveys = .10.78) were only made in 1974 and 1976, bivariate correlations involving IQ were estimated from approximately one-half of the cases in this dataset. GSS samples from the non-institutionalized, adult (18+) population of the continental United States. GSS occupational data were originally coded in Siegel's(1971) metric; these data were adjusted to the Treiman metric using NFG re-scoring results. Results from the OCC rescoring indicate that rescoring does attenuate the observed correlation between occupation and education, but this attenuation is not as large as that involved in translation from Duncan SEI scores to SIOPS (i.e., 21% vs. 12%). Estimates from GSS do not deflate any of the zero-order correlations.

(b)   Estimates derived from a re-analysis of data reported by Sewell and Hauser (1975; Table 4.1) for a cohort of males selected from among the males attending the fourth year of high school in 1957. IQ data are from school records; re-interview data from 1964 contains occupational status information for 84 percent of the original sample. Sample size for the correlation matrix used in these analyses was 1789.

(c)   Estimates derived from re-analysis of data originally reported by Kohen (1972; Tables 1 and E-1) from the National Longitudinal Survey of the Labor Force. Subsample sampled was the population of white males aged 18 to 24 in 1966, who were employed and not currently enrolled in school, and who had completed at least one year of high school. IQ estimates are derived from high school records; sample size for analyses was 66.

prestige of occupations judged appropriate for these workers was twice as large as the corresponding coefficient representing the influence of IQ. A similar result was found when the prestige levels of the occupations prediced for ages 25, 35 and 50 were averaged; however, analysis of the behavior of the coefficients across different ages reveals that for the U.S.A sample the net influence of education diminishes as judgments are made later on in the career, while the influence of IQ increases. Thus, while a year difference in education is associated with a 4.06 point difference in the prestige of occupations predicted for men at age 25, the corresponding effect for age 35 is only 3.24, and for age 50 only 3.07. For IQ, on the other hand, we find that a ten point difference in IQ produced a net change of 1.4 points in the prestige of occupations judged appropriate at age 25, at age 35 this effect had increased to 2.1 points and by age 50 it was up to 3.0 points. A similar pattern is found for   female 'workers', although we also note that, overall "predictions" of occupations are less closely related to IQ and Education for women 'workers' [R^2 = .35 (male); .22 (female)].

Results for the United Kingdom diverge somewhat from those for the United States. Thus, we note that the net effect of IQ upon the judgements personnel managers is greater than that for education, at least with regards to the average "predicted" prestige of occupations. For judgements of the occupations "appropriate" for the workers described in our resumes, we find that education plays a stronger role (beta weight = +0.41) than IQ (beta weight = +0.20) for women, but not for men [betas = .17(ED) and .35 (IQ)]. Overall, while a one year increment in ascirbed educational attainment caused a 3.8 unit increment in the prestige of occupations for women, a similar increment for men yielded only 1.86 change in occupational prestige. On the other hand, changes in ascribed IQ of ten points yielded some-what larger increments in occupational prestige for men than for women (+2.7

vs. +1.5.)

Across time, we find that the impact of education and IQ upon occ-
upational predictions changes systematically. For workers of both sexes in
the United States and for females in the United Kingdom, we found that the
effect of education upon the judgements of our subjects decreased as they
were asked to predict attainment at later ages; and the effect of ascribed
IQ, on the other hand, tended to increase. While the behavior of our est-
imates for the U.K. male workers does not conform precisely to this pattern,
the relatively small sample size prepresented of this group (N = 154) and
the relatively large standard errors for the coefficients of this equation
when estimated for this group) (se_E = 1.1; se_{IQ} = .09,) argue against any substantive
interpretation   of this aberration. However, given the rather larger
sample sizes for the U.S.A. portion of the study and the correspondingly
smaller standard errors (se_E = +0.31; se_{IQ} = .04,) some confidence can be
placed in the conclusion that the importance of IQ increases and that of
education declines with the age of the workers for whom the occupational
placement predictions are being made.

Panel B of Table 4.9 presents comparative data showing the role of
IQ and education in the actual occupational attainment of samples of real
workers. These estimates exhibit several interesting features. First, in
their own right, we observe that the coefficients representing the 'effect
of education' shows considerable variability across samples. So, for example,
while the overall 'return to investment in education' is roughly 1.6 occupation-
al prestige units per year of education for the population of American men aged
18 and over, considerably higher levels are found for young   cohorts.
Among the 20 - 29 year men in America the corresponding "return" is 2.33 units,

and for the men 18 to 24 in the National Longitudinal Survey the estimated

advantage gained by an additional year of schooling is 2.5 units. Finally,

among the group of 24 year old Wisconsin men studied by Sewell and Hauser

(1975) we find that the increment associated with an additional year of

study is almost 3.8 prestige units. [In regard to these coefficients it should

be remembered   that our restimates have extremely small standard errors

(e.g., se$_E$ .25 units.)].

Curiously, this wide range of estimates for the returns to edu-

cation in different samples has not previously drawn much attention. Indeed,

in a lengthy methodological chapter comparing their Wisconsin sample to

American national samples, Sewell and Hauser do not comment upon the fact

that their own computations (in the Duncan SEI metric) show the impact of

education for Wisconsin 24 year olds to be twice as large as that found in the

cross-sectional CPS-NORC data analysed by Duncan(1968), or that found for the

18 to 24 year old sample from the National Longitudinal Survey (first reported

by Kohen, 1966 and re-analysed by Sewell & Hauser, 1977). Indeed, they conclude that,

> In summary, we are impressed with the similarity
> across samples in the interpretation of the deter-
> mination of educational attainment, occupational
> achievement and earnings...and we think this is
> important because we wish to generalise from our
> own [Wisconsin] sample to the national situation
> of representative cohorts. (Sewell & Hauser,]975,
> p. 71.)

An examination of the national survey data presented in panel B of

Table 4.9 indicates that education plays a more substantial role than IQ

in workers' occupational attainment. Using sample data for American men

and women aged 18 to 64 we find that the standardized partial regression

coefficients for education are roughly twice as large (p_{OE} = 0.43 and 0.47)

as the corresponding coefficients for IQ ($p_{0,IQ}$ = 0.19 and 0.20.) Comparing

the unstandardized coefficients, we find that the 'effects' of education upon occupational attainment in the cross-sectional sample are of similar but somewhat smaller magnitude than those derived from the 'predictions' of our personnel managers. So, taking the average   level of predicted occupations we find that one year increments in ascribed education produce increments of 2.8 (males) and 2.4 (females) prestige units in the occupations selected. In the cross=sectional survey data the corresponding coefficients are 1.6 and 2.1 in the U.S.A.: in other words, the <u>actual</u> effects of education upon occupational   attainment are 40 percent (for males) and 14 percent (for females) smaller than those found in our experimental study.

However, if we restrict our comparisons to males and females in the cohort aged 20 to 29, we find considerably more similarity in the estimates derived from our experimental data and those derived from surveys of actual workers. For this comparison we find the effects of education in the real world to be 21 and 14 percent smaller than those derived from the judgements of our subjects. Moreover, if we look at the data presented for the restricted cohort of 24 year-olds (<u>i.e.</u>, the Wisconsin sample,) we find the estimated 'effects of education' in our experiment to be <u>smaller</u> than those found in the real world.

For IQ a similar range of results are found, and the effect of ascribed IQ in our experimental data falls within the range of the survey data. Overall, the survey data suggest that, net of education, a one point change in IQ causes a 0.1 to 0.2 unit change in the prestige of the occupation attained by a real worker; the mean value of this coefficient in the survey data is 0.13. In our experimental data the corresponding range is 0.06 to 0.30, and the mean of those coefficients is 0.20.

While the foregoing estimates provide some indication of the cojoint effects of education and IQ upon occupational attainment, our analyses rest upon rather strong assumptions about the nature of the interrealtionships between these three variables. In particular, our analyses have assumed not only normal distributions of the variables in question (a condition met in these data), but also that the relationships between the independent and dependent variables are linear and additive. While the assumption of linearity appears to be appropriate (see footnote 16), we know little about the validity of our assumption of _additive_ relationships. To provide some empirical validation of this assumption we have undertaken one further analysis. Polychotomizing the distribution of education and IQ into three categories which divided the sample into thirds, we have undertaken a full analysis of variance to assess the magnitude of non-additive effects in these data. The results of this analysis indicated that, patterns of association between Education and IQ on one hand and occupational. attainment, on the other, did satisfy the assumption of additivity; the non-additive effects revealed in our analysis were of insubstantial magnitude and statistically insignificant.[17]

Social Class biases

To assess the impact of our manipulation of workers social class of origin upon the judgements of our personnel managers we computed the correlations between the prestige of the occupations selected for workers and the level of the occupations attributed to their fathers. Table 4.10 compares these correlations (controlling educational level) to those observed in national surveys. It will be seen that the correlations found in our experiment are of remarkably similar magnitude (circa 0.1 to 0.2) to those observed in the real world.

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[17] Only the U.S.A. sample had sufficient cases to permit reliable analyses. We trichotomized the IQ distribution (0-93 vs. 94-105 vs. 106+) and education distribution (0-11 vs. 12-13 vs. 14+ years), and used these independent variables in a hierarchical analysis of variance using the prestige of the average "predicted" and average "appropriate" occupations as dependent variables. The main effects for education and IQ were highly significant in these analyses (Ps <.001) and jointly they accounted for 27.8 and 24.3 percent of the variance in subject's occupational choices. The interaction terms in these analyses were both insignificant [F(4/1573) = 1.2 and 0.5, ns.].

Table 4.10: Partial correlations (controlling education) between prestige of occupations selected and social origin (O_f) ascribed to workers in experiment and in national population

A. EXPERIMENTAL RESULTS

Sample and Gender of Workers	Occupational Judgement	$r_{OO_F \cdot E}$
U.S.A.: Males	Avg. Appropriate Occ.	.116
	Avg. Expected Occ.	.158
U.K.: Males	Avg. Appropriate Occ.	.135
	Avg. Expected Occ.	.130
U.S.: Females	Avg. Appropriate Occ.	.074
	Avg. Expected Occ.	.134
U.K.: Females	Avg. Appropriate Occ.	.050
	Avg. Expected Occ.	.241

B. NATIONAL SURVEY RESULTS

Sample Surveys of Workers	$r_{OO_F \cdot E}$
OCG-I: American Males, 20-64 in 1962[a]	.163
OCG-II: American Males, 20-64 in 1973[b]	.148
General Social Survey: American Males, 18+ in 1973-6[e]	.142
Butler & Stokes: British Males, 20-64 in 1963[c]	.274
Sewell & Hauser: Wisconsin Males, aged 24 in 1964[d]	.076
OCG-II: American Females, 20-64 in 1973[b]	.095
General Social Survey: American Females, 18+ in 1973-6[e]	.107

NOTES. All estimates have been rescaled to SIOPS prestige metric, and where appropriate, zero-order correlations for Duncan SEI metric have been deflated to reflect attenuation revealed in re-scorings of OCG-I data (i.e., r_{OE} by 21%; and r_{OO_F} by 36% for Duncan SEI measurements).

[a] As reported by Hauser & Featherman (1977) for OCG-I; original data rescored in SIOPS metric.

[b] From Featherman & Hauser (1977); re-estimated for SIOPS metric; represents only married, spouse-present respondents.

[c] Survey data from Butler and Stokes (1969) translated into SIOPS metric by Treiman & Terreil (1975).

[d] From Sewell & Hauser (1975; re-estimated for SIOPS metric.

[e] GSS occupational data were scored in Siegel (1971) prestige metric; these correlations were not "corrected" the OCG re-scoring showed r_{OO_F} and r_{EO}

to be identical in SIOPS and Siegel metrics [i.e., r_{OO_F} = .24(S) vs. .24(SIOPS); and r_{EO_F} = .23(S) vs. .22(SIOPS)].
The correlation between education and occupation did, nonetheless, show a modest attenuation when coded in SIOPS metric (.44 vs. .37).

The Impact of Ascribed Personality upon Occupational Placement. The final class of independent variables manipulated in our resumes were the four personality variables: Extraversion, Neuroticism, Conservatism, and Machiavellianism. Two types of analyses have been performed with these variables; these analysis have attempted to assess the impact of personality upon both the prestige level and the type of occupations selected for workers.

Analysis of the prestige-level data indicated little gross association between ascribed personality and the prestige of the occupations selected. Table 4.11 presents the zero-order correlations between both the four major personality variables(and their constituent subscales) and the prestige level of the occupations chosen for workers. It will be seen from this table that the correlations are basically nil.

While the personality variables had little impact upon the prestige level of the occupations chosen for the workers, they did, nonetheless, exert a substantial influence upon the types of occupations selected. We began our analysis of this phenomenon by classifying the occupations selected into the major census occupational categories: professional, administrative, clerical, sales, service, and production-transport. We then assessed the degree to which the various personality variables were non-randomly distributed across these occupational groups. Figure 4.4 shows the personality profiles of each occupational category for the four major personality variables, and figure 4.5 shows a similar set of results for the three subscales (sociability, self-evaluation, and enjoyment of adventure and risk) which comprise the Introversion variable.

The results of these analyses indicate that the manipulation of the personality variables did have statistically significant effects upon the types of occupations which were selected for workers. The most

Table 4.11: Correlation Between Personality Variables Manipulated in Experiment and Prestige of Occupation Selected for Worker.

Personality Variable	Sample	Correlation With Prestige of	
		Avg. Predicted Occupation	Avg. "Appropriate" Occupation
1. Introversion Factor	USA	.03	.01
	UK	.10*	.02
(1a) Sociability subscale	USA	.02	-.01
	UK	.08	-.03
(1b) Self-Evaluation subscale	USA	.02	.03
	UK	.09	.03
(1c) Adventure & Risk subscale	USA	.03	.01
	UK	.07	.05
2. Neurotism Factor	USA	-.02	-.01
	UK	.00	.00
(2a) Worries subscale	USA	-.01	-.01
	UK	.04	.01
(2b) Irritability subscale	USA	-.03	-.01
	UK	-.04	-.02
3. Conservatism Scale	USA	-.09**	-.09**
	UK	-.00	-.15**
4. Machiavellianism Scale	USA	-.08**	-.14**
	UK	.02	.00

*p < .05

**p < .005
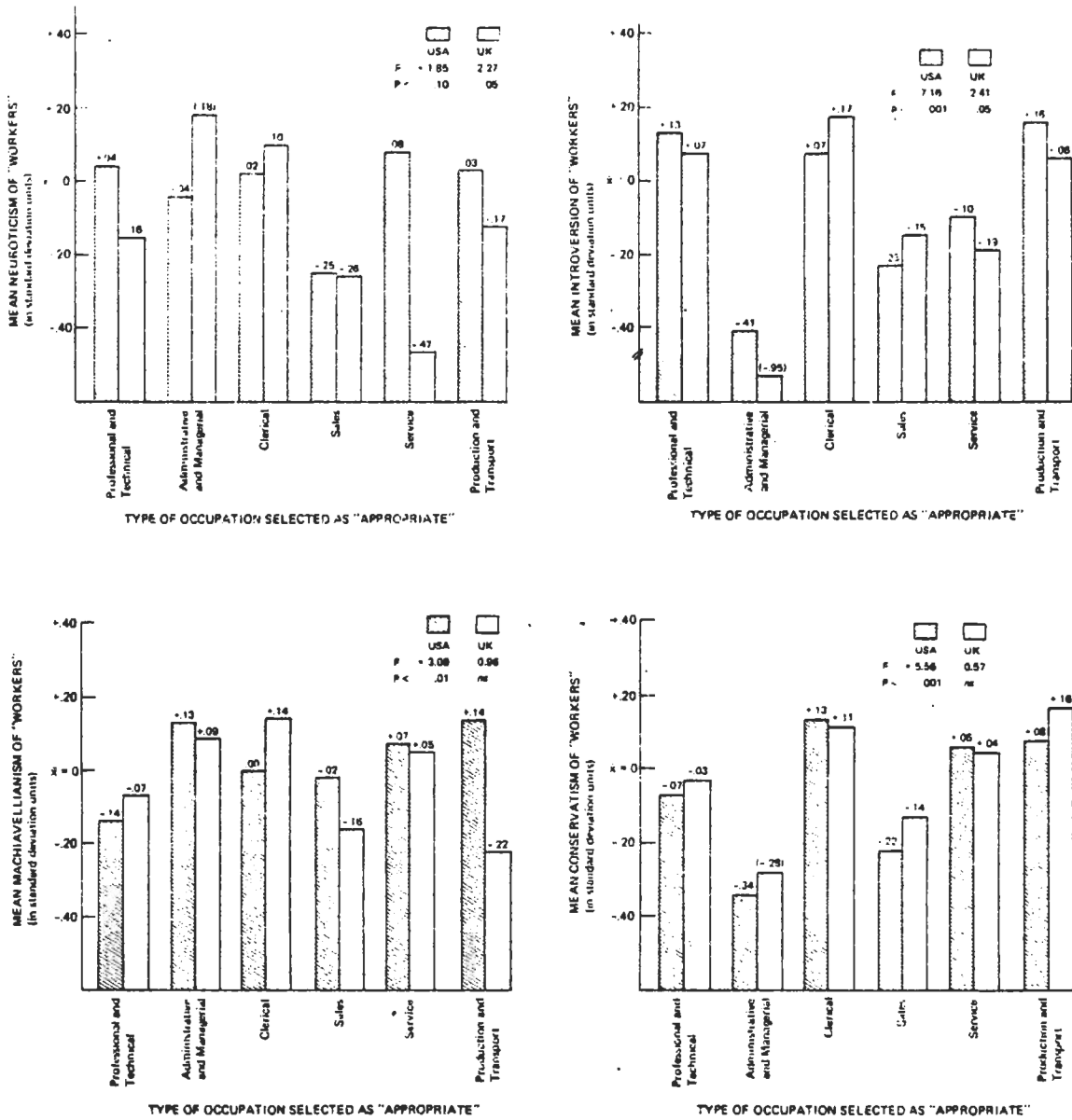
Figure 4.4: Mean score one four major personality dimensions of workers assigned to different types of occupations.
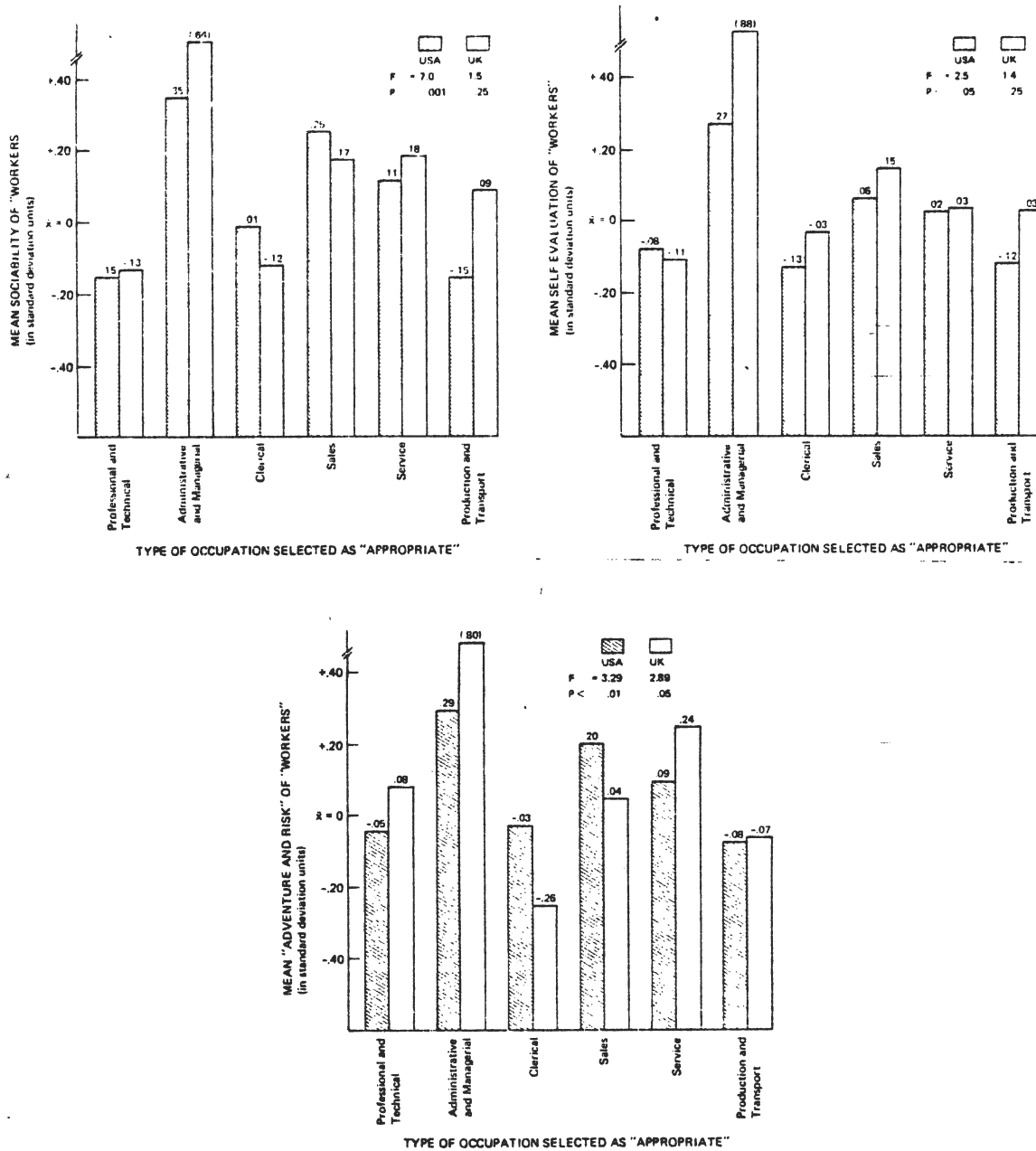
Figure 4.5: Mean score on three Introversion subscales of workers assigned to different types of occupations.

significant result was found for the manipulation of the level of introversion ascribed to workers. [$F(5/574) = 7.16$, $p < .001$ in U.S.A.; $F(5/274) = 2.41$, $p < .05$ in U.K.]. Our analyses indicated that workers described as introverts were considerably less likely to be selected for sales, administrative, or managerial, jobs, and considerably more likely to be assigned to positions in production, transport or the professional occupations. Overall, we found that the average worker selected for an administrative occupation in the U.S.A. had an ascribed introversion level 0.41 standard deviations below that of the average worker, which is to say that the corresponding resumes described rather extroverted workers. Similarly, workers assigned to sales occupations were 0.23 standard deviations below the mean in introversion. Assignment of workers in the British segment of the study followed closely the pattern obtained from our American personnel managers.

The second most powerful effect revealed in our analyses was that for the Conservatism variable. Our analyses indicated that, at least for the American portion of the study, there were significant differences between the types of jobs assigned to workers who were high and low in Conservatism. Most strikingly, our analysis indicated that there was a very significant tendency for administrative and managerial jobs to be assigned to less conservative workers. Overall, the average level of conservatism of men and women assigned to managerial jobs was 0.34 standard deviations below the mean for the total sample of worker resumes. Similarly, workers assigned to sales occupations were also somewhat less conservative than average; this effect, however, was not as large (i.e., 22 s.d.) as that for managerial occupations. In contrast, workers assigned to production, clerical and service jobs were somewhat more conservative than average, although none of these effects was dramatic (i.e., means level of conservatism = +0.05 to +0.13 s.d.).

<u>Personality and Occupational Attainment for Subgroups</u>. So far, our analyses indicate that personality variations have a significant influence upon the types of occupation selected for a worker, but they have no general effect upon the gross level of prestige of the occupations selected. The latter non-finding prompts some further questions.

Is it, perhaps, the case that by combining our samples of men and women that we have obscured significant relationships that hold only for male (or female) workers? Or, given previous findings regarding the role of (IQ) and education as a <u>moderating</u> variable, has our analysis of gross prestige relationships, obscured important relationships that hold only for 'educated' workers? Or, finally, is it possible that the process of personnel placement is a two stage process where a 'type' of occupation (e.g., sales, clerical, etc.) is first selected and then a particular 'level' of occupation is chosen within that type (e.g., within clerical occupations: administrative secretary <u>vs</u>. filing clerk)?

In the following pages we present the results of our analyses of these questions.

<u>Controlling Gender and IQ</u>. Table 4.12 presents matrices of correlations between each of the manipulated personality dimensions and the prestige of the occupations selected for (1) male and female 'workers' and (2) high- and low-IQ 'workers.' Panel A of the table presents data for both the U.S.A. and Great Britain; in Panel B correlations for four subgroups (High IQ males, High IQ females, Low IQ males and Low IQ females) are presented. The latter correlations are presented for the U.S.A. sample only; the relatively small size of the sample made a four-way breakdown infeasible for the U.K.

Table 4.12: Correlations Between Personality Variables Manipulated in Experiment and Prestige of Job Selected for Male and Female "Workers" and "Workers" of High and Low IQ

"Worker" Subgroups

Personality Variable	Attainment Variable[a]	Males US	Males UK	Females US	Females UK	Low IQ US	Low IQ UK	High IQ US	High IQ UK
Introversion	App. Occ.	.02	-.06	.00	.11	.00	.05	.05	.15*
	Exp. Occ.	.04	.12	.01	.08	-.01	.07	.10**	.25**
Neuroticism	App. Occ.	-.06*	-.05	.04	.04	-.06	.04	.00	-.05
	Exp. Occ.	-.05	-.07	.00	.09	-.05	.00	-.04	-.01
Conservatism	App. Occ.	-.07*	-.11	-.10**	-.20*	-.11**	-.08	-.04	-.25**
	Exp. Occ.	-.04	.08	-.15**	-.10	-.12**	.02	-.03	.00
Machiavellianism	App. Occ.	-.14**	.00	-.14**	-.01	-.12**	.06	-.16**	-.08
	Exp. Occ.	-.11**	.01	-.05	.04	-.05	.06	-.11**	-.00

"Worker" Subgroups[b]

Personality Variable	Attainment Variable	High-IQ Males	High-IQ Females	Low IQ Males	Low IQ Females
Introversion	App. Occ.	.08*	.00	-.01	-.01
	Exp. Occ.	.10*	.09*	.01	-.05
Neuroticism	App. Occ.	-.05	.05	-.16**	.02
	Exp. Occ.	-.04	-.04	-.13**	.02
Conservatism	App. Occ.	-.03	-.03	-.12**	-.10**
	Exp. Occ.	-.00	-.06	-.08*	-.19**
Machiavellianism	App. Occ.	-.16**	-.15**	-.13**	-.12*
	Exp. Occ.	-.12*	-.09*	-.12**	.00

NOTES: (a) Attainment variables are averages of prestige scores for three occupations selected as appropriate (App. Occ.) and three occupations predicted for ages 25, 35, and 50 (Exp. Occ.). Division into High vs. Low IQ made at IQ = 100.

(b) Correlations shown in lower panel are for U.S.A. sample only; the small size (N = 300) of the U.K. sample made it impractical to attempt division of this sample with 4 subgroups.

* p <.05

The results shown in Table 4.12 reveal a small number of surprising correlations between manipulated personality dimensions and the prestige of the selected occupations. For example, introversion shows rather substantial correlations with the prestige level of the occupations predicted (r = +0.25 (UK) and +0.10 (USA); ps <.005) and judged 'appropriate' (r = +0.15; p< .05, and +0.05, ns) for workers with above average IQs. Similarly, Conservatism is found to impede the occupational attainment of Low-IQ but not High-IQ workers. In turn, Neuroticism, which had no substantial correlation with attainment for the sample as a whole, nor in the breakdowns presented in panel A, has significant negative correlations with the prestige level of jobs judged 'appropriate' (r = -0.16, p <.005) and 'expected' (r = -0.13, p <.005) for High-IQ men.

These instances of correlations discovered by disaggregating the sample are sufficiently numerous to support the generalization that the influence of personality varies with the sex and IQ level of workers. However, we should also note that this is not the case for all of the personality dimensions, and that the magnitude of the observed correlations is modest.

Evidence for a two-stage placement process. Table 4.13 presents correlations between each of the manipulated personality dimension and the prestige of assigned occupations within gross categories of occupation. That is to say, for all workers assigned to given type of occupation (e.g., clerical) the displayed coefficients represent the association between the level of a specified personality variable and the prestige level of the specific occupation selected for the worker. Thus, entries in the first line of the table represent the extent to which, for workers assigned to professional/technical occupations, the level of the specified personality variable affected the (prestige) level of occupation assigned.

Table 4.13: Correlations between personality variables and prestige of occupations assigned (computed for subsamples of "workers" assigned to the same occupational class.)

Class of Occupation	Assignment	Sample	Neuroticism	Introversion	Conservatism	Machiavellianism	Sample Size
				Personality Variable			
Professional & Technical	Appropriate Occ. at age 24	USA	.04	.01	-.02	-.14*	431
		UK	-.26*	.36**	.08	-.07	65
	Expected Occ. at age 50	USA	.03	.01	.11*	-.01	242
		UK	-.05	.19	-.09	.13	28
Administration	Appropriate Occ. at age 24	USA	-.01	-.01	.11	-.27*	49
		UK	(a)	(a)	(a)	(a)	7
	Expected Occ. at age 50	USA	-.12*	-.01	.06	-.01	244
		UK	-.19	-.03	.09	-.10	35
Clerical	Appropriate Occ. at age 24	USA	.01	.01	-.01	-.03	457
		UK	-.06	-.15	-.06	-.16*	100
	Expected Occ. at age 50	USA	.03	.00	-.05	-.07	367
		UK	-.02	-.10	.08	-.06	97
Sales	Appropriate Occ. at age 24	USA	.11	-.04	.00	-.06	173
		UK	.09	-.27	.24	.24	26
	Expected Occ. at age 50	USA	.22**	.15*	-.04	-.02	138
		UK	-.08	.26	.22	-.02	23
Service	Appropriate Occ. at age 24	USA	.06	.13*	-.25**	-.09	149
		UK	.00	-.03	-.04	-.25	37
	Expected Occ. at age 50	USA	-.01	.13*	-.19**	-.07	159
		UK	.12	-.03	-.12	-.22	25
Production & Transport	Appropriate Occ. at age 24	USA	-.04	.00	-.06	-.08	328
		UK	-.08	.04	.10	.28*	36
	Expected Occ. at age 50	USA	.00	.10*	-.10*	.01	326
		UK	-.30*	.17	-.10	.22	50

NOTES. Coefficients are product moment correlations between prestige (SIOPS metric) of occupation selected as "appropriate" or "expected" and level of each personality scale manipulated in construction of resume-- within categories of selected occupations.

Because workers could theoretically be assigned to different categories of occupation in judgements of 1st, 2nd, and 3rd most appropriate occupations as well as occupations 'expected' at ages 25, 35, and 50, it is not possible to average subjects' judgements. Thus, for the purpose of this analysis, we choose to study judgements of the 'most' appropriate occupation and the occupational level subjects expected workers to reach at the final stage of their careers (i.e., age 50).

It will be seen that there are a large number of relatively substantial coefficients displayed in Table 5.13. Fifteen (of the 92) coefficients from this analysis are +0.20 or larger in magnitude (i.e., sufficient to account for at least four percent of the variance in prestige). Reading across a row of coefficients indicates the pattern of personality traits that determined placement in high and low status jobs within a given type of occupation; thus, we find that British personnel managers placed men and women described as non-neurotic introverts in high status professional jobs while workers described as neurotic extroverts were placed in lower status (i.e., 'technical') positions. Similarly, conservative service workers in both the U.K. and U.S.A. were assigned to less prestigious jobs and, in the U.S.A. (but not the U.K.) introverts were thought appropriate for relatively more prestigious service occupations.

While the correlations presented in Table 4.13 are generally modest, they must be considered together with the evidence previously provided on the significant role of personality in determining the particular 'types' of occupations to which workers are assigned. While in no case did our personality variables have an overwhelming influence on occupational placement, it should be remembered that these two effects are cumulative.

Summary and Conclusions

We began this chapter by asking to what extent the naive psychology of the men and women who control access to occupations in corporations could account for the findings of survey research on occupational attainment. As with all fundamental questions, the answers to this question is not simple nor fully explored by any single piece of research.

All the variables incorporated in our study had <u>some</u> reliable effects upon occupational placement. For some variables, our results indicated that biases in the 'naive psychology' of organizational gatekeepers was sufficient to explain the relationships observed in our survey data. For example, the degree of sex bias apparent in the occupational placements made by our personnel managers <u>fully</u> reproduced the degree of bias extant in the real world. Similarly, the residual influence of social origins upon the prestige level of job selected for 'workers' in our experiment, equalled the correlation typically left unexplained in conventional models of attainment (<u>cf</u>., ch. 2). These results are gratifying. They show that the hypothetical mechanisms embodied in our experimental simulation are sufficiently powerful to account for two social phenomena of considerable theoretical and practical interest.

Similarly, our finding that education and IQ, when manipulated in our resumes, had effects paralleling those in the real world is satisfying. This result, however, was more validational than revealing; the fact that the personnel manager's use of education replicated the relationship of education and occupational attainment in the real world provides good evidence that our subjects took the experiment seriously. Of greater substantive interest in this regard was the finding that the effects of education on predicted occupational attainment decline over time, while those of intelligence increase.

This result suggest that educational credentials are most important in determining entry into the occupational world, and its importance decreases after that point. In contrast intelligence is less important at entry level, but its importance in determining subsequent career progress increases over time.

Our findings and non-findings on the influence of personality variables have proved a major irritant to this author. Initially, we had hoped that simple correlations between the prestige of assigned occupations and the level of the personality variables manipulated in our resumes would be amenable to straightforward re-estimation of the equations presented in Chapter 3. The reality of our data stymied this plan. Taking the sample as whole, the correlations between our personality variables and the prestige of assigned occupations were essentially nil. From our data it appears that personnel managers used personality information to assign 'workers' to types of occupations, rather than to occupational prestige levels. Thus we found that introverts, for example, were thought to make better scientists than business managers or salespeople. Indeed, across the whole range of personality variables we found that there was a significant and meaningful variation in the personality profiles of workers assigned to different types of jobs. To this extent our belief that personality influences occupational attainment was correct. However, the form of this influence was not what we thought it to be at the beginning of our research.

Disaggregation of the sample to take into account the moderating influences of sex and intellectual ability revealed some significant relationships between the prestige level of assigned occupations and the level of our manipulated personality variables. Even more importantly, analysis of the relationship between occupational level and personality within types of occupations revealed a

relatively large number of substantial effects. The latter finding suggests that it might be more useful to conceptualize of the influence of personality as a two stage process, i.e., first, a type of occupation is selected, and then a given (prestige) level within that type. While admittedly post hoc, this conceptualization makes considerably more sense of our personality data than our original scheme.

Interpretation of our personality data must, unfortunately, be viewed as incomplete in its present form. This is so because it remains to be seen whether the differences we have found make sense in terms of the attributes of occupations themselves. Relatively objective and comprehensive data upon similarities between occupations would allow us to determine whether manipulation of personality attributes produces an according shift in the nature of jobs assigned. Our finding that 'introverts' were not usually assigned sales or managerial positions suggests that this is so. However this preliminary approach to the question is quite crude. After all, there are not just six categories of occupations, but rather several hundred different occupations which were assigned in our experiment.

A promising approach to this question would involve use of the occupational analysis materials produced for the Dictionary of Occupational Titles (D.O.T.) and other job evaluation programs. The D.O.T. contains a scaled evaluation of 20,000 different occupations in terms of the extent to which they demand interaction with (1) data, (2) people, and (3) things (all, broadly conceived). It would be of great interest to use the D.O.T. scores of the occupations assigned in the experiment to assess whether ascribed personality causes workers to be assigned to jobs with different characteristics (e.g., involvement with "people, data, or things"). Unfortunately, analyses of this sort are presently beyond the scope of our research project.

While there are further analytic tasks for the future, there are also important conclusions which can be drawn from the analyses presented in this chapter,

1) first, we have found that it is possible to conduct social psychological experiments in the real world--even using high status subjects;

2) the results of our experiment indicate that sex discrimination on the part of the personnel administrators is sufficient to account for patterns of sex segregation observed in the American and British labor force;

3) our findings on income indicate that British personnel administrators assign salaries to women that are approximately ten percent below those paid to men (controlling for type and level occupation).

4) that given appropriate information, personnel administrators will assign jobs that are significantly--although modestly $(r = .13)$--correlated to the worker's social class of origin. The extent of this social class bias matches that found in the labor force as a whole.

5) that the personality characteristics of workers have a significant influence upon the types of jobs which are assigned, and--in a complex and incompletely understood way--upon the prestige levels of jobs assigned to workers.

The limits of Interpretation.

While there are a large number of conclusions which can be drawn
from the results presented in this chapter, there are also limits upon the certainty
with which any inference can be established. Some of these limitations suggest
directions for future research.

Briefly, there are three major areas in which readers may wish to
qualify or re-assess our conclusions:

(1) Artificiality of Task. In the concluding chapter of this monograph
we will critically discuss the limits upon interpretation and application
of traditional experimental research in social psychology. One of the most
important limitations derives from the artificiality of the context of such
experiments. We argue that this artificiality limits the generalizations
which can be made from the results of social psychological experiments.

An appropriate spirit of self criticism requires us to acknowledge that
our own work suffers from some similar blemishes. For example, it can be
argued that a "realistic" situation for personnel managers is to be confronted
with one job to be filled and a pool of applicants (or multiple jobs and multiple
pools of applicants). The extent to which the behaviors found in our experiment
generalize to this "realistic" case is open to question. However, we would point
out that alternative research strategies which might be more "realistic"
seem less desireable from other perspectives. For example, sending multiple
resumes to each manager harbors the distinct possibility that subjects would
be alerted to the variables being manipulated in the resumes; this, in turn,
would be likely to increase the probability that managers would give the
socially (and legally) desireable responses rather than revealing their "naive
psychology".

(2) Social Norms. In interpreting the results of our experiments it is not
unreasonable to suggest that the behavior of our subjects may reflect more upon

the prevailing norms in hiring than upon the personnel managers own personal beliefs about the appropriateness of given candidates for different types of jobs. It might, for example, be the case that subjects truly believed that female candidates could make excellent ironworkers, but they also knew that the reaction of workmates (and perhaps the candidate herself) would have made such a choice inappropriate.

While this alternate interpretation suggests a different process of decisionmaking, it leaves intact the basic conclusion that significant biases operate at the point of entry into the occupational world.

(3) Bias as a concept. We have been somewhat cavalier in our use of the term "bias"—applying it to discrimination based upon gender but not to discrimination based upon education, intelligence, etc. Clearly, this reflects an implicit value judgement which readers need not make; indeed, we are not comfortable with the values implicit in such a distinction. We do not believe that it is inherently just to pay workers different wages because of their educational qualifications or alleged intelligence; nor, of course, is it just to pay different wages to men and women. The latter, of course, is now legally interdicted and draws widespread opprobrium. We have followed the prevailing convention and applied the term sex "bias" to this behavior. Clearly, in a world with different values the term "bias" would also be applied to other sources of wage differences.

Those readers who wish to invest heavily in our conclusions or to draw policy implications from them should keep these qualifications in mind; those contemplating further research in this area might consider the directions suggested by this list of qualifications.

Chapter 5

THE ROLE OF SOCIOECONOMIC ATTAINMENT IN THE DEVELOPMENT OF ADULT PERSONALITY:

the social and psychological origins of depression.

--If one were to try to foretell logically what season would be most favorable to suicide, one might easily assume the season when the sky is darkest and the temperature lowest... Does not the desolate appearance of nature at such times tend to incline men toward revery, awaken unhappy passions, provoke melancholy? Moreover, this is the time when life is most difficult... Today, statistics have definitely refuted (this view). Neither in winter nor in autumn does suicide reach its maximum, but during the fine season when nature is most smiling and the temperature mildest. Man prefers to abandon life when it is least difficult. (Book 1, Ch. 3: "Suicide and Cosmic Factors")

--In resume, just as suicide does not proceed from man's difficulties in maintaining his existence, so the means of arresting its progress is not to make the struggle less difficult and life easier. If more suicides occur today than formerly, this is not because, to maintain ourselves, we have to make more painful efforts, nor that our legitimate needs are less satisfied, but because we no longer know the limits of legitimate needs nor perceive the direction of our efforts. (Book 3, Ch. 3: "Practical Consequences")

-Emile Durkheim (1897),
Le Suicide

The preceeding chapters have been concerned with the role of personality in socioeconomic attainment. In the present chapter we consider the converse of this proposition, that is, the influence of socioeconomic attainment on adult personality development. In particular, this chapter considers the role of occupational attainment in the genesis of depression in early adulthood.

Background

In _Mourning and Melancholia_ Freud defined depression (_melancholia_) as regression to the oral stage in reaction to the perceived loss of a loved object. It has long been accepted that both social conditions and psychological factors can predispose individuals to depressive reactions; parent-child relations are frequently cited in this regard (_see_ Birbring, 1953; Jacobson, 1954).

Despite the importance which is ordinarily ascribed to environmental factors, there has been relatively little systematic work on the social psychology of depression. This deficiency has produced theoretical inconsistencies in the literature. A notable example of such inconsistency is the interpretation of the positive correlation between occupational level and depression (_e.g._, Odegaard (1956) in Norway, Rao (1966) in India, Jaco (1960) in U.S.A., El Islam and El Deeb (1969) in Egypt). Since there is a very substantial relationship between self-esteem and an individual's success in his work role, we would expect, if anything, that there would be a _negative_ correlation between occupational level and depression. The finding of a _positive_ correlation poses a theoretical paradox: Why should "success" engender depression? Unfortunately, rather than opening up the subject for more extensive inquiry, this paradox is ordinarily dismissed with the facile assumption that it reflects the "stressful nature" of professional and managerial occupations. This interpretation, like many in this area, is empirically untested (_see_ review by Bagley, 1973).

The dearth of reliable data upon the social aetiology of depression stands in contrast to the high incidence of depressive disorders. It has been estimated that approximately 100 million of the world population suffer from some form of clinically diagnosable depression, and this number is apparently growing (Sartorius, 1974; NIMH, 1973). "Stressful" social conditions are usually considered to be responsible for this trend. Thus, Kielholz opened a recent conference on the treatment of depression by observing that:

> ...the growing stresses imposed by modern life especially
> in an urban environment in which a man finds himself cut
> off from his fellows, has led to an increase in the
> prevalence of depression (1974, 13).

This observation is not unique. It is common for both laymen and clinicians to attribute the rising incidence of depression, the abuse of chemical anti-depressants, and the greater frequency of depression in upper occupational strata to the "stresses" of life in the "advanced" sectors of evolving post-industrial societies.

The present chapter attempts to test the validity of one aspect of this interpretation. We will, in the following pages, present a variety of evidence on the social and psychological origins of adult depression--paying particular attention to the alleged role of occupational "stress" in determining men's vulnerability to the symptoms of depression.

Historically inquiries such as ours have been hampered by important methodological problems. The common design for research in this area contrasts the premorbid history of patient populations to that of control groups. These designs are subject to significant biases since data about a patient's past are obtained after he has been diagnosed. Thus, assessment of a patient's previous history, interpersonal relations and other experiences are viewed through the distorting lens of hindsight. Moreover, there are substantial difficulties in even arriving at accurate and uniform diagnoses. These

difficulties arise not only because loss of confidence and depressed mood are symptoms prevalent in many psychiatric disorders, but also because of varying interpretations of what constitutes "ill health" across cultures and even across subgroups of the same society (cf. Hollingshead and Redlich, 1958; Becker, 1974, ch. 4; Schwab et al., 1966).

Overview of the Analyses

The availability of a rich source of longitudinal data, such as the LSE study, allows us to surmount the historical impediments to causal inference in this area. First, and most importantly, we have information on an individual's psychological state prior to the beginning of his occupational career together with subsequent assessments of the incidence of depressive symptoms. Secondly, biases arising from self-selection and variations in the "labeling" of depression are avoided since each member of our sample completed the same symptom inventory in adulthood. Finally, these data have other desirable features, e.g., (1) educational and occupational careers through age 33 were charted; (2) the study's starting point, early adolescence, is considered particularly important in the development of self-identify (e.g., Erickson, 1963); and (3) the study includes information on social background, family structure, home environment, and intellectual aptitude which can be used in further explorations of the social aetiology of depression.

Initially, we will use the data from the LSE longitudinal survey to investigate three categories of hypotheses concerning the reported correlation of occupational status and depression. Briefly, they are:

a. Procedural and Methodological Explanations: i.e., that the correlation is an artifact arising from the greater tendency of the upper occupational strata to seek help for depressive symptoms, and/or for psychiatrists to label such people as "depressed."

b. Sociogenic Explanations: i.e., that the correlation arises because social mobility predisposes individuals to depression, and/or because depressive symptoms are a consequence of child-rearing practices (e.g., withdrawal of love) in the middle and upper classes.

c. The Psychogenic Explanations: i.e., that personality orientations which cause a man to be a high achiever also make him vulnerable to the symptoms of depression.

Subsequently we will propose and estimate the parameters of a multi-causal model of the genesis of depression. Using this model we will identify several adolescent personality variables and social processes which predispose an individual to depressive symptoms in adulthood , and we will suggest an explanation for the correlation between occupation and depression which is consistent with empirical data and theoretically more plausible than interpretations based upon the notion of "stress".

Method

Index of Depressive Symptomology

To measure the incidence of (non-somatic) depressive symptoms we use a self-image scale in which the respondent checked one of three statements as most accurately describing himself. The 20 sets of such items were then factor analyzed, and the resultant factors were rotated to achieve simple structure.[1] The three factors which emerged -- ambition, depression, and interdependence -- accounted respectively for 15, 14, and 10 percent of the variance in the item pool. The question which loaded most highly on the depression factor received a high score if the respondent indicated a suitable mood by checking,

I often feel depressed. (factor loading = 0.71)

and this was reinforced by a blander "mood" item, together with other items tapping the respondent's level of anxiety, self-satisfaction and confidence, and social withdrawal. Table 5.1 presents the full set of items included in the index, and parallel items found in two standard diagnostic inventories.

Insert Table 5.1 about here

The dependent variable for our analyses was constructed using the factor loadings to weight the importance of each item in the index; the resultant index was then recalibrated to a standard nine point scale (mean = 5.0, s.d. = 2.0). One important result of our scale construction effort was the confirmation in our "normal" population of the finding that the constellation of depressive symptoms--including feelings of inadequacy, chronic anxiety, mood depression, and social isolation--are highly intercorrelated.

It will be seen from Table 5.1 that the dependent variable, and hence all of our conclusions, are restricted to a subset of the domain of depressive symptoms.

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[1] Principal factor solution (using squared multiple correlations as communality estimates) using the varimax criterion for rotation.

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TABLE 5.1

Items Used in Index of Depressive Symptomology and Parallel Items from
Standard Clinical Scales

Factor Loading	Item	Corresponding Items from Beck et al.	from Hamilton
+0.71	I often feel depressed.	A: Mood indicator	1: Depressed mood
+0.51	I am often worried and anxious.	-none-	10: Psychic anxiety
+0.50	I frequently worry about my inability to cope with situations.	C: Sense of failure (?)	7 & 10: Anxiety & feeling of incapacity
+0.59	I have great difficulty in making new friends.	L: Social withdrawal	7: Decreased social activity
+0.58	I am a serious (rather than happy-go-lucky) sort of person.	A: Mood indicator	1: Depressed mood (?)
+0.57	I am a rather discontented sort of person.	D: Lack of satisfaction	10: Tension and irritability (?)

Note: Corresponding items are from the scales of Beck et al. (1961), and Hamilton (1960); a question mark next to an entry indicates that correspondence is incomplete.

In particular somatic manifestations are excluded due to the lack of available data. Furthermore, our index relies on self-reports typically describing the frequency of these symptoms; i.e., we know if respondents frequently "feel depressed" but not whether they were "depressed" at the time of the interview. Thus, although we shall speak loosely of "depression" in our analyses, it should be borne in mind that we are referring more specifically to the self-reported incidence of non-somatic depressive symptomology in a "normal" population.

ANALYSES

Procedural Alternative Hypotheses

Almost all of the available evidence (reviewed by Bagley, 1973) on the relation of occupational status to depression has used patients who were currently under treatment for their symptoms. These studies have demonstrated that there were more "depressed" patients from the upper classes than one would expect on the basis of either normative data (e.g., the census), or age-matched groups of non-psychiatric patients. The procedures used in these studies are vulnerable to two counter-hypotheses which explain their findings in terms of sampling or diagnostic biases. The first counter-hypothesis states that:

1. There may be a tendency for upper-class patients to seek medical care in general, or more specifically, there may be a greater tendency for such individuals to seek medical advice when faced with unhappiness, discontent, anxiety, etc.

Thus, the apparent correlation between occupation and depression might arise not from class-differences in the incidence of depressive symptomology, but rather from differential access or willingness to seek medical treatment for such symptoms.

A second counter-hypothesis derives from Schwab et al.'s (1966) finding that, "...it seems that our clinicians perceive depression as an upper-class malady (p. 537)." An empirical investigation by these investigators has provided proof of such bias on the part of clinicians, and thus another alternative interpretation of the evidence in the literature is that:

2. Given equivalent depressive symptoms, physicians are more likely to elicit the report of such symptoms and/or are more

likely to correctly diagnose patients from the higher occupational groups.

Given our sample-selection procedures and the standardized nature of our index of depressive symptomology, the present data are not subject to the distortions described by these counter-hypotheses. Thus, if these alternatives are adequate explanations of the phenomenon, we would predict that no relation would be found between occupational level and depression in our data.

The appropriate evidence to test this prediction is presented in Figure 5.1 which shows the relationship between depression and the occupational level of our subjects at age 25. This relationship is strong ($F = 4.02$, $df = 5/364$, $p < .005$) and linear ($r = +0.30$); the difference between the depression scores of the highest and lowest occupational levels is almost one standard deviation.

This evidence permits us to reject the two methodological counter-hypotheses and proceed to the substantive interpretation of this correlation.

Insert Figure 5.1 about here

Sociogenic Alternative Hypotheses

The most plausible sociogenic hypothesis argues that the important factor is not the final occupational level achieved, but rather the experience of occupational mobility. This hypothesis draws a parallel to the relationship between anomie and suicide detailed by Durkheim. In one author's words:

When children move into social classes which differ from those
of their parents, their emotional ties to their families are
weakened and the extended family unit is less stable. Thus
mental illness may occur more commonly in people whose social
class differs from that of their parents (Birtchnell, 1971, 218).
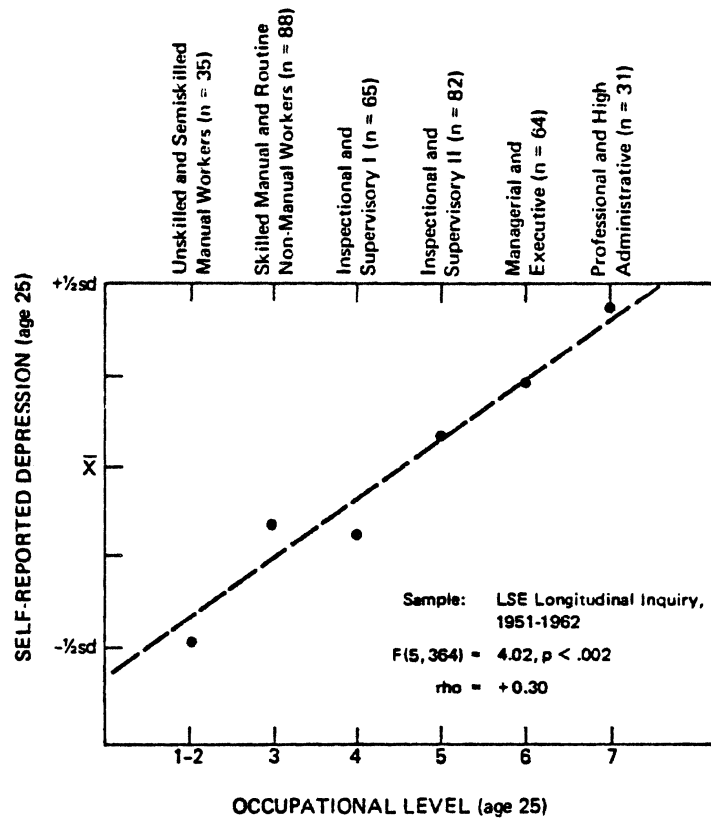
Figure 5.1. Mean levels of depression for LSE longitudinal sample at age 24/25 as a function of occupational level.

Although the concept has some plausability, largely by analogy to Durkheim's

findings regarding suicide, there are substantial problems with this theoretical

position. First, there is good evidence (Litwak, 196) that extended family

cohesion does not diminish with the experience of social mobility. Secondly,

such a hypothesis could explain our results only by the additional stipulation

that upward mobility alone caused such effects. Despite such problems, the

hypothesis that:

3. The experience of (upward) social mobility causes depression,

continues to attract serious consideration (cf, Kessin, 1971; Stacey, 196)

To test this hypothesis we have computed a raw mobility score for each

respondent (son's occupational level minus father's); Table 5.2 shows the dis-

tribution of scores on the depression index by the respondent's social

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Insert Table 5.2 about here

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mobility. These results are shown separately for the grammar and secondary

modern samples, since there was some minor divergence in our findings for

these groups. Overall, we find that the hypothesis is not confirmed (F = 1.30,

df = 4/364, ns), but we do observe a weak trend indicating that boys who were

"written-off" by the educational system and assigned to secondary modern

schools, but who nonetheless were highly mobile (+2 or +3 classes), were more

depressed than their less successful schoolmates (t = 2.15, df = 131, p < .05).

This finding is unexpected.

We should note, however, that this latter group represents the extreme

case of the "successful misfit"-- i.e., men who broke out of the mold made for them

TABLE 5.2

Depression and Intergenerational Social Mobility

| Social Mobility | Mean Score on Depression Index | | |
	Grammar School Sample	Secondary Modern School Sample	Total Sample
Downward 1 or more classes	4.94	4.50	4.76
Immobile	5.00	4.45	4.69
Upward 1 class	5.16	4.77	5.00
Upward 2 classes	5.22	5.42	5.27
Upward 3 or more classes	5.10	5.12	5.10
F ratio:	0.15	1.33	1.30
df:	4/228	4/127	4/360
p:	ns	ns	ns

Note: Intergenerational social mobility is the difference between the Hall-Jones class of father's job (in 1951), and the level of respondent's occupation (in 1962). The depression index has a mean of 5 and a standard deviation of 2.

educational system. One suspects that these men may have been in double jeopardy since their success may have strained ties to their social origins, while their inferior education left them ill at ease in their newly-attained social class. This interpretation, however plausible, is obviously speculative, and will require independent verification.

Before moving on to other analyses, it should be pointed out that the greater incidence of depression found in the grammar school sample is entirely attributable to the greater occupational attainments of this group. When occupational level is controlled, there are no systematic differences between the two samples, i.e., at each occupational level men from grammar and secondary modern schools have equivalent scores on the depression index.

Our second alternative sociogenic hypothesis inverts the logic of the preceeding explanation. Rather than arguing that the experience of rising in the social structure generates depression, this hypothesis claimes that the experience of passing a childhood in the upper classes typically produces a guilt-ridden, depression-prone personality. Since there is a very substantial tendency for men to obtain occupations at approximately the same level as their fathers,[2] and since there is substantial evidence that different social classes use different methods of child-rearing with different results (see Broffenbrenner, 1966), this claim is theoretically plausible. And indeed, some authors (e.g., Green, 1956) have formulated variants of the proposition that:

4. Child-rearing practices in the middle and upper classes predispose individuals to depressive disorders.

To test this hypothesis we have cross-tabulated men's scores on the depression index by the occupational level of their father in 1951. Figure 5.2 presents these results, which reveal a weak and unreliable trend in the appropriate direction. This result is insufficient to account for the

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[21] E.g., Using data from representative sample of 20,700 men aged 20 to 64 in March, 1962, Blau & Duncan (1967) found a correlation of +0.405 between the socioeconomic status of fathers and sons in the U.S.A.

Insert Figure 5.2 about here

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association between occupational level and depression scores. Controlling father's occupational status, the correlation between son's occupational level and depression decreases only slightly -- from +.30 to +.26.

Having considered the two most plausable sociogenic explanations, we have not uncovered sufficient evidence to warrant rejection of the hypothesis that the "stress" of professional and managerial occupations increase one's vulnerability to (non-somatic) depressive symptoms. Although a variety of further social structural variables might be contentiously proposed, there is little theoretical basis for expecting that "controls" for these variables would alter our conclusions. Thus we will turn to our final category of alternative hypotheses.

Psychogenic Alternative Hypotheses

While it is not reasonable to believe that depression per se heightens the occupational achievements of an individual -- the research literature suggests it is a handicap -- it is possible that depression may have psychological antecedents which are   conducive to occupational attainment. If this were so, the correlation between depression and occupational level would be void of causal significance. As Bagley (1973) hypothesized, it may be that:

> 5. A particular type of personality disposes certain individuals
>   both to rise in the occupational world and to be prone to
>   depression.
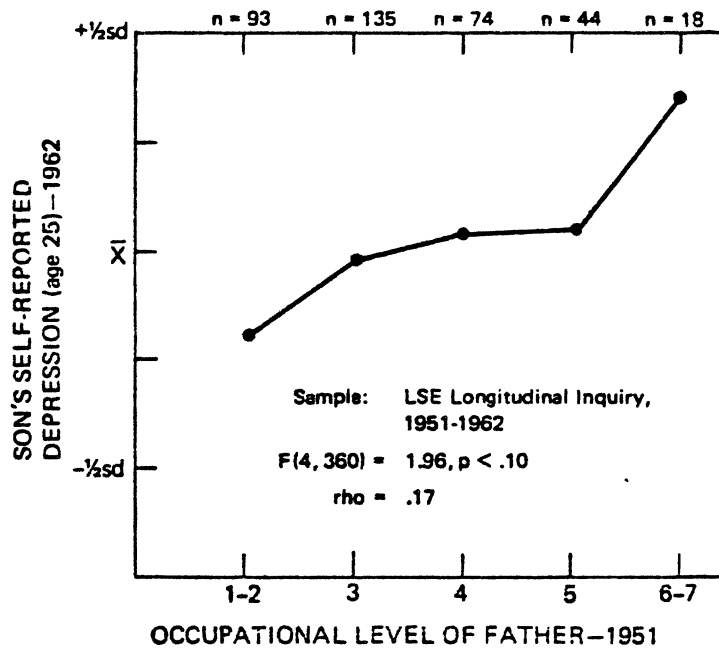
Figure 5.2. Relationship of social orginins to (mean) level of adult depression in LSE longitudinal sample (at age 24/25).
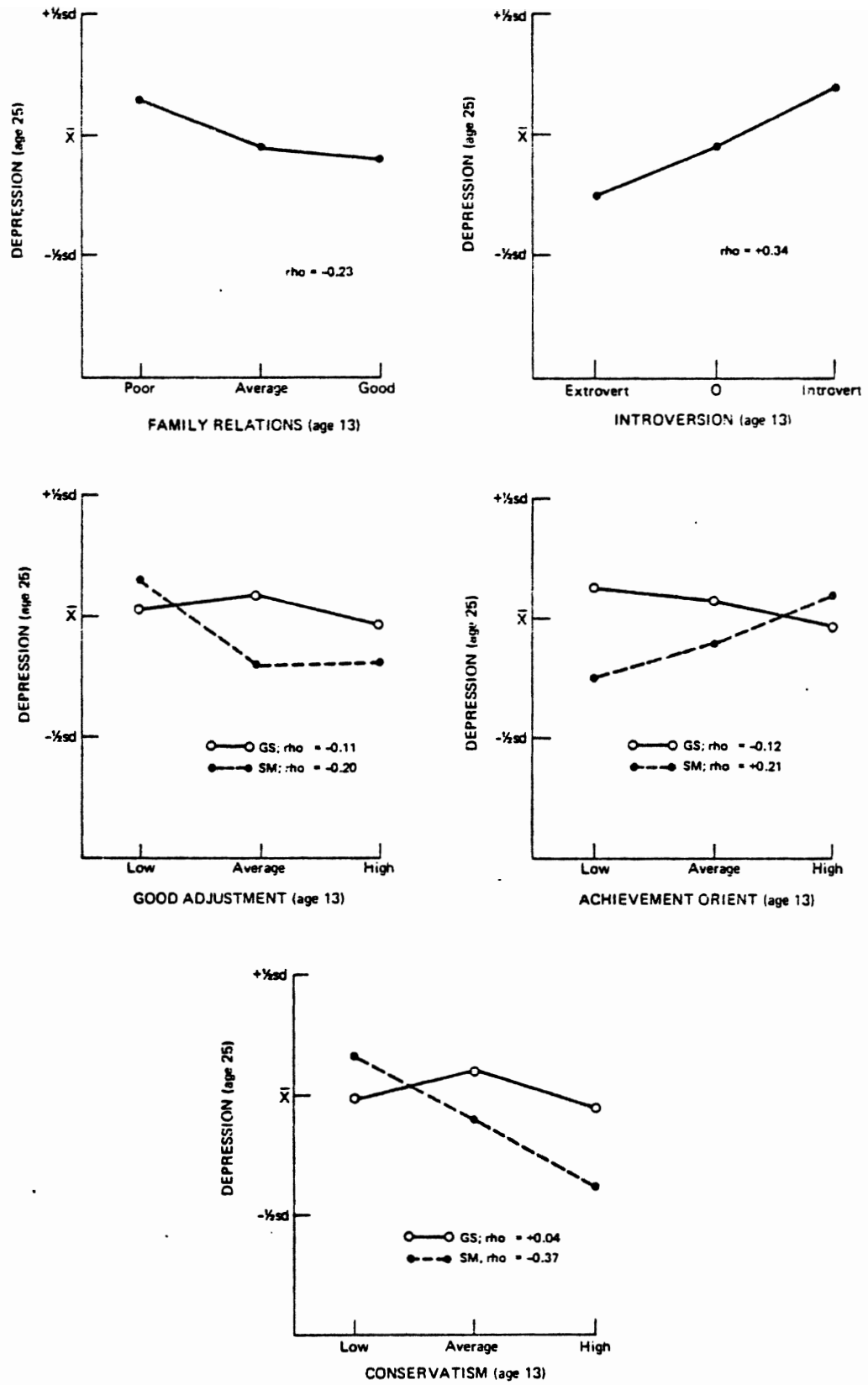
Figure 5.3: Relationship of early adolescent personality (age 12/13) to early adult depression (age 24/25) in LSE longitudinal sample.

Some evidence for this proposition does exist. Two variables with known influences on occupational attainment (see Duncan et al., 1972), intelligence and achievement drive, are thought to be linked with depression. Becker (1960) has reported that manic depressives score higher than normals on McClelland's (1953) measure of achievement motivation, and there is some clinical speculation (e.g., Astrup et al., 1959) that high intelligence may have emotional consequences. Similarly, intraversion, which is a likely antecedent of depression, has been causally linked to socioeconomic attainments (cf., Eysenck, 1971 and our chapter 3).

The investigation of the psychogenic theories of the origin of depression will require a two step process. First, we must find that one or more of the psychological variables suggested by our theories co-vary with adult depression; and second, we must then show that when such variables are introduced into a multivariate model of the origins of depression, the net impact of occupational status is nil. The present data are uniquely suited to such an investigation, since they contain a wide variety of personality measures which were obtained early enough to be uncontaminated by the respondent's career experiences.

We have included in this analysis our three major personality factors from adolescence: achievement orientation, intraversion, and neuroticism. Additionally, since clinicians report that depressives are more "conforming" (Noyes and Kolb, 1963) and since there is a widespread belief that childhood interactions with parents are crucial in personality development, we have also included our Likert scale measure of social conservatism, and self-reported family relations (both obtained at age 13).

The relationship of each adolescent variable to adult depression is shown in the panels of Figure 5.3. Since it has previously been shown that the

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Insert Figure 5.3 about here

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type of secondary school a boy attends moderates a range of social and
psychological relationships (see Ch. 2 and 3),

all of these analyses were first performed separately for each sample.
Where these results showed no significant differences between samples, the
results have been aggregated.   These analyses, representing the relationship
of each personality variable to depression, are shown in Figure 5.3.   Clearly,
the first requirement for establishing the validity of a psychogenic inter-
pretation   is   satisfied

Multi-Causal Analysis: Integrating Social and Psychological Hypotheses

Given that the foregoing psychological variables predict the emergence of
depressive symptomology and also predate the commencement of the occupational
career, we now seek to determine how well such factors account for the correla-
tion between occupational achievement and depression.   To accomplish this we will
use the decomposition techniques of path analysis (Land, 1969).   Figure 5.4 presents
a schematic

Insert Figure 5.4 about here

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representation of our causal model;   the pattern of causal asymmetry assumed by our
model is implicit in the sequencing of the life cycle.   Thus we postulate that social
class background and intellectual ability codetermine the course of adolescent
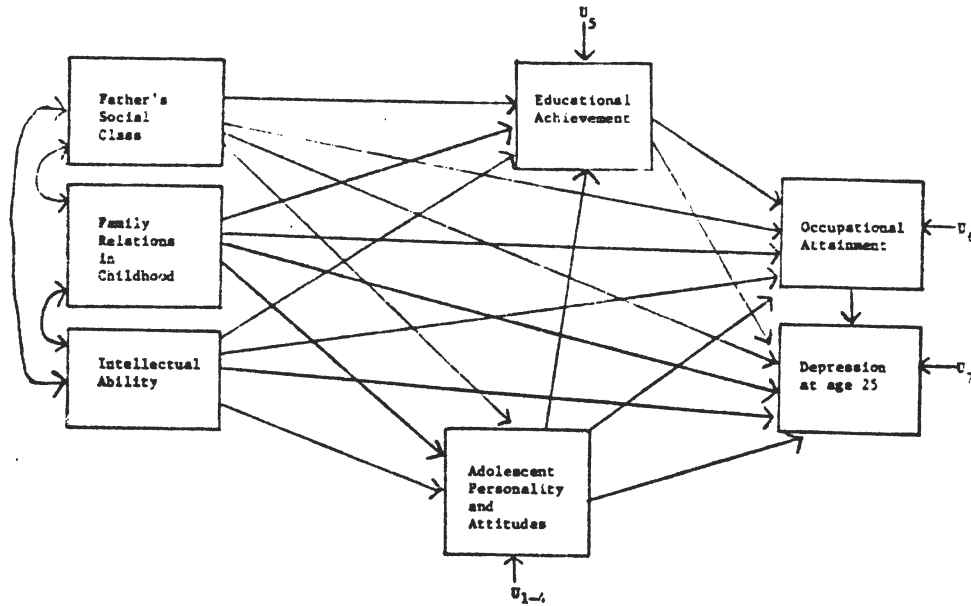
Figure 4.

SCHEMATIC CAUSAL MODEL

<u>Model Definition</u>

Variables: R = family relations (self-report at age 13)
F = occupational level of father;
I = IQ at age 12;
E = educational attainment;
A_i = four dimensions of adolescent personality
(1 = introversion, 2 = neuroticism,
3 = achievement orientation, 4 = conservatism);
O = occupational level at age 24;
D = depression at age 24;
U_i = unmeasured determinants of variable;
P_{ij} = standardized path coefficient representing
net direct influence of "j" upon "i."

<u>Structural Equations</u>

(1) $\underline{i = 1,4}$: $A_i = P_{A_iF}F + P_{A_iI}I + P_{A_iR}R + P_{A_iU_i}U_i$

(2) $E = P_{EF}F + P_{EI}I + P_{ER}R + [\sum_{i=1}^{4} P_{EA_i}A_i] + P_{EU_5}U_5$

(3) $O = P_{OF}F + P_{OI}I + P_{OR}R + [\sum_{i=1}^{4} P_{OA_i}A_i] + P_{OE}E + P_{OU_6}U_6$

(4) $D = P_{DF}F + P_{DI}I + P_{DR}R + [\sum_{i=1}^{4} P_{DA_i}A_i] + P_{DE}E + P_{DO}O + P_{DU_7}U_7$

<u>Estimating assumptions</u>

$\underline{i=1,6;\ j=1,6}$: $r_{U_iU_j} = 0$

Figure 5.4:   Schematic causal model of social and psychological origins
of depression.

personality development, and that social background, IQ and personality influence a boy's educational achievement. Similarly, occupational success is postulated to arise from educational achievement, personality, IQ, and social background, and adult depression is seen to potentially depend on the joint influences of all these factors.

First, we estimate a number of model parameters, the most important of which are the path coefficients representing the independent effects of all influences upon the final outcome variable -- depression. Coefficients representing the magnitude of these effects are fitted , as before, using a model equation which represents the severity of depressive symptomology as a linear, additive function of occupational level, educational attainment, adolescent personality, social background and intellectual ability. Table 5.3 presents estimates derived separately for each sample.

Insert Table 5.3 about here

This analysis indicates that the major causes of depression in the grammar school were: adolescent intraversion, poor family relations, high occupational attainment, and the lack of an academic orientation in school. In the secondary modern sample the most important influences were: high occupational and educational attainment, poor family relations, and relatively high intellectual ability. For both samples there is a modest trend for boys who were "poorly adjusted" in adolescence to report more depressive symptoms in adulthood.

In interpreting these results it should again be remembered that the two types of schools we sampled differ markedly in character and function. The English grammar school of the 1950's was an institution of high academic standard which

Table 5.3: The Genesis of Depression in Early Adulthood: Estimated Coefficients for Structural Equation 4

Independent Variable	Sample	Standardized Path Coefficient	Unstandardized Path Coefficient	Sig. Level [a]
F: Occupation of father (in 1951)	GS	+.110	+.165	.10
	SM	-.003	-.006	ns
I: Intellectual ability (IQ at 11)	GS	+.025	+.007	ns
	SM	+.145	+.021	.15
R: Family relations (self-report at age 13)	GS	-.154	-.146	.025
	SM	-.267	-.267	.05
A_1: Adolescent Intraversion	GS	+.272	+.269	.0025
	SM	-.097	-.094	ns
A_2: Adolescent Neuroticism	GS	+.085	+.079	.15
	SM	+.110	+.102	.15
A_3: Adolescent Achievement Motivation	GS	-.229	-.225	[b]
	SM	+.063	+.062	ns
A_4: Adolescent Conservatism	GS	-.002	-.002	ns
	SM	-.155	-.143	ns
E: Education (years completed)	GS	-.021	-.020	ns
	SM	+.191	+.279	.05
O: Occupational level (age 24)	GS	+.282	+.418	.025
	SM	+.189	+.278	.15
R^2	GS	.219 [$F(9.223) = 3.6$, $p < .0005$]		
	SM	.252 [$F(9,122) = 2.6$, $p < .01$]		

Notes. Estimates were derived using ordinary least squares procedures. Correlations for F, I, R, E, A_1, and O were estimated using data for all cases in the 1962 sample (total N = 450); correlations involving D were derived from the smaller sample of men (N = 365) who returned the 1962 Home Questionnaire.

The coefficients presented in this table provide a basis for meaningful cross-sample comparisons (cf. Schoenburg, 1972); i.e., they provide (a) both standardized and unstandardized coefficients, (b) variables that are identically coded in both samples, and (c) a reasonable accounting for measurement errors. To satisfy the final requirement, the matrix of intercorrelation estimates was adjusted to correct for attenuation arising from random measurement errors (cf. Johnston, 1963). Estimated reliabilities of measurement were in the range +0.89 to +0.95 for demographic variables (F, E, O) and IQ, and an estimate of +0.75 was used for the Adolescent Personality variables and the family relations and depression indices. Measures of scale homogeneity for the latter variables indicate that our reliability estimates may be slightly conservative, and hence the results presented in the above table probably understate, to a modest extent, the "true" relation between these variables and depression. Unfortunately, more precise estimates would require explicit test-retest data which are not available in the present study.

The standardized path coefficients in the above table may be interpreted to be the effect (as a proportion of 1 s.d. on the depression index) of increasing the value of a given independent variable by 1 s.d. while holding other variables constant. The unstandardized coefficients describe a similar relation in the metric of the original variables, i.e., as a change in the raw depression score resulting from a one unit (year, level, etc.) change in the independent variable.

Unfortunately, there is no sampling theory—except in a non-applicable, special instance treated by Lord (1960)—to permit formal hypothesis testing using regression coefficients estimated when measurement of the independent variables are imperfect. To provide some guidance in this regard we have re-estimated these coefficients under the conservative assumption that all correlations were "true" measurements (i.e., unattenuated by measurement error) derived from simple random samples of sizes 233 (gs) and 132 (sm). The resultant significance tests are presented in the final column and final row of the table; these statistics should be treated as conservative estimates of the confidence one might have in any particular finding.

[a] Probability values are one-tailed; the predicted sign of the coefficient is consistent with the discussion and hypotheses presented in text.

[b] Coefficient estimated for Achievement Motivation in grammar school sample is opposite in sign to that predicted; the t-value for this coefficient (2.1) would be significant (p < .05) in a two-tailed test.

accepted only the brightest fifth   of the school-age population and prepared these students for university and professional life. The secondary modern schools, on the other hand, were non-academic in orientation and accepted all students who did not win places in grammar schools.[3] Viewed within this context it is not surprising to find that the "brighter" boys who failed to win grammar school places -- and thus obtain preparation for professional careers -- should be more depressed in adulthood than other secondary modern pupils. Indeed, this is striking evidence for the frequently conjectured, long-term effect of early selection in the traditional English school system. Similarly, we find that boys who were selected for grammar school, but who did not share this institution's high valuation of academic pursuits, were also more depressed in adulthood.

Beyond these specific context effects, the two sets of results show remarkable consistency. In both samples, poor family relations during childhood and high socioeconomic attainment exert direct causal influences upon men's proneness to the symptoms of depression. In the latter instance, it is likely, although we cannot explicitly test this hypothesis, that the significant education coefficient for the secondary modern sample further identifies the occupational level of these men by singling out those who stayed in school to obtain qualifications for higher grade non-manual occupations. (n.b., The occupational scale used in our study groups these white collar occupations together in level 3 with the most skilled manual occupations).

One final result, the strong causal influence of adolescent introversion upon adult depression, fits well with the notion that social isolation is symptomatic of the depressed. The fact that this trait predisposes individuals to depression 12 years after it was first measured is remarkable, although we hasten to observe that this finding held only for the grammar school sample.

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[3] See Chapter 2 and Turner (1960) for an extended discussion of these differences. It should be remembered that this is a characterization of the state school system at mid-century, i.e., when these men were pupils. In recent years pressures against early allocation of students to different educational careers has been mounting, and the intervention of various governments has resulted in growing adaption of a unified secondary school system (the comprehensive school).

Having estimated the independent effects of our social and personality variables, it appears that <u>both</u> contribute to the genesis of adult depression. Our task now is to determine the extent to which the observed correlation between occupational attainment and depression arises through the correlated effects of other model variables. Using the basic theorem of path analysis it is possible to decompose the zero-order correlation between occupation and depression into one component arising from the direct causal effect of occupation, and another component arising because occupational level is correlated with other model variables which in turn exert a causal influence upon an individual's proneness to depression. Carrying out the necessary computations we obtain the results presented in Table 5.4. These data indicate

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Insert Table 5.4 about here

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that the <u>direct</u> linkage between occupational level and depression is the largest component of the correlation between these variables. The other variables included in our model do play an explanatory role of the sort suggested by Bagley (1973), however this contribution to the observed correlation is less substantial than the direct linkage between occupation and depression.

Table 5.4: Decomposition of Correlation Between
Occupation and Depression

Sample	zero-order correlation	component attributed to causal influence of occupation	"spurious" component
grammar school	+0.224	+.272	- .048
secondary modern school	+0.291	+.188	+ .103

Note. These decompositions, using the techniques of path analysis (cf. Land, 1969), are based upon the causal model presented in figure 4 and the related equations. The spurious component of correlation arises from instances where a model variable is causally related to both occupation and depression; in such instances there is a component (devoid of causal significance) which is added to the correlation between occupation and depression.

In the ideal case of spurious correlation we might have two variables A and B (say, energy consumption and the incidence of suicide) which have no direct causal connection, but which nevertheless could be empirically correlated because they both were influenced by a third variable, e.g., economic depression.

Discussion and Interpretation

In Figure 5.4 and the related equations we proposed a schematic causal model representing certain broad social and developmental processes we believe to be involved in the genesis of adult depression. In working with this model we have been especially fortunate in having data upon the same individuals followed for many years. These data allowed the resolution of problems that would have otherwise been intractable. For example, rather than engage in endless speculation about whether personality influences socioeconomic attainment or vice versa it was possible for us to study the role of attainment in producing depression while controlling for the effects of pre-attainment personality variables.

In fitting our model to the available data we found that the correlation between its predictions and the level of depression observed in our samples was reasonably high (+0.42 for the grammar school and +0.50 for the secondary modern school group). Although these results indicate that there are substantial idiosyncratic variations in the experience of depressive symptoms, they also show that one-quarter of the variance in individual vulnerability to depression is systematically related to identifiable social and psychological factors. Further analyses have revealed that failure to employ explicit multicausal models can bias inferences regarding the effect of specific variables. For example, our results indicate the statistically significant correlation between the socioeconomic status of parents and their offsprings' level of depression was largely attributable to the causal chain which links one's origins to his own socioeconomic attainment which, in turn, is linked to depression. Thus, although one finds a reliable association

between social origin and depression, proper controls for indirect influences show this association to be void of causal significance.

It must be borne in mind that all of our analyses, describe how social and psychological factors predispose _normal_ populations to the symptoms of depression. Our work differs from other studies in this area not only in its focuses upon a non-patient population, but also because it follows this population from early adolescence into adulthood. As a result the framework of our analyses is also somewhat different. Rather than enumerating ways in which populations of depressed patients differ from "normals," we have sought to understand how the personality of individuals and the nature of their social history make some individuals particularly vulnerable to the symptoms of depression. Thus we have been especially concerned with the causal schema which lie behind the raw correlations found in our data and the published literature; the correlation between depression and occupational level has been of particular interest in this regard.

Our analyses have identified a number of variables which have a direct causal influence, within the context of our model, upon the genesis of depression. Foremost among these are poor family relations during childhood, poor psychological adjustment in adolescence (_i.e._, high levels of anxiety and tension), employment in higher level occupations, and social intraversion. Furthermore, variations between models estimated for the grammar and secondary modern school samples suggest that early selection and tracking of students causes increased depression—even twelve years later—among the more able students who were denied admission to the elite (grammar) schools.

Our finding with regard to occupational level is unexpected. We had anticipated that given adequate longitudinal data we would be able to isolate the cause of the theoretically anomalous correlation between occupation and depression,

and by embedding the relevant variables within an appropriate multicausal model that we would be able to expose the spuriousness of the correlation while simultaneously providing a framework for its interpretation. Our expectation in this regard followed from the fact that the relationship between occupational success and self esteem (or, "loss of loved object") is the reverse of that required in classical theories of the aetiology of depression.

We have considered a large number of procedural, sociogenic, and psychogenic explanations of this empirical anomaly, but the data have stubbornly refused to be "explained." Taking account of every objection, there still remains a substantial and statistically reliable correlation between the level of a man's job and his vulnerability to the symptoms of depression at age 24. Given this result we have no choice but to reconsider the conventional wisdom regarding this correlation.

Simply put, the commonly accepted interpretation postulates that:

(1) "stress" is a greater occupational hazard for accountants, university professors, etc. than it is for coal miners, truck drivers and other similar workers; and

(2) "stress" causes depression.

We find this interpretation deficient in several respects. First, the concept of "stress" used in this explanation is ill defined, and there is no empirical evidence in support of the first postulate. Furthermore, the second postulate is inconsistent with research and theory on the aetiology of depression. Although there has been some research (e.g., Leff et al., 1970) showing that "stressful life events" appear frequently in the premorbid history of depressed patients, these "stressful events" typically involved loss of self esteem or loss of a loved object, for example, by divorce, bereavement, threats to sexual identity, etc. Thus, unlike occupational success, these stressful events involved a "stress-by-loss" which is entirely consistent with the conclusions of other research on the aetiology of depression.

We believe these deficiencies to be crucially important. However, we also
must note that our analyses have failed to confirm our initial expectations
regarding the correlation between occupation and depression. Therefore,
rather than argue further on theoretical grounds for the rejection of the "stress
hypothesis," we will propose one further interpretation and empirically examine
its merits.

Our alternate interpretation is motivated by a concept which has been called
the "anomia of success" (cf. Merton, 1964; Cohen, 1972). For the task at hand we
have applied this concept by standing on its head the "success" of our successful
young men. Specifically, rather than inquiring as to what they have gained by
their achievements, we seek to discover what it is that they have lost.

It is tautologically evident that in reaching their goals these men have
lost their goals. Thus, the man who at age twenty-four has succeeded to a high
status professional or administrative position no longer has a well-defined
occupational path with important milestones to anticipate. By fulfilling his
aspirations he enters a state which is relatively normless; the normative goals
that remain are amorphous and progress toward them is difficult to assess. Moreover,
we suspect that the translation of one's idealized aspirations into reality may
cause dissatisfaction with the imperfections of reality and it may initiate a
process whereby past accomplishments are devalued and ever higher aspirations
replace those which have already been satisfied. In contrast, less successful
men still have conventional goals to strive toward at age 24, and they may yet
expect to make notable advances toward these goals.

Although this interpretation is admittedly post hoc, it is sufficiently
well defined for its adequacy to be tested. Using the available adolescent and adult

measures of job aspirations and expectations, we can measure the association between men's vulnerability to depressive symptoms and three of the mechanisms postulated by this interpretation: (1) early satisfaction of aspirations, (2) rising levels of aspiration, and (3) early closing-off of the expectation of major occupational advancements.

The relevant data are summarized in Table 5.5. These calculations provide considerable support for the anomia-of-success interpretation. Specifically they show that:

1) Men, aged 24, who have satisfied the occupational aspirations they set for themselves during adolescence are considerably more depressed than other men (difference = +0.4 s.d.; p < .001);

2) Men who raise the level of their occupational aspirations between age 13 and age 24 are also more depressed than other men (difference = +0.2 s.d.; p < .01);

3) The expectation of future occupational advancement is associated with lower levels of depression; specifically,

    a) Men who report that they do not anticipate rising to a higher occupational level are more depressed (difference = +0.2 s.d.; p < .05);

    b) Men who expect to rise two or more levels above their present position are significantly less depressed than other men (difference = -0.3 s.d.; p < .01).

Furthermore, when we introduced these variables (from Table 5.5) into our model of the genesis of depression (Fig. 5.4), the relationship between absolute occupational level and depression was reduced to statistical insignificance; (standardized partial regression coefficients = +0.07 and -0.04.)

Insert Table 5.5 about here

TABLE 5.5: The Relation of Depression to Occupational Aspirations, and Expectations

Variables	Coding	Means	Sig. Level	CORRELATION with [a]	
				Depression	Occupational Level
A. Occupation (age 25) equals or exceeds adolescent aspirations	0 = NO 1 = YES	4.76 5.54	.001	+.23**	+.51**
B. Raised occupational aspirations (age 13 vs. age 25)	0 = NO 1 = YES	4.75 5.22	.01	+.15*	+.22**
C. Occupational aspirations stable [b] (age 13 vs. age 25)	0 = NO 1 = YES	5.02 4.94	ns	+.02	+.03
D. Present occupation 2 or more levels below that expected at end of career.	0 = NO 1 = YES	5.11 4.61	.01	-.15*	-.33**

* p .01

** P .001

[a] Correlations are for combined (grammar + sec. modern) samples.

[b] Aspirations were considered "stable" if the occupation selected at age 24/5 was at the same Hall-Jones level or no more than one level below the level of the job selected at age 12/13.

These results demonstrate that the "anomia-of-success" interpretation is consistent with available data and powerful enough to account for the entire correlation between occupational level and depression. Put in a different way, acceptance of the anomia interpretation moots the question of the validity of the stress hypothesis.

While the foregoing empirical results do not invalidate the stress hypothesis, our alternative interpretation does have certain theoretical advantages. In particular, it is consistent with a substantial body of evidence on the nature of other environmental factors associated with depression, and it is also sufficiently well defined to be empirically testable.

Finally, we would observe that evidence recently provided by Inkeles and Smith (1974, Ch. 18) has cast doubt upon a widely accepted corrolary of the stress hypothesis. This corrolary postulated that industrialization imposes psychic "stress" upon a population, and that this stress, gives rise to psychiatric disorders, in general, and depression, in particular. As two proponents of this thesis have written,

> The rapidly changing psycho-social environment of man often gives rise to situations of acute and/or prolonged environmental stress which may lead to depressive reactions (Sartouris, 1974, 18).

> It is widely believed in many developing countries that the rising incidence of psychiatric disorder is a product of the march of civilization and industrialization (El-Islam & El-Deeb, 1969, 288).

Inkeles and Smith studied populations in six developing countries. They found no evidence that either participation in industrial (vs. agricultural) production, or migration to urban centers, or exposure to the "modernizing" influence of the mass media or formal education increased the rate of psychiatric symptoms (including "nervousness," insomnia, feelings of insufficiency). Indeed, the bulk of their evidence contains insignificant trends in the opposite direction.

Given the foregoing evidence, we believe it advisable to consider the correlation between occupation and depression to arise--not from the "stressful" nature of high status occupations--but rather as an anomic consequence of success. As Durkheim (1897) concluded in his study of suicide,

> In resume, just as suicide does not proceed from man's difficulties in maintaining his existence, so the means of arresting its progress is not to make the struggle less difficult and life easier. If more suicides occur today than formerly, this is not because, to maintain ourselves, we have to make more painful efforts, nor that our legitimate needs are less satisfied, but because we no longer know the limits of legitimate needs nor perceive the direction of our efforts.

Chapter 6

IMPLICATIONS FOR THE DISCIPLINE

a brief epilog

When the XIXth Congress met 3 years ago in
London, and certainly a half-dozen years
back at the Moscow Congress, social
psychology appeared to be in a golden age.
It was a prestigious and productive area...
Any moments of doubt we experienced involved
anxiety as to whether we were doing our thing
well, rather than uncertainty as to whether
it needed to be done at all.

The image of these golden boys...of social
psychology, glowing with confidence and
chutzpah only 6 years back at the Moscow
Congress, blissfully unaware of the strident
attacks which were soon to strike confusion
into the field, brings to mind a beautiful
haiku of Buson that goes...,

> On a temple bell
> Settled asleep,
> A butterfly.

We social psychology researchers know all
too well that the peaceful temple bell on
which we were then displaying ourselves
has now rudely rung. During the past
half-dozen years, the vibrations which could
be vaguely sensed at the time of the Moscow
meeting have gathered force. Now the temple
bell has tolled and tolled again, rudely
disturbing the stream of experimental social
psychological research and shaking the
confidence of many of us who work in the area.

--William McGuire (1973)
"The Yin and Yang of Progress
in Social Psychology: seven koan."

As promised in the introduction to this dissertation, the present chapter will <u>not</u> provide a resume of our research findings. Because of the way we organized the preceeding chapters much of the discussion ordinarily reserved for such a "final summation" has already been presented. Thus, rather than further summarizing, this last chapter will use the experience of our own research to pose some questions concerning the definition (and re-definition) of the appropriate domain of social psychology and the methods appropriate for fundamental research within this domain.

In the introduction to this dissertation we stated that the purpose of our research was,

> "...to improve our understanding of the <u>interrelationship</u> between the sociology of status and income attainment and the psychology of human personality development"

We made the further claim that, given this aim, our research "may be properly characterized as social psychological." To readers who do not consider themselves to be social psychologists, the latter claim may seem so self-evident as to be redundant with our statement of purpose. However, to a substantial number of men and women who call themselves social psychologists, our claim will be viewed with a certain amount of skepticism. For example, Jones and Gerard (1967) have defined social psychology as a "subdiscipline of psychology" whose particular domain is "the scientific study of the behavior of individuals as a function of social stimuli (<u>Foundations of Social Psychology</u>, p. 1)." From this perspective, social psychology lies within the tradition of experimental psychology. The dominant conceptual

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paradigm for research in this tradition may be described as S-[O]-R, which is to say that, social "stimuli (S) are varied and behavioral responses (R) are observed in order to make inferences about the psychological nature and processes of the 'organism' (O) or person [House, 1977, 163]."

The extent to which this paradigm dominates social psychology is reflected in the hegemony of the experimental method as the sine qua non of "scientific" social psychology. In 1959, over eighty-five percent of the research articles published in the American Psychological Association's (APA) journal for social psychology reported on laboratory experiments (Christie, 1965). In the mid-1960's this predominance of experimental methodology gave birth to a new journal devoted exclusively to experimental social psychology.[1] However, even the addition of this new publication outlet for the experimentalists did not diminish the hegemony of the experimental method in APA's own journal. By 1969, Highbee and Wells (1972) would report that the percentage of experimental studies in the Journal of Personality and Social Psychology had risen to over ninety percent. Moreover, even the American Sociological Association's (ASA) journal of social psychology, Sociometry, showed a similar predominance of experimental methodology. Despite a statement of Editorial Policy which read,

> Sociometry is concerned with the entire range of interests and problems in social psychology...
> The journal promotes no theoretical or methodological orthodoxy...[the journal's] emphasis is on quality, whatever the data and the mode of analysis chosen by the investigation.

The editor lamented in 1977 that,

> During my first few months as editor, the modal paper received by Sociometry has been a report of a single laboratory experiment, though it is good to see that there are also a few papers which report a logical sequence of experiments ...While we continue to welcome reports of laboratory experiments--and they are often of high quality--we also wish to encourage papers making use of other methodological approaches (Schuman, 1977).

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[1]The Journal of Experimental Social Psychology, established in 1964.

The hegemony of the laboratory experiment as the methodology of social psychology poses important problems for the discipline. It has led, for example, to frequent complaints that the "findings" of social psychology have little practical relevance and are of limited value to social policymakers (cf. Sanford, 1970; Goodwin, 1971; Skellie et al, 1971). Indeed, one might hypothesize that this "lack of relevance" is reflected in the negative growth rate for funding of basic research in social psychology during the last decade.[2] The hegemony of experimental methodology has also caused sophisticated methodologists to wonder whether or not contemporary social psychological research can meet the criterion of external validity (cf. Borgatta & Borhnstedt, 1974). These critics question whether--even when social psychological experiments are "internally valid" (i.e., replicable in anyone else's laboratory)--the findings of such laboratory experiments generalize to the domain of interest (i.e., the world outside of the laboratory).

Research conducted between 1954 and 1970 on the "Machiavellian Personality" provides a useful illustration of the latter problem. Over the course of 15 years an impressive body of laboratory evidence was collected

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[2]Total federal expenditures (including National Science Foundation) for basic research in the social sciences (excluding psychology) rose from $44 million in 1966 to $91 million in 1976--an increase of 107 percent. During the same period funding for "social aspects" of psychology declined from $21.5 million to $20.9 million dollars (Kiesler, 1977).

If we take into account the decline in purchasing power of the dollar during the same period (using Consumer Price Index as a deflator), these figures represent a decrease of 44% for funding of "social" psychology vs. an increase of 19% for funding of other social sciences.

showing that (a) there were stable differences between individuals in their degree of emotional affect, their concern for traditional morality, and their proneness to ideological commitment; (b) individual differences in the latter areas were meaningfully correlated and defined a dimension of personality, and (c) that individual differences between people on this dimension of "Machiavellianism" were highly predictive of individual behavior in specificable circumstances. In particular, it was found that in situations involving face-to-face interaction, latitude for improvisation, and an opportunity to arouse irrelevant emotions, high-Machiavellians would manipulate social interactions to obtain desired rewards (e.g., by out-conning or out-bargaining opponents). The results of this research led quite naturally to the inference that Machiavellianism was a determinant of socioeconomic achievement in the real world. Fortunately, the investigators were prudent enough to test the generalizability of this conclusion. When they did so, they found that there was no correlation between Machiavellianism and status or income attainment for a representative sample of Americans.

Subsequent work on this topic suggested an enlightening explanation for the failure of this laboratory research to generalize to the "real world." As with much social psychological research, almost all of the subjects in this research on Machiavellianism were (male) college students. Numerically, college students are a small portion of the total population; indeed, slightly less than one-half of the adult population in the U.S.A. has ever attended a college of any sort. Following a suggestion by Touhey (1973), the survey data from the original research project were re-analyzed, and it was found (Turner & Martinez, 1977) that there was a reliable positive correlation between Machiavellianism and socioeconomic attainment for men who

had attended college. However, for men who had twelve or less years of education the correlation was of equal absolute value but negative in direction, i.e., among men with less than a college education higher Machiavellianism was associated with below-average attainment.

In this instance, the results of the laboratory studies could be cross-checked against the real world. This was possible because the original investigators commissioned a national survey to test the external validity of their findings. This survey protected the researchers from drawing improper generalizations from their laboratory data, and it made possible subsequent attempts to reconcile the laboratory data with the real world. While the importance of testing the external validity of laboratory results is well illustrated by this example, it has been fifteen years since this discovery was initially made [Christie & Geis, 1970]. In that time, there has been no trend to employ similar strategies to insure the external validity of laboratory findings in other areas of social psychology.

We believe that the future health and relevance of social psychology depends upon a re-definition of the discipline as a more equal marriage of the traditions in methods and substance of sociology and psychology. In contemplating this future and how it might apply to specific research areas, we believe it is important that our own work not be interpreted as a contribution made by psychology to the study of sociological phenomena (or vice versa). Such a parochial view would obscure the creative interplay which occurs between sociology and psychology in the study of this and other social phenomena. For example, in chapter five we saw that there are important insights which derive from the incorporation of social structural factors in the study of phenomena central to psychology, e.g., the aetiology of depression. Thus, while there is much which psychology can bring to the study of questions of sociological

interest, there is much, in turn, that sociology brings in methods and theory to the study of subjects that have long been of interest to psychologists. This creative interplay between disciplines makes possible the unique contribution of a broadly conceived social psychology. In order to realize this potential, however, we need to foster an appropriate catholicism in our choice of research areas and research methods. We would further suggest that an appropriately catholic approach to the definition of social psychology would also provide one avenue for alleviating the malaise which currently afflcts the discipline (cf. Ring, 1967; Smith, 1972; McGuire, 1973; House, 1977; Liska, 1977).

In this concluding chapter we will discuss five examples from our own research to illustrate the benefits which can flow from social psychological research which avoids disciplinary parochialism. The examples we have chosen are:

1. provision of a more adequate and useful understanding of the structure of social phenomena.

2. provision of a more complete understanding of the causes of social phenomena;

3. provision of a safeguard against vacuous psychological theory (e.g., women's "fear of success" as an explanation for sex differences in occupational attainment).

4. provision of a safeguard against vacuous sociological theory (e.g., speculative interpretations of the mechanisms which mediate the "effect" of social origins upon adult attainment).

5. provision of a method for briging the gap between the
laboratory and the "Real World."

We will consider each of these advantages in turn and shall conclude with a
sober assessment of the problems and prospects of the approach we suggest.

(1) <u>Understanding the Structure of Social Phenomena</u>. Chapter
Two presented a somewhat belaboured argument that <u>unitary</u> structural models
of socioeconomic attainment were theoretically in error and empirically
falsifiable. The basis for this claim has an important but distant origin
in our own research program. The origins of this claim exemplify one way
in which the perspective of psychology may lead to an important redefinition
of the structure of social structural phenomena.

The implicit basis for our present findings may be traced back to
a decision of the investigator who collected the original data in 1951. She
decided to study the process of socialization as an interaction of individuals
within <u>varying</u> social structures--rather than attempting to characterize an
<u>aggregate</u> process of social mobility. Thus, her research, which began as an
ancillary to the British Mobility Survey of 1949 (Glass, 1951), did <u>not</u>
draw a sample designed to merely <u>represent</u> the population of the nation. Rather,
she drew samples from within the two main types of educational institutions.
By committing equal resources to the study of the 15 percent of the population
selected for 'elite status' and the 85 percent who entered the educational
limbo of the mid-century 'modern' schools, she enabled us--25 years later--to
<u>test</u> the presumed unity of the attainment process.

Furthermore, the initial orientation of the study emphasized the role
of the   social structure as an active socializing force designed
to affect future societies through its effect upon individuals'

attitudes, personality and behavior. This orientation led to the study of

the different functions assigned to different parts of the educational system.

As the original investigator later noted,

> It is worth emphasizing that the school's explicit function
> --a function assigned to it by society and underwritten by
> parents--is to socialize the child, that is, to affect his
> behavior and outlook, and that for this task the school
> has as much contact (with the child)...as do his parents.
>
> This makes it all the more suprising that psychologists
> neglect to seriously consider the school as an active
> socializing agent. One of the reasons for this neglect
> in the United States may lie in the fact that the American
> educational system is comprehensive and unified; the
> children all proceed from primary to secondary schools where
> any separation of children into different grades or
> preparatory courses is a minor division within a unified
> whole...
>
> (However) in England and on the Continent it is more difficult
> to ignore the school as an independent socializing force. This
> part of the world has divided secondary school systems in which
> (at an early age)...children are separated into different types
> of schools...Input policy, teacher and pupil composition
>   curricula and objectives of the two principle types
> of...school differ considerably. Indeed, it is no exaggeration
> to say that the school to which a child is allocated influences
> far more his life chances than do his ability, social background,
> motivational state or personality predispositions (Himmelweit
> & Swift, 1969).

These interests led to a

particularly fortuitous sampling design. The investigator drew equal-sized

samples from <u>both</u> sectors of the educational systems, so that the influence

of the 'elite' system (with only 15% of population) could be precisely

characterized. The benefits of this sampling design, ultimately

extended to the narrowest of structural models of status attainment. Thus,

we saw that the recent pandemonium of research applying American models of status

attainment to Britain (e.g., Treiman & Terrell, 1975; Ridge, 1976; Kerckhoff,

1976) ignored important functional consequences of the structural division of

European educational systems.

In this instance, the concerns of the psychologists enriched our understanding of the structure of an important social phenomenon (i.e., socioeconomic attainment).

(2) Understanding the Causes of Social Phenomena. Of all the benefits derived from a broadly conceived social psychology, the present category requires least discussion. We began this study with the specific aim of providing a better understanding of the causes of individual variations in socioeconomic achievement. Our initial approach to this research was 'incremental.' We believed that by including psychological variables in models of status attainment we would increase our ability to explain observed variations in achievement

In pursuing this goal we have been rather successful. Our models which incorporated personality variables had significantly greater predictive power than models which included only structural and economic indicators. In this regard, our initial belief about the value of psychology in understanding the causes of attainment seems to have been correct. Thus, we would argue that our results provide an example of the unique contribution which a broadly conceived social psychology can make to our understanding of the causes of important social phenomena.

(3) Safeguards against vacuous psychological theorizing. The third and fourth categories of advantage involve the interpretation of data whose meaning is clear in the context of one discipline (e.g., sociology) but 'problematic' when viewed from the perspective of second discipline (e.g., psychology). Our first example draws upon the well known theory of women's 'fear of success.'

In an article entitled, "Femininity and Successful Achievement: a basic inconsistency," Matina Horner (1970, p. 47) described the "motive to avoid success" as a "stable, enduring personality characteristic of women." Her terminology derived from theories of Achievement Motivation[3] which we discussed in chapter 3. Horner argued that the psychology of women's fear of success provided a plausible explanation for differences between the socioeconomic attainments of men and women, i.e.,

> arousal of motivation to avoid success may very well account for a major part of the withdrawal of so many trained American women from the mainstream of thought and achievement (Horner, 1970, 70).

The positing of a psychological construct, i.e., women's fear of success, as an explanation for sex differences in socioeconomic attainment has recently been challenged on the grounds that the available evidence is inadequate. In a review and replication of Horner's original work, Levine and Crumrine (1975) were led to conclude that,

> In short, the most accurate explanation for (our) lack of replication may well be that serious methodological flaws in the first (i.e., Horner's) study produced artifactual data.

However,

> Despite the technical flaws in the original study, despite the fact that the study was not published in professional journals with review procedures, despite failures to confirm the original findings (see Curtis, Zanna, and Campbell 1973; Katz 1972; Morgan and Mausner 1971; Tresemer 1973), the motive to avoid success is accepted as a discovered and proven fact and is now working its way into standard sources as the conventional wisdom (Bernard 1973; pp. 773-94; Epstein 1973; pp. 912-35; Hochschild 1973, pp. 1011-29; Horner 1972a, 1972b, 1972c, 1974; Papanek 1973, pp. 852-70). The Science Citation Index for 1972 and the first half of 1973 showed 21 citations in addition to those in the American Journal of Sociology. (Levine et al., 1975, 971)

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[3]Horner argued that the "motive to avoid success" is aroused in a classic approach-avoidance paradigm as women pursue occupational goals; this motive becomes stronger as the probability and magnitude of success increases.

"Fear of success," furthermore, is not the only commonplace psychological 'explanation' for the different career attainments of men and women. Another popular explanation cites the lack of female 'role models' in the professions and management.

Without arguing against (or for) the plausibility of psychological theories of modelling or notions of immanent differences in the 'enduring' personality characteristics of men and women, we can ask whether such hypothetical notions are necessary to explain the phenomenon of sex differences in occupational attainment. The results of our experimental study of decisionmaking by personnel managers in the United States and Britain indicate that simple sex discrimination by the people doing hiring in industry is,

    a)   adequate to account for observed disparities in employment of men and women;

    b)   adequate to account for a 15 percent difference in average earnings net of occupational type and level.

These results make it clear that there is no need to posit hypothetical unobserved variables, such as personality differences or exposure to role models, in order to explain observed disparities between the sexes in socioeconomic achievement. Parsimony would dictate that simple, empirically verifiable mechanisms such as employment bias are preferable as explanations of social phenomena to complex and unverifiable psychologizing.

In this instance, the return on our investment in broadly conceived social psychology is the provision of a sociological safeguard against unwarranted psychological speculation. When social structural mechanisms are sufficient to explain a phenomenon there is no need to invoke psychological hypotheses.

(4) <u>Safeguards against vacuous sociological theorizing</u>. Hand in hand
with psychologist's penchant for expropriating the explanation of social
phenomena by vacuous "psychologizing" goes a remarkably similar hubris on
the part of sociologists. Curiously, however, the corresponding sociological
speculations often invoke psychological variables. Let us take, for example,
the question of status and income inheritance.

Contemporary concern with income and status inheritance is a
consequence of a more general concern with social equity.
Evidence of the inheritance of income or status advatages commonly
elicits both speculative interpretations as to its causes and demands for
social policies to eradicate it. Resultant social policies take many
forms, ranging from quasi-legal   Commissions on Equal Employment Opportunity
to governmental intervention in the early life of 'disadvantaged' children.

In the rubric of the models we have used, evidence of status inheritance
can take two forms. First, there are the 'explained' advantages which accrue
to the children of the privileged classes; these take the form of indirect
inheritances such as those arising from unequal opportunities for schooling.
In addition, there are also 'unexplained' inequalities which appear in our
models as the "direct effect" of parents' social status upon their offspring's
socioeconomic attainment. This "direct effect" represents the inequality

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[4]See Bottomore (1966) and Young (1958) for incisive treatments of
the paradoxes and implications of the concept of 'equal opportunity.'

in the attainment of children from different social origins which persists after all other relevant variables (such as education, ability, etc.) have been controlled.

In the initial decomposition of the substantial correlation (r = +0.41) between the status of fathers and sons in America, Blau and Duncan drew attention to the model coefficient (p_{OO_f} = +0.12) representing this "direct effect" of parental social status and suggested that,

> We might speculate that the direct effect of father's occupation on the occupational status of a mature man consists of this modest amount of strict occupational inheritance. (Blau & Duncan, 1967, 173)

However, by occupational inheritance, Blau and Duncan did not mean that sons entered the same occupation as their fathers but merely that the socioeconomic status scores for their occupations were identical,

> identity of status score does not imply that father and son were in the same occupation (The father may have been an electrician scored 44, and the son a cashier likewise scored 44)...
>
> (Thus) If we are to argue for a causal interpretation of r (the correlation between status of fathers' and sons' occupations) we shall have to posit a somewhat more complex sort of causation than mere apprenticeship or strict occupational inheritance. Economic resources and socialization processes are probably the major factors underlying this correlation.

Blau and Duncan's interpretation in terms of "economic resources and socialization processes" had two limitations. First, it confused the notions of occupational inheritance with their very specialized notion of status inheritance Thus, Blau and Duncan's discussion of occupational inheritance gave extraordinary significance to fathers and sons having occupations with identical status scores. We would suggest, however, that the concept of occupational inheritance more properly characterizes the process whereby the son of an electrician becomes a television repairman (SES scores: 44 and 36) than the case whereby an electrician's son becomes a cashier (SES

scores: 44 and 44). By singling out equivalence in the two-digit status scores for an occupation Blau and Duncan confused nominal identities with substantive equivalence. In addition to this limitation, Blau and Duncan's appeal to unspecified "socialization processes" as an explanation for intergenerational status inheritance was sunstantively unenlightening. This explanation did not tell us what these "processes" were or how they influenced attainment.

The results of our own research, that of Sewell and his colleagues (e.g., Sewell & Hauser, 1975) and Duncan's subsequent work (Duncan et al., 1972), indicate that such psychological hypotheses are inadequate to eliminate the residual effect of parents' social status upon their offspring's attainment. Among the socialization variables which have been controlled are,

1. By Sewell et al.: mother and father's education, own education, parental income, IQ, high school grades, teacher's encouragement to attend college, parents' encouragement, friends' college plans, own educational plans, own occupational aspirations;

2. By Duncan et al.: parents' education, family size, IQ, national origin, occupational aspirations, achievement motivation, affiliation motivation, Power motivation, Ambitiousness, Work orientation, peer and parental influences, etc.

3. By Multitudes too numerous to mention: education, IQ, parents education;

4. By the Present study: parental education, family size, IQ childhood family relations, introversion, neuroticism, achievement orientation, conservatism, own education.

Although extensive efforts have been made to "explain" the residual correlation between the status of fathers' and sons' occupations by controlling for an ever expanding universe of psychological variables, the situation remains little changed from that found by Blau and Duncan in their initial study (i.e., partial $r_{00_f} \approx .16$)--even though a very wide range of social and psychological have been controlled.

The very active research interest in status attainment during the last decade provided sociologists with an empiricist's immunity against casual acceptance of Blau and Duncan's speculations as to the cause of this 'unexplained' correlation. It did not, however, provide a viable alternative explanation. The results of our own experimental study indicate that an adequate explanation for this correlation does not involve the socialization history, personality, or familial characteristics of the workers themselves. While the interpretation of this persistent correlation is psychological, it involves the psychology of those who hire, promote, and fire workers rather than the psychology of the workers themselves. Our experimental investigation revealed that, when otherwise identical workers are alleged to come from humble social origins, personnel managers will place them in somewhat less prestigious occupations. This social class bias is not massive (education and IQ influenced personnel managers' judgements to much greater degree). Nonetheless, the partial correlation between the prestige scores for the occupations ascribed to the father's of workers in our study and the prestige of the occupations into which workers were placed by our personnel managers was both statistically significant and identical in magnitude to that found in surveys of employed workers in the United States and Great Britain (i.e., partial $r = +.13$).

In this instance, application of theoretical insights derived from Heider's writings on the psychological structure of social reality has suggested a straightforward interpretation for a phenomenon that was previously poorly understood.

Bridging the gap between the laboratory and the real world. The norms of research practice in sociology had an important influence on the design of our social psychological experiment. Since we believe that this influence increased the external validity of our experiment in ways that are generalizable to other social psychological research, the details of our experience are worth reporting.

Our experimental design differed from that of most social psychological experiments in two major ways. First, we did not use college students as subjects in our research;[5] this decision was motivated by our unwillingness to assume that the processes which characterize decisionmaking by real-world personnel managers would be identical to those of naive adolescents. In approaching our "real" personnel managers, in turn, we sampled randomly from the universe of interest.

It was possible to design our experiment so as to eliminate the need for face-to-face contact with our subjects, and thus our research costs were quite small (<$1 per subject) even though we used a sample of the relevant population. We suspect that many other social psychologists may be able to test their experimental hypotheses on "real" people outside of their laboratories e.g., by mail experiments such as ours, or through random telephone contacts, or with face-to-face contact in subjects homes. Even for experiments that require special equipment, there is often little reason why such experiments could not be done with portable equipment in the subjects' residences. In considering the feasibility of such strategies for their own research readers should remember that none of our corporate personnel

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[5]In contrast, Higbee & Wells (1972) report that of the articles published by the Journal of Personality and Social Psychology in 1969, 76% used college students as subjects; with a further 10% employing other "children or adolescents."

managers were paid for their participation in our study. The public will
cooperate with such research; opinion researchers, for [6]
example, routinely get seventy to eighty percent of the people they contact
to patiently submit for 30 to 90 minutes to tedious and often
sensitive questions. We would suggest that in many instances social
psychologists will often be able to do better (i.e., externally valid)
experiments by abandoning their laboratories and conforming to the
sociologists norm of doing research with random samples of "normal"
populations.

The second influence of sociological norms on our experiment was
to instill in us a concern for the "representativeness" of our independent
variables. Thus, we were particularly careful to insure that the variables
we manipulated (e.g., the education, social class, etc. ascribed to our
workers) represented the range of variations present in the real world. For
this reason we matched the mean and standard deviation
of the variables in our experiment to those of the national population.
By following sociological norms in this way we were able to meet the criticism
that social psychological experiments do not produce generalizable knowledge
because what they demonstrate is frequently the limiting case.
Thus it is argued that independent variables in social psychological
experiments are allowed to take on extreme values so that they have an
"effect" upon a given dependent variable--even though there are no effects
when the intensity of the independent variable is within the range normally
observed in the population. As Borgatta and Bohrnstedt noted in their

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[6]E.g., the National Opinion Research Corporation at the University of
Chicago reported a 75% completion rate for its 1977 General Social Survey.

critique of experimentation in social psychology,

> Extreme conditions of almost any type can have "significant
> effects" on variables to which they are only weakly related.
> Thus (one must ask in general whether)...experimenters have
> shown that a relationship exists in a range of behavior and
> involving magnitudes of relationship which are meaningful
> for theory, or has the experimenter merely shown...that a
> stimulus can be raised to such an extreme value that it
> "makes a difference" (1973, 118)

The difference between the norms of quantitative sociology and
experimental social psychology, in this regard, is that the former typically
is concerned with the use of samples to generate estimates of the magnitude
and form of relationships which hold in a population. Experimental social
psychology, on the other hand, is more typically characterized by attempts
to demonstrate that a variable (or particular interaction of variables)
produces non-equivalent distributions of another variable (e.g., a behavior).
Furthermore, in psychological research it is often implicitly assumed that the
fundamental principles of behavior are universal and thus any available sample
of subjects (human or animal) will suffice. This assumption underpins
common psychological (and biomedical) generalizations that,[7]

> principles derived from the laboratory (study of one
> species) could be applied to...behavior under non-
> laboratory conditions throughout a considerable
> segment of the phylogenetic scale (Breiland & Breiland,
> 1961, 681)

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[7]It should be noted that the quoted authors wrote the foregoing
while questioning the assumption that "the white rat (can) reveal everything
there is to know about behavior (1961 , 681)."

While the research norms of sociology and psychology differ, they are not inherently anatgonistic. In the present research it was possible to conduct an experiment in which the manipulated variables were scaled to match their distribution in the population of interest. As a result, the relationships observed in our experiment could be compared to those found in surveys of the reference population. This comparison permitted us to assess potency of the explanatory mechanisms simulated in our experiment.

Thus, in the case of social class bias and sex discrimination we saw that the magnitude of the relationships observed in our experimental simulation equaled those observed in real life. In contrast, the personality variables we manipulated had relatively small (although still "significant") effects upon occupational placement. The latter non-finding provides an important lesson. It would not be difficult to manipulate the neuroticism variable in our resumes so as to have a very substantial effect upon the behavior of personnel managers (e.g., by describing workers as extremely worried and irritable vs. "average"). Our aim, however, was not to show that there was some relationship between neuroticism and occupational placements, but rather to estimate for the population the magnitude of the relationship between these variables. The latter question required that we match the distribution of our expermentally controlled variable (neuroticism) to the levels observed in our referent population. And so, while we will state confidently (and without any evidence) that there are some significant relationships between attributed neuroticism and the prestige of occupations in which workers will be placed by personnel managers, our experiment indicated that across the normal range of neuroticism these relationships are of such limited frequency and small magnitude that they are of little consequence in the explanation of socioeconomic attainment.

In the present research, there was no essential conflict between our wish to estimate the magnitude of relationships for a normal population (in the tradition of sociology) and our need to maintain experimental control for unfettered causal inference (in the tradition of experimental psychology). While there may be instances in social psychological research where the implications of these two traditions present mutually exclusive research alternatives, we would suggest that our own experience is far from unique. Experimental social psychology can often be done with normal subject populations and variables calibrated so as to enable meaningful comparisons with representative social processes.

Problems and Prospects

It is correct, but unenlightening, to label as "idealistic" our proposals for the redefinition of social psychology.[8] Any prescription for the future of a discipline suffers from inevitable idealism; the relevant question of praxis is whether there are adequate and recognizable benefits to be derived from struggling for change. It is only the recognition of future benefits which will coalesce others into the actions needed for reform.

The difficulties of reform should not be underestimated. Changing an established discipline is not easy. As Kenneth Gergen noted in his reflections on his own agenda for the future of social psychology,

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[8] It should be noted that others (e.g., Stryker, 1977; House, 1977) have recently urged rather similar redefinitions of the domain of social psychology. The benefits perceived by these authors included the rediscovery of Marx, Weber, and even Durkheim, as "social psychologists". The addition of this cadre to our personnel roster does little, of course, to augment our numerical strength. It does, however, suggest the broad range of social phenomena which are within the domain of our discipline.

Expansion of the perceived range of social phenomena considered appropriate for study may, in itself, serve as a further goad to change. As

> If (this) orientation is to be taken seriously, its
> adherents must be prepared to confront the realities
> of an inimical institutional structure. Virtually all
> of the major editorial positions within social psychology
> are occupied by individuals who have been trained in the
> traditional...manner. Much of the same is true of the
> review committees of the major granting agencies, and
> the editorial advisors for major publishing companies.
> ...Anyone concerned with the exigencies of continued
> employment (might) be wise to avoid (this) perspective or
> to seek ways of altering the existing structure.

> ...Competition for graduate school placement, assistant
> professorships, journal space, research funds, tenure,
> and so on is intense, and indicators of excellence are
> frustratingly ambiguous. Given such difficulties, it
> is very tempting to be skeptical of the uncertain promise
> of an unconventional choice, and to favor the "tried and
> true." It is simpler to reject a manuscript, a research
> proposal, or a monograph outline which is unintelligible
> in terms of that which has preceeded or for which the usual
> standards of excellence·do not appear relevant, than to
> risk appearing foolish, if the recommended hybrid proves
> wanting (Gergen, 1977, 718).·

We have attempted in the brief epilog to describe some of the benefits

which accrue to a broader definition of the domain of social psychology.

For ourselves, we believe that these advantages were sufficient to justify

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8 (cont'd)
    House(1977) noted in his writings on this subject, the future
health of the discipline may benefit from disciplined iconoclasm,

> ...renewed attention to the conditions which prevailed
> immediately after World War II may be instructive...the war
> brought the skills of social psychologists (indeed, social
> scientists) from a wide variety of perspectives and
> backgrounds to bear on common social phenomenon or problems
> all of which were seen as having some ultimate applied value.
> A similar orientation...characterized major research topics
> in the immediate post-war period such as authoritarianism
> (Adorno et al., 1950), conformity (e.g., Asch, 1958)
> communication and influence (Katz and Lazarsfeld, 1955;
> Hovland, 1959), group dynamics (Cartwright & Zander, 1960) and
> race relations (e.g., Williams, 1964). More recently, each
> face of social psychology has turned in upon itself, often
> being more interested in advancing its particular substantive
> and/or methodological concerns than in understanding major
> social phenomena or problems. Thus, a first step may be
> for social psychologists of all types to think less about
> the relation of their work to other work (in) social psychology
> and to think more about how their work contributes toward
> understanding a specific social phenomenon or problems.

the research costs incurred, and the resultant isolation from the contemporary mainstream of experimental social psychology.

Whether the benefits we have perceived will be sufficiently attractive for others to follow our example is uncertain. But we do note that the "crisis" literature in social psychology continues to grow, and discontent is a harbinger of change.

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Appendix 1: Supplementary Tables

Table A1.1: Test of presumed linearity
of bivariate relations

| | | VARIANCE EXPLAINED | | | |
| | | Linear | Non-linear | | # |
Dependent Variable	Independent Variables	R^2	eta^2	F	Categories
Achievement Orientation	Family Relations	.02	.03	0.94	9
	Family Size	.01	.03	2.59	5
	IQ	.07	.07	0.49	8
	Father's Occ.	.05	.05	0.17	7
Neuroticism	Family Relations	.00	.01	0.20	9
	Family Size	.00	.00	0.12	5
	IQ	.00	.00	0.23	8
	Father's Occ.	.00	.02	1.37	7
Introversion	Family Relations	.03	.04	1.21	9
	Family Size	.01	.00	0.19	5
	IQ	.02	.03	0.88	8
	Father's Occ.	.01	.01	0.27	7
Conservatism	Family Relations	.00	.02	1.37	9
	Family Size	.04	.04	2.19	5
	IQ	.10	.12	1.55	8
	Father's Occ.	.02	.03	.90	7
Education	Conservatism	.09	.10	0.88	9
	Achievement Or.	.14	.15	0.93	9
	Neuroticism	.00	.01	0.67	9
	Introversion	.06	.08	0.98	9
	Family Relations	.04	.06	0.75	9
	Family Size	.09	.09	0.33	5
	IQ	.28	.30	2.36	8
	Father's Occ.	.13	.13	1.32	7
Occupation (1962)	Conservatism	.04	.09	2.93	9
	Achievement Or.	.11	.13	1.25	9
	Neuroticism	.01	.01	0.24	9
	Introversion	.02	.03	0.95	9
	Family Relations	.04	.06	0.89	9
	Family Size	.12	.12	0.62	5
	IQ	.23	.24	1.58	8
	Father's Occ.	.10	.11	1.32	7
	Education	.56	.58	1.46	14

Table A1.1: Test of presumed linearity
of bivariate relations (Cont'd)

Dependent Variable	Independent Variables	VARIANCE EXPLAINED		F	# Categories
		Linear R^2	Non-linear eta^2		
Income (1962)	Conservatism	.00	.06	3.66	9
	Achievement Or.	.00	.02	1.23	9
	Neuroticism	.00	.01	0.60	9
	Introversion	.00	.02	0.88	9
	Family Relations	.01	.03	1.49	9
	Family Size	.01	.01	1.01	5
	IQ	.01	.02	0.94	8
	Education	.02	.05	0.91	14
	Occupation	.09	.13	4.74	7
Depression	Conservatism	.01	.02	0.39	9
	Achievement Or.	.00	.02	0.88	9
	Neuroticism	.01	.02	0.57	9
	Introversion	.04	.05	0.48	9
	Family Relations	.01	.02	0.58	9
	Family Size	.00	.00	0.27	5
	IQ	.02	.03	0.47	8
	Education	.05	.08	0.87	14
	Occupation	.05	.05	0.41	7
Log Income	Conservatism	.00	.05	3.25	9
	Achievement Or.	.00	.02	1.05	9
	Neuroticism	.00	.01	0.73	9
	Introversion	.00	.01	0.78	9
	Family Relations	.01	.03	1.57	9
	Family Size	.01	.02	0.98	5
	IQ	.01	.02	0.89	8
	Father's Occ.	.02	.02	0.57	7
	Education	.02	.05	1.02	14
	Occupation	.08	.12	4.18	7

Table A1.2: Comparison of coefficients for occupational attainment model estimated for OCG sample and General Social Surveys of 1974 and 1976

Equation: $O = b_1 O_F + b_2 ED + C$

Independent Variable	(coefficient)	Coefficient Estimates	
		OCG data	GSS data
Father's Occupation	(b_1)		
	STD	.12	.14
	UNSTD	.14	.16
	SE	(.01)	(.03)
Education	(b_2)		
	STD	.50	.50
	UNSTD	1.76	1.71
	SE	(.03)	(.10)
Constant	(c)	17.6	15.0
Variance Explained	R^2	.30	.30
Sample Size	N	20,700	1360

NOTES: OCG sample represents white males, aged 25-64 in 1962. Estimates are from Treiman & Terrell's (1975) reanalysis. GSS data are combined for 1974 and 1976 and represent males aged 18+.

Education is coded in years. Occupation scores have been standardized to metric of SIOPS scale. (Treiman, 1977).

Table Al.3: Estimates of net effect of
Father's Occupational status,
Education and IQ upon the annual
earnings of American men using
semi-log functional form

Equation: $\log_e (\text{income}) = a_1 0_F + a_2 Ed + a_3 IQ + C$

Independent Variable	(coeff)	All Men	Low IQ[a] Men	Average IQ[b] Men	IQ[c] Men
Father's	(a_1)				
Occupation	STD	-.051	.063	-.067	-.045
(SIOPS	UNSTD	-.004	.007	-.005	-.004
metric)	SE	.003	.012	.003	.007
Education	(a_2)				
	STD	.201	.199	.139	.378
	UNSTD	.049	.049	.038	.089
	SE	.010	.029	.013	.018
Thorndike-	(a_3)				
Lorge	STD	.172	.010	.174	.031
IQ	UNSTD	.010	.017	.016	.009
	SE	.002	.020	.004	.022
Constant	(c)	7.693	6.734	7.215	7.094
Variance explained	R^2	.103	.055	.065	.143
Sample Size		870	86	616	168

SOURCE: General Social Survey, 1974 and 1976

[a]Low IQ: bottom 15% of distribution
(approximately IQ < 85)

[b]Average IQ: middle 60% of distribution
(approximately 85 ≤ IQ ≤ 115)

[c]High IQ: top 15% of distribution
(approximately IQ > 115)

<u>Table A1.4</u>: Estimated net effects of father's occupational status and IQ upon men's educational attainment for populations with different IQs

<u>Equation</u>: $Ed = a_1 O_F + a_2 IQ + C$

Independent Variable	coeff	Low IQ[a] Men	Average IQ[b] Men	High IQ[c] Men
Father's Occupation	STD	.072	.151	.135
	UNSTD	.031	.049	.032
	SE	.036	.011	.018
IQ (Thorndike-Lorge)	STD	-.037	.343	.137
	UNSTD	-.026	.133	.114
	SE	.058	.012	.061
C		9.68	-3.42	-.0.19
R^2		.006	.155	.041
Sample Size:		145	805	185

SAMPLE: General Social Survey, 1974 + 1976

[a] $IQ < 85$

[b] $85 \leq IQ \leq 115$

[c] $IQ > 115$

Appendix 3.1: Measurement Reliability and Model Estimation.

Appendix 3.1: Measurement reliability and Model Estimation.

Parameter estimates for the models we have proposed require that some assumptions be made about the relationship between the "true value" of a given variable and the value observed in our data. That is to say, estimation requires us to posit a measurement model to deal with the fallibility of our observations, e.g., mis-reporting, errors of recall, errors of response, etc.

In the earliest work with models of status attainment (e.g., Blau & Duncan, 1967) and in some more recent publications (e.g., Sewell & Hauser, 1975), models have been estimated under the assumption that the observed values of a given variable were true values, i.e., measurement errors were ignored. Of course, these investigators were aware of the potential impact of random and non-random measurement errors. For random errors, the effect of measurement unreliability is to attenuate observed correlations between variables. Attenuation occurs in inverse proportion to the reliability of the measurement of each variable, that is,

$$r_{ij} = \frac{r'_{ij}}{\sqrt{r_{ii}r_{jj}}} \quad \underline{or} \quad r'_{ij} = (r_{ij})\sqrt{(r_{ii})\ (r_{jj})}$$

where r'_{ij} is the observed correlation, r_{ij} is the true correlation, and r_{ii} and r_{jj} are the reliability correlations for the measurement of each variable. To illustrate the nature of the attentuation which arises from random errors of measurement, the following table presents some exemplary cases.

| | Measurement Reliability | | Observed |
True Correlation	Variable i	Variable j	Correlation
+0.60	0.95	0.95	.57
	0.95	0.75	.50
	0.75	0.75	.45
	0.50	0.50	.30
	0.40	0.40	.24
	1.0	.20	.27
+0.40	0.95	0.95	.38
	0.95	0.75	.34
	0.75	0.75	.30
	0.50	0.50	.20
	0.40	0.40	.16
	1.0	0.20	.18

It can be seen from these examples that the effects of random measurement errors can substantially alter conclusions about both the actual and relative degree of association between variables. For example, well measured variables(r_{ii}=r_{jj}=0.95) whose _true_ correlation is only +0.40 will be _observed_ to have a higher empirical correlation than two variables whose actual true correlation is greater (r_{kl}=+0.60) but whose measurement is more unreliable (i.e., if r_{kk}=0.70 and r_{ll}=0.50; then, r_{kl}=0.35).

In the initial stages of our work (chapter two), we dealt entirely with socioeconomic variables; these variables are commonly subject to a lesser degree of random measurement error than attitude and personality variables. Thus, in chapter 2, we followed the convention adopted by Blau and Duncan (1967) and assumed the reliability of our measures to be perfect (i.e., r_{ii}= 1.0). The implication of this assumption is that, to the extent there are _random_ measurement errors in our data, the findings reported in chapter two understate the magnitude of the true relationships between variables; the degree of this understatement is greatest for variables that are most poorly measured.

In chapters three and five, our inclusion of personality variables required that a more realistic assumption be made about our measurement process. In this regard, we were fortunate that all of our personality variables were constructed as latent variables from a variety of indicators. The degree of agreement between the various indicators of each latent variable provides some measure of the overall consistency of our measurements. Measures of internal consistency, in turn, can provide a surrogate indicator of overall measurement reliability for these variables. Generally, we found that estimates of internal consistency (e.g., root mean square correlations between components and latent factors; Cronbach's alpha for Likert scales) hovered in the range +0.55 to +0.60. Since studies of the measurement reliability of common socioeconomic variables generally yield values in the range 0.80 to 0.95, failure to allow for imperfect measurement of our personality variables would differentially attentuate the observed correlation between personality variables and attainment.

To provide model estimates that were reasonable, but that insured a conservative test of our hypothesis concerning the impact of personality variables, we (1) assumed that all variables were perfectly measured and tested the hypothesis that personality variables made a significant contribution to the explanation of variance in our attainment variables (F ratios from this analysis were significant); and (2) we have subsequently assumed that the level of measurement unreliability in our personality data is not as great as suggested by internal consistency measures but rather lies midway between that of the best socioeconomic reasures ($r=0.90$) and the estimates derived from internal homogeneity measures.

Using the resultant reliability estimate of +0.75 for our personality measures, and reliability estimates derived from Siegel and Hodge (1968),

Bowles and Nelson(1974) and Jencks et al. (1972) for our socioeconomic variables, we have attempted to correct for the attenuation presumed to arise from random errors of measurement. In particular, following procedures described by Johnston(1963) and used for this purpose by Jencks et al.(1972) we have purged our basic correlation matrix of the presumed effects of random measurement error. The corrected matrix of intercorrelation coefficients derived by this procedure has served as the basis for the estimation of the models presented in chapters three and five. Since the reliability estimate we have used for our socioeconomic variables are derived from sources of extremely high quality (e.g., Census' Current Population Survey), and since the reliability estimates for our personality variables have been deliberately understated, we believe that our procedures provide a conservative correction for the random measurement errors present in our data.

Implications of Estimation Procedures.

As in all studies which do not obtain objective verification of self-report measures, it is always possible to argue that measurement errors are responsible for the pattern of results we have obtained. We have attempted to control for the implications of random errors of measurement in our analyses, but it should be realized that our results are not independent of the assumptions we have made concerning the nature of these errors. The assumption of randomness is particularly crucial. Although very recent work (Bielby et al., 1977) suggests that response errors in the measurements of common socioeconomic variables (e.g., education, occupation, income) are essentially random for nonblack respondents, no parallel evidence is available for measurements of our personality variables. Thus, it remains possible to interpret our findings in terms of nonrandom response errors. For example,

one might plausibly argue that our results reflect an association between respondents' personality and their willingness to misreport their occupational status and income.

Similarly, although the reliability estimates for our personality variables are buttressed by internal evidence, our assumptions concerning those estimates and the others used in our analysis are of consequence to our conclusions. While the basic assumption -- that errors in the measurement of socioeconomic variables are considerably smaller than those involved in the measurement of psychological variables -- appears warranted, it is important to realize that radically different assumptions would lead to different conclusions.

TABLE A3.1: Intercorrelations, means and standard deviations for social and psychological variables included in models of chapter three. Correlation coefficients are **not** corrected for attenuation assumed to arise from random errors of measurement.

SEC. MODERN

Variable	O_f	OP	E_p	FS	IQ	E	O_{24}	O_{20}	O_{33}	I	FR	AD_1	AD_2	AD_3	AD_4	ASP	Mean	S.D.	N
Father's Occupation	-	.05	.26	-.15	.10	.28	.27	.14	.17	.16	.19	.15	-.11	.00	-.10	.13	2.69	1.08	187
Ordinal Position	-.04	-	.04	-.52	.04	.18	.18	.11	-.01	-.01	.18	.12	-.05	.04	.16	.16	0.41	0.49	187
Parents' Education	.48	.04	-	-.11	.08	.24	.25	.12	.13	.10	.07	.23	.07	.01	-.01	-.01	0.14	0.35	187
Family Size	-.05	-.50	-.04	-	-.11	-.17	-.26	-.21	-.12	-.09	-.16	-.03	.03	-.01	-.11	-.11	3.06	1.50	187
IQ at age 11	-.04	.09	-.03	-.12	-	.36	.23	.21	.23	.10	.18	.03	-.07	.15	-.26	.14	97.61	12.15	187
Education	.16	.11	.15	-.17	.00	-	.53	.58	.66	.10	.10	.19	-.06	.17	-.26	.20	10.20	1.21	187
Occupation: 1962	.09	.11	.11	-.18	.00	.59	-	.78	.70	.20	.18	.15	-.04	.16	-.02	.16	3.29	1.20	115
Occupation: 1966	.18	.04	.18	-.15	-.02	.59	.71	-	.85	.12	.08	.15	.11	.16	.20	.11	3.60	1.38	187
Occupation: 1970	.12	.12	.17	-.24	-.05	.59	.71	.81	-	.04	.18	.13	.16	.24	-.09	-.09	4.04	1.51	187
Income: 1962	.06	.16	.01	-.07	-.08	.13	.34	.31	.26	-	.11	-.06	.04	-.06	-.01	-.08	806.13	177.64	78
Family Relations	-.04	.03	.06	-.16	.07	.13	.08	.04	.11	.06	-	.04	-.05	.09	-.06	-.06	4.67	1.78	187
Achievement Or.	.09	.07	.10	-.01	.02	.25	.23	.30	.25	.05	.04	-	.16	.09	-.20	.22	4.30	1.81	187
Neuroticism	-.02	.02	-.08	-.07	-.08	-.01	.03	.06	.07	-.06	-.10	-.05	-	.04	-.09	.02	4.90	1.90	187
Introversion	.11	.02	.08	-.07	.05	.27	.07	.06	.01	-.08	-.17	.14	-.01	-	-.32	-.05	4.83	1.83	187
Conservatism	-.03	-.07	-.04	-.11	-.15	-.18	-.14	-.14	-.18	-.07	-.02	-.28	-.01	-.17	-	-.18	5.38	1.51	187
Aspirations: 1962	.11	.11	-.01	-.07	.05	.22	.15	.18	.24	-.05	-.03	.26	.07	.10	-.12	-	4.15	1.34	187
GS: Mean	3.59	.67	.37	2.23	118.1	12.9	5.00	5.28	5.70	847.4	5.43	5.65	5.16	5.22	4.40	5.27			
Std. dev.	1.26	.47	.48	1.10	6.72	1.99	1.28	1.28	1.12	165.7	2.00	1.93	2.04	1.92	1.96	0.96			
Sample Size	263	263	263	263	263	263	263	209	168	263	263	263	263	263	263	263			

NOTES: Correlations for secondary modern school sample appear above the main diagonal of the table; those for the grammar school are below.

Appendix 3.2: Further documentation of Adolescent Personality variables
in LSE database.

Appendix 3.2: Adolescent summary factors in LSE database.

The analysis presented in chapter three builds upon work on the scaling of attitude and personality variables undertaken by H. T. Himmelweit, B. Swift, D. Phillips, et al., at the London School of Economics between 1951 and 1970. As described in the text the initial phase of their work resulted in the preparation of Likert scales for groups of items that were similar in content; subsequently a variety of exploratory analysis were conducted to derive higher-order factors which would account for common variation across the scales developed during the first phase of the work. Psychometrically, this procedure is akin to the extraction of second-order factors in personality research (cf, for example, Eysenck, 1969).

Since many of the individual items administered in 1951 are only recoverable in higher-order factors (due to the vagaries of data storage) we have included in this appendix a copy of the original document describing the factor analysis which produced the variables we employed in chapter three. The scores used in our analysis are the factor scores (standardized into a 9-point scale) derived from this analysis.   The three variables which played a major role in our analysis were AD1, AD6, and AD8; appearing in brackets next to these factors are the labels we have applied to these factors in our analysis.

Table 3.3 in the main text presents details of the items which consitute the individual Likert scales which were factor analysed.   Certain scales, e.g., Irritability, were presented with only a few exemplary items.   Documentation describing the full set of items included in these scales follows the description of the factor analysis.

20.10.70
f.1.1.

ADOLESCENT SUMMARY FACTORS   (FROM FA[73])

These eight summary factors were selected as the best representatives

of the adolescent social attitude and personality indices we have developed.

Program: FA 5

No. of factors: eight factor solutions chosen after inspection of range of

solutions.

% of variance accounted for by the 1st. eight principal components: 58%

Selected solution: oblique (Promax)

Beneath is given a description of the items which have high loadings

on the factors. The underlined words indicate the way an individual with a

high factor score has answered the item. Ignore, therefore, the signs of

the loadings.

AD.1 Academic orientation with preference for a demanding job [ACHIEVEMENT ORIENTATION]

    -.68 Has an academic (not a sport) orientation
    -.58 Prefers a personally testing job to an undemanding one
    -.58 Would choose a friend with academic (rather than sports) interests
    -.57 Prefers a non-manual type job
    -.34 Is not highly gregarious

AD 2 Adult (not peer) style

    -.68 Prefers a friend with adult (rather than peer) values
    -.61 Has little liking for fighting
    -.60 Finds little enjoyment in adventure and risk
    -.40 Intropunitive (rather than extrapunitive)
    -.35 Endorses authoritarian parental rule
    -.29 Prefers a non-manual type of job

AD 3 Weak (v. sterm) superego

    -.72 Low punishment score (would punish few things)
    -.68 Has low school need achievement
    -.67 Low conventional conscience (thinks few behaviours are bad)

-.56 Low participation in school
-.29 Does not endorse authoritarian parental rule
-.27 Prefers a non-manual-type job

AD 4 Non-Authoritarian outlook

-.88 Has not an authoritarian view of society
-.81 Not jaundiced view of life
-.51 Authoritarian parental rule not endorsed
-.41 Does not accept the status quo
-.33 High participation in school
-.25 Gregarious - high

AD 5 Self accepting, non punitive

-.83 Would not use physical punishment in dealing with son
-.72 Wants to be different in few ways
-.52 Aspires to a high level job

AD 6 Relaxed, not irritable, tense, neurotic   [low NEUROTICISM]

-.79 Low irritability (i.e. not easily annoyed)
-.69 Low worries score (i.e. not easily
-.36 Low conventional conscience (i.e. thinks few behaviors are bad)

AD 7 Accepting, non-striving

-.88 Wants to be ordinary (rather than great) person
-.43 Intropunitive
-.41 Accepts the status quo

AD 8 Not confident and gregarious [INTRAVERSION]

-.68 Low self evaluation (Does not think he is better than others
         in many things)
-.69 Not gregarious
-.58 Has little enjoyment in adventure and risk
-.34 Prefers manual-type job
-.28 Academic (rather than sport) orientation

TRANSCRIPTION (cont'd)

CORRELATIONS AMONG ADOLESCENT FACTORS

	I	II	III	IV	V	VI	VII	VIII
I	1.00	.14	-.24	.19	.19	-.07	-.12	.14
II	.14	1.00	-.26	.07	-.08	-.10	.11	.03
III	-.24	-.26	1.00	.11	.12	.02	-.20	.05
IV	.19	.07	.11	1.00	.41	-.01	-.24	.30
V	.19	-.08	.12	.41	1.00	.04	-.27	.06
VI	-.07	-.10	.02	-.01	.04	1.00	.20	-.01
VII	-.02	.11	-.20	-.24	-.27	.20	1.00	-.12
VIII	.14	.03	.05	.30	.06	-.01	-.12	1.00

END - TRANSCRIPTION

ADDITIONAL LIKERT SCALE ITEMS

Table 3.3 contains a sampling of items from the "Worries" and "Irritability" scales; the full set of the items together with those for the family relations variable follow.

1. Irritability.

Question: "Not every boy gets annoyed by the same things. Below is
             a list of things which annoy some boys. Put a tick in
             column 1 if it annoys you a lot, in colum 2 if it annoys you
             a little, and in column 3, if it does not annoy you at
             all."

      1....You cannot sleep
      2....Being told how much better other boys are at
          doing things
      3....A blaring wireless
      4....Being treated by your parents like a 'baby'
      5....Someone does not listen to what you are saying
      6....You are interrupted just when you are doing something
          interesting.
      7....Someone pushes in front of you in a cinema or bus queue
      8....Someone comes and tells you how to do a job when you
          know quite well how to do it
      9....A dripping tap
     10....When your parents don't believe what you tell them
     11....Doing badly on an examination
     12....Not doing well at sport
     13....When you forget something you had promised to do
     14....The squeaking of chalk on a blackboard
     15....You cannot remember some of the things your mother sent
         you to buy
     16....It is raining and your mother tells you you cannot go out
     17....You are supposed to meet someone at a certain time, and
         you are kept waiting
     18....People quarelling
     19....A dog barking all the time when you are trying to go to
         sleep
     20....When some boys won't let you play with them
     21....The teacher asks you a question and you have forgotten
         the answer
     22....When boys call you names
     23....When boys talk behing your back
     24....Having to look after your brothers and sisters
     25....Boys say something rude about someone in the family
     26....Your brother or sister held up to you as a good example

2. Worries.

Question: "Below is a list of problems which worry some boys. Read each one carefully and tick the right column. (1 = does not worry me; 2 = worries me a little; 3 = worries me a lot)."

-Too much homework
-Not getting along well with the boys at school
-Wanting to live in a nicer house
-So often feel restless in classes
-Laziness
-Too few nice clothes
-My manners
-Being let down by friends
-Girls making fun of me
-Mother does not treat me right
-Lacking self-confidence
-Not having a suitable place to study at home
-Some teachers not being friendly
-Hurting people's feelings
-Not getting along with a teacher
-Studies being too hard
-Parents making me spend too much time on homework
-Feeling anxious
-My brothers and sisters seem to do things better than
 I can
-Losing my temper
-Parents expecting too much of me
-Worrying about schoolwork
-Not mixing well with girls
-Being treated like a child at home
-Often feeling shy
-Parents liking my brothers and sisters better than me
-Not enough money for pleasures
-Too many silly rules and regulations
-Parents not understanding me
-Being called names
-Feeling that some boys look down on me
-Parents not seeming to care enough for me
-Being called snobbish at home
-Unable to express myself well
-Too often, when I want to do something, it is forbidden
-Tiring very easily
-Father does not treat me right
-Not enough time for play
-Carelessness
-Grown-ups not understanding boys of my age
-Having less money than friends have
-Feeling that others look down on me
-Afraid I am not doing well
-Unsure of what to do in company
-Not knowing how to show parents how much I care for
 them
-Being called unfriendly
-Not taking things seriously enough
-Grown-ups nagging too much
-Unable to concentrate

2. Worries (cont'd).

                    -Feeling inferior
                    -Being called stuck up or stand offish
                    -Parents wanting me to be 4 different type of boy
                    -Having to take second place to other boys
                    -Marks being unfair; they do not really show what you
                     can do
                    -Not being popular
                    -Thinking too much about girls
                    -Some boys letting down the tone of the school
                    -No place of my own at home, where I can be private
                    -Feeling that some boys would not like to come to my
                     house
                    -Not allowed to go out often enough
                    -Wanting to have a girl friend
                    -Feeling an outsider
                    -Not being able to keep up with school work
                    -Feeling jealous
                    -Having to recite before the class

3. Overall Family Relations Scale.

The Likert scale is used as an exogenous variable in the models of chapters three and five. The scale items with their weightings follow. Items which were phrased as reversals are indicated by an "R."

Item	Weight	Reversal
Feels happy and contented when at home with the family	2	
Mother has enough time for him	2	
Someone at home picks on him	1	R
One of his parents seems annoyed with him without cause	1	R
Parents seem to wish that he was a different type of child	2	R
Parents seem to change from day to day in the way they treat him	2	R
Father has enough time for him	2	
When his parents tell him they will do something, they do it	1	
He talks to parents about problems and worries	1	
His parents try to understand his problems and worries	2	
He talks with his parents about what he has done during the day	1	
When he is in trouble at school, he tells his parents about it	1	
He has a "square deal" at home	2	
He is allowed enough time for play	2	
His parents expect him to explain "every move" to them	1	R
His parents tell him how much better other children are	1	R
Parents seem confident that he will behave the way they want him to	1	
He feels that he behaves the way his parents want him to	1	

3. Overall Family Relations scale (cont'd)

Item	Weight	Reversal
He feels that his home is as nice as those of his friends	2	
Parents seem old-fashioned in their ideas about how young people should behave	1	R
He dislikes doing what his parents tell him to do	1	R
He is allowed to invite his friends into his home	1	
His parents approve of his friends	1	
His parents are cheerful and happy when together	1	
His parents agree about the things he is to be punished for	1	
One or both of his parents help him with his hobby	1	
Agrees most parents don't try to understand their children	1	R
Agrees a boy should talk over his troubles with his father	1	
Agrees that when a boy feels unhappy his parents can help him	1	
Agrees that a boy should talk over his troubles with his mother	1	
Agrees that most boys never really get to know their fathers well	1	R
Agrees at home there is always plenty of fun and laughter	1	
Agrees home is often a dull place	1	R
Agrees when he gets home he always feels better no matter what happened to him	1	
Agrees home is a place where you get nagged at	1	R
Agrees every boy has at times felt like running away from home	1	R

Appendix 3.4: Non-additivity is Status Attainment Models.

Appendix 3.4: Non-additivity in status attainment models.

By their nature, models of the status attainment process which follow
the methodology of Blau and Duncan represent attainment as a linear, additive
process. That is, the predicted attainment of an individual is the sum of
the weighted contributions of a number of exogenous and endogenous variables.
Framed, as it is, within the rubric of the general linear model, the procedures
used to estimate the parameters of the Blau and Duncan equations, depend vit-
ally upon the adequacy of the assumption of additivity.

The additivity assumption posits that at all levels of other independent
variables, the expected effect of a   variable upon the dependent vari-
able (attainment) is constant. This assumption is not met when the influence of
one independent variable is moderated by the level of a second variable. This
would occur, for example, if the effect of IQ upon attainment were zero for
children born into lower class homes, but non-zero otherwise. One might
imagine such an interaction holding where a caste system governed attainment
in one segment of the status continuum, while meritocratic norms functioned
in other sectors. Numerous other possible interaction could be suggested.

Non-additivities appear as interaction terms in the analysis of variance
methods commonly used with experimental designs. Interaction terms represent
the extent to which the experimental condition $A_i B_j$ has a distribution of Y
values which deviate from that predicted by the weighted average of Y values
for A_i (averaged across all values of B) and B_j (averaged across all values
of A). In the analysis of fixed experimental designs, the effects of the
interaction of A x B has an explicit, predetermined form, and the presence
of significant interactions is commonly tested for. However, in models of
the type we use, the nature of the relevant interactions is generally not

unspecified. Indeed, the central importance of the assumption of additivity in the estimation of our model parameters derives from the fact that the number of <u>possible</u> interaction terms in our models is the product of the number of categories in each independent variable.

Let us take a relatively simple case; consider the equation:

$$ED = a_1 O_f + a_2 FS + a_3 FR + c$$

This equation specifies educational attainment (E) to be an additive function of father's occupation (O_f), Family size (FS) and Family relations in childhood (FR). Using our methods, we describe this relationship using only four free parameters: a_1, a_2, and a_3, and c. However, if we are unwilling to constrain the functional relationship between these variables to be linear and additive, the full description of this relationship requires a set of terms equal in number to the product of the number of categories of each variable:[1]

$$C_{O_f} \quad x \quad C_{FS} \times C_{FR}$$

Since the variables O_f, FS, and FR have 7, 5 and 9 categories, respectively, this yields 315 cells in a matrix describing the relationship between these variables and E. Clearly, this indiscriminate strategy taxes our ability to reliably estimate the relevant effects.

Interactions, of course, can be handled within the format of the Blau-Duncan model <u>if</u> we can specify their nature beforehand (assuming they are not ubiquitous). So, for example, in our education equation we could easily add terms to our equations to indicate that the attainments of certain groups is "peculiar" (i.e., inadequately accounted for by the linear, additive model) , e.g., for only-

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1. In fact, we would estimate a model having one less effect than the product suggests; the reasoning here is that used with the incorporation of dummy variables in regression format (cf. Cohen, 1968).

children (FS=1) from upper class homes (O_f=7) where family relations were abysmal (FR=9). We would incorporate this interaction into our model by adding a term representing this phenomen, i.e.,

$$E = a_1 O_f + a_2 FS = a_2 FR + a_4 Z + c$$

where Z was a variable coded "1" if: O_f=7; FS=1, and FR=9; Z would be coded zero otherwise. In estimating this equation, the coefficient a_4 would provide an estimate of the deviation of this particular case from the value predicted by our additive model. Similar techniques can be applied when we have reason to believe that there are multiplicative effects within models. The problem, of course, is to know beforehand what effects to expect.

Disputes about non-additive relationships in models do occur,[2] however, they are hardly common. Generally, the assumption of additivity is made as a painful expedient. In our own research, we are no better off than other investigators. We are not in a position to draw upon extensive bodies of research to expand our models by incorporating the non-additivities suggested by other studies; however, we are equally uneasy with the blithe assumption that the world is neatly additive.

To provide some insight into the non-additivites which afflict our model estimates, we have adopted a somewhat novel procedure. We first estimated our equations for each sample, and then computed, within the two samples, the residuals between the values predicted for each case by our model and the respondents' actual educational, occupational and income attainment. We then subjected these residuals to a heuristic analysis designed to assist in the discovery of non-linear and non-additive relationships (cf. Sonquist & Morgan, 1973).

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2. See, for example, the dispute between Hause (1972) and Taubman and Wales (1974) over non-additive effects of IQ and Education upon earnings.

This analysis performs a stepwise dichotomization of a sample into sub-groups to minimize the within-group sum of squared deviations for the dependent variable. At each stage in the analysis, one group (initially the total sample) is chosen, and it is split into two subgroups; the split is made upon any one of the independent variables treating each level of the independent variable as a non-ordered category (i.e., a nominal-level variable). By cycling through this procedure a number of times,[3] an interaction profile is built to partition the variance in the dependent variable into a specified portion explained by the profile vs the unexplained (within subgroup) variance.

The advantage of this procedure for our purposes was twofold: (1) it allowed us to experiment with non-linear relationships, and (2) the resultant profiles were non-additive, i.e., they did not assume the effects of one variable operated over all subgroups in the sample. Most importantly, the "automatic interaction detector [AID]" of Morgan and Sonquist(1973) allows this to be done with realistic sample sizes.

In our own case, by applying this analysis to the residuals from our models, we have effectively allowed the more parsimonious linear, additive models to explain all of the variance they could. We then used the AID procedure to assess the extent to which non-additivities and non-linearities caused deviations from our model's predictions.

We have run this analysis of residuals for the model equations represent-ing educational, occupational and income attainment. In doing these analyses, we set the following limits on the AID program's search:

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3. Until there is no group with a sufficient sample size which can be split so as to reduce the within group sums of squared deviations for Y by a specified percent.

(1) No subgroup could be created with less than 20 cases;

(2) No subgroup could be further split if the within subgroup variance was less than one percent of the total variance in the dependent variable;

(3) No split could be performed if the within subgroup sum of squared deviations in the dependent variable was not reduced by one percent (4).

To facilitate our analysis, we have collapsed the range of our personality variables from 9 to 5 categories by combining the categories representing one or more standard deviations above or below the mean; IQ was also recoded into six categories.[5]

We performed our analysis upon each set of residuals, using all of the independent variables specified in the model equations.[6] The results derived from our analysis are shown in figures A3.4.1, A3.4.2, and A3.4.3. For two of our residual variables, we found no initial split which would explain at least one-percent of the variance in the residual terms. Figure A.3.4.1 shows the result for education which revealed that the relationship most nearly approaching the desired level was the split between boys reporting slightly above-average family relations (+0.5 to +99 s.d.) in childhood vs

---

4. We have applied these standards to the analysis of residual deviations around our model estimates; a reduction of one percent in the unexplained residual variance in a dependent variable (e.g., occupational attainment) corresponds to a considerably smaller reduction in the unexplained variance in the dependent variable, specifically:

$$\Delta R_m^2 = R_r^2 \, [1-R_m^2] \; ; \; \text{for Occ:} \quad .01(1.0 - .50) = .005$$

where R_r^2 is the variance accounted for in analysis of residuals, and the R_m^2 terms reflect the variance in the dependent variable explained with and without including the partioning discoverd in the residual analysis.

5. Specifically, Introversion, Neuroticism, Conservatism, Achievement, Orientation, and Family Relations were collapsed so that the values 1, 2, 3 and 7, 8, 9 each represented 1 category. IQ was collapsed to form six categories with an approximately equal number of respondents in each category (categories 75-85; 86-99; 100-104; 105-115; 116-120; 121+).

6. Type of School (grammar vs. secondary modern) was also included in the set of potential independent variables.

everyone else. These boys obtained an average of .30 years more schooling
than was predicted by our model equation. Analysis of the income residuals
produced a somewhat similar result; it was impossible to obtain any initial
split which accounted for at least 1% of the total variance in the residential
term. The split most nearly satisfying this criteria indicated that boys who
scored very high or very low (outside range:$-1sd < x < 1sd$) on neuroticism
earned an average of 17.6 pounds a year more than would be predicted by our
model.

While the analysis of the education and income residuals did not provide
convincing evidence of pervasive non-linear or non-additive relationships,
the results for the occupation equation were more substantial. In figure
A3.4.2, the history of our analysis is charted. It will be seen from this fig-
ure that it was possible to perform six separate splits of subgroups in our
sample; each of these splits satisfied our minimum criteria. This analysis
yielded seven final subgroups; Table A3.4.5 lists these subgroups together
with the mean value of the residual term for each subgroup.

It will be seen from this compilation that most of the splits involved
the specification of non-linearities in the operation of our independent
variables -- particularly the personality variables. The characteristic form
of these non-linearaities linked together the extreme scorers at both ends of
the continuum (e.g., the people very high and very low on the Introversion
scale).. This finding suggests that attention should be given to the use of
special variables identifying "extreme scorers" in future research in this area.

Overall, however, the analysis of our occupation residuals indicates
that the incorporation of non-linearities and non-additivities increases our
ability to account for variations in the occupational attainment of our sample

by   3.5 percent. While this finding is notable, it is not so large as to undermine our willingness to accept the results of the analyses presented in chapter three.

Figure A3.4.1: Analysis by AID of education residuals.

Total sum of squared deviations about residual mean= $0.1086(10)^4$

Residual Mean = $0.016(10)^0$

Residual standard deviation = $0.1554(10)^1$

Sample Size = 450

NOTES. Entries at branching points in chart indicate: (B) sum of squared deviations in residual term attributable to subgroup differences; (B/T) ratio of variance explained by split into subgroups to total variance of parent subgroup (in percent
       Since the criterion for splitting was: $[(B/T) > 1\%]$, the split charted below did not satisfy the criterion, and analysis was terminated.

TOTAL SAMPLE
N=450
$\bar{X}$=0.02

B= 10.48
B/T= 0.9%

Family Relations(6)
$\bar{X}$= +0.30, N=99

Family Relations(1-5,7-9)
$\bar{X}$ = -0.06, N=351
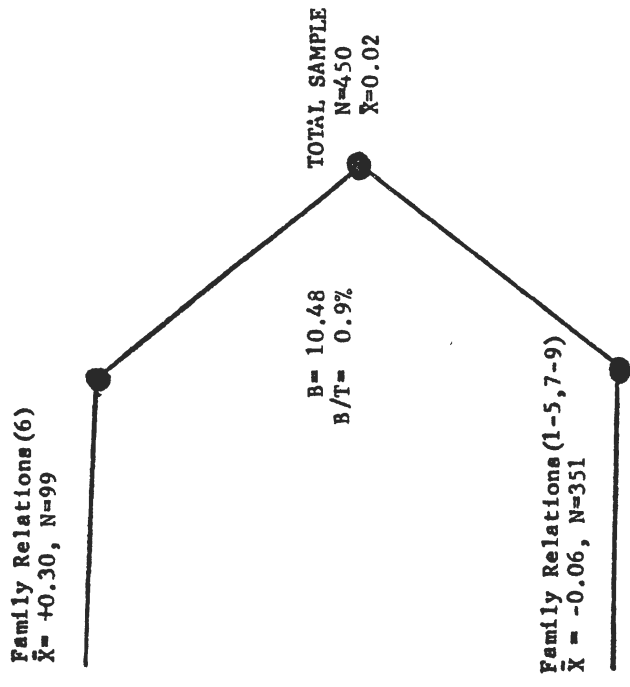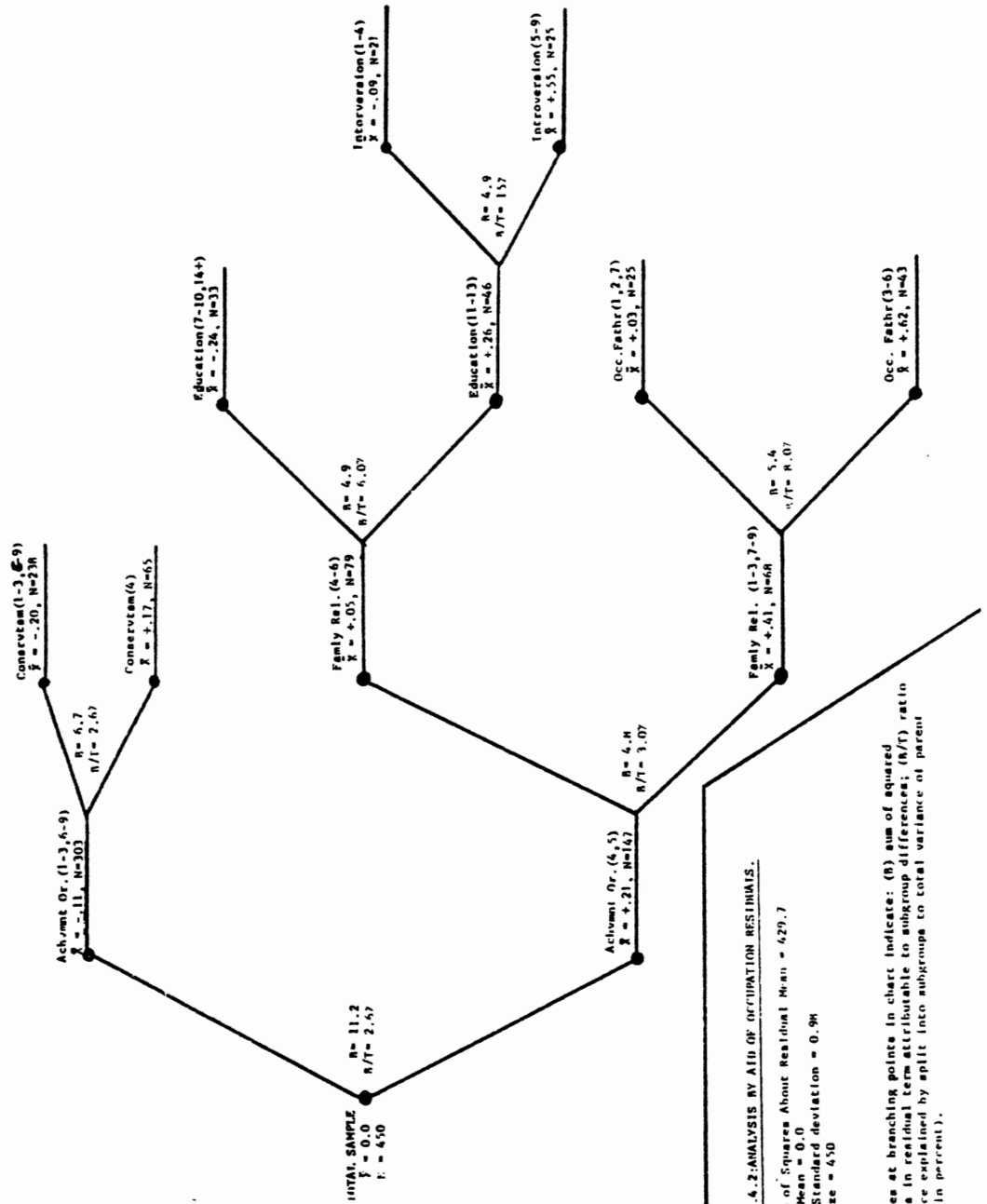
FIGURE A3.4.2: ANALYSIS BY AID OF OCCUPATION RESIDUALS.

Total Sum of Squares About Residual Mean = 429.7
Residual Mean = 0.0
Residual Standard deviation = 0.94
Sample Size = 450

NOTES:

Entries at branching points in chart indicate: (B) sum of squared deviations in residual term attributable to subgroup differences; (R/T) ratio of variance explained by split into subgroups to total variance of parent subgroup(in percent).

TOTAL SAMPLE
$\bar{X}$ = 0.0
N = 450
R = 11.2, R/T = 2.67

Achvmnt Or. (1-3,6-9), $\bar{X}$ = -.11, N=303
Achvmnt Or. (4,5), $\bar{X}$ = +.21, N=147

Conservtsm(1-3,6-9), $\bar{X}$ = -.20, N=238
Conservtsm(4), $\bar{X}$ = +.17, N=65
R = 6.7, R/T = 2.67

Family Rel. (4-6), $\bar{X}$ = +.05, N=79
Family Rel. (1-3,7-9), $\bar{X}$ = +.41, N=68
R = 4.8, R/T = 3.07

Education(7-10,14+), $\bar{X}$ = -.24, N=33
Education(11-13), $\bar{X}$ = +.26, N=46
R = 4.9, R/T = 6.07

Occ.Fathr(1,2,7), $\bar{X}$ = +.03, N=25
Occ. Fathr(3-6), $\bar{X}$ = +.62, N=43
R = 5.4, R/T = 8.07

Introversion(1-4), $\bar{X}$ = -.09, N=21
Introversion(5-9), $\bar{X}$ = +.55, N=25
R = 4.9, R/T = 1.57

Figure A3.4.3: Analysis by AID of income residuals.

Total Sum of Squared deviations about residual mean= $0.121(10)^8$

Residual mean= $0.176 (10)^0$

Residual standard deviation = $0.164 (10)^3$

Sample size = 450

NOTES: Entries at branching point in chart indicate: (B) sum of squared devitions in residual term attributable to subgroup differences; (B/T) ratio of variance explained by split to total variance of parent subgroup (in percent).
        Since the criterion for 'splitting' was [(B/T)>1%], the split charted below did not satisfy the criterion, and analysis was terminated.
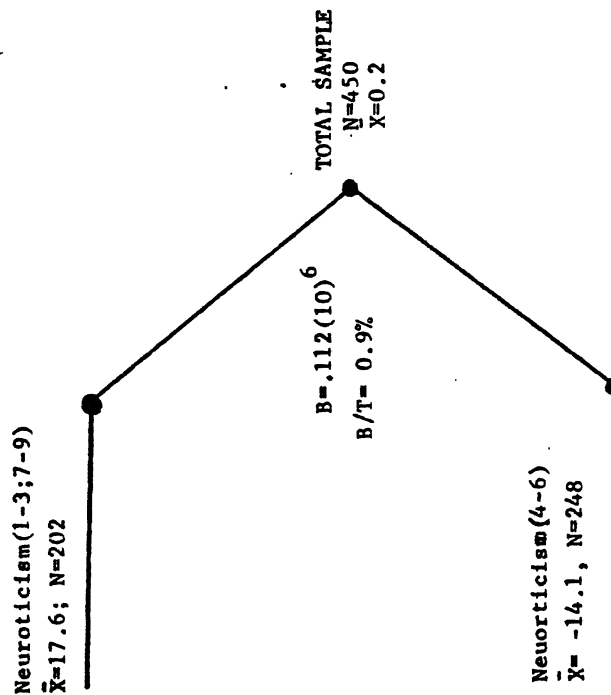
Table A3.4.5:   Subgroups produced by AID analysis of occupational
                 attainment residuals.

Group[1]		Mean deviation from occupational level predicted by Model (residual)	N
1.	Intermediate Achievement Orientation (4, 5) with Very Good or Bad Family Relations (1-3, 7-9) and Middle Class Background (O_F=3-6)	+0.62	43
2.	Intermediate Achievement Orientation (4, 5) with Intermediate Family Relations (4-6) and Intermediate Education (11-13 years) and Introverted (5-9)	+0.55	25
3.	High or low Achievement Orientation (1-3, 6-9) with Intermediate Conservatism (4)	+0.17	65
4.	Intermediate Achievement Orientation with very good or bad Family Relations (1-3, 7-9) and working or upper class social origins (O_F=1-2, 7)	+0.03	25
5.	Intermediate Achievement Orientation (4, 5) with Intermediate Family Relations (4-6) and Intermediate Education (11-13 years) and Extraverted (Introversion = 1-4)	-0.09	21
6.	High or low Achievement Orientation (1-3, 6-9) and high or low Conservatism (1-3, 5-9)	-0.20	238
7.	Intermediate Achievement Orientation (4, 5) with Intermediate Family Relations (4-6) and high or low Education (< 10 or >14 years)	-0.24	33

Note   Personality variables are standardized on a 9-point scale with a mean of
        5 and a standard deviation of 2. Social origins is measured by level of
        father's occupation (Hall-Jones scale; range: 1-7).

1.   Numbers in parentheses indicate values of independent variable.

Appendix 4.1: Occupational Attainment and Career Stability.

Appendix 4.1: Occupational Attainment and Career Stability.

In chapter four, an alternate explanation for the correlation between personality variables and attainment is suggested. This explanation posits a two-stage process, i.e.,

1. That occupational attainment is a function of a worker's stability in an occupation, e.g., staying in a job (or type of occupation) long enough to obtain promotions; and

2. That stability in an occupation (or job) is a function of personality variables.

Since the LSE database contains some (albeit less-than-ideal) measures of career stability, some empirical investigation is possible. We have briefly attempted to assess the adequacy of this explanation.

The data available to us contain two measures of career stability (both taken at age 24). The first, number of jobs, is simply a count of the total number of jobs held by the respondent; this measure includes both changes in occupation and changes in employer. The second measure, number of occupations, is a count of the number of different occupations held by the respondent; this measure appears to have been broadly conceived in that it did not treat normal career progressions (e.g., electrician's apprentice ➡ electrician) as reflecting an occupational change. Unfortunately, it is not possible to precisely characterize the breadth of the latter coding.

Allowing for the inadequacies of documentation in the coding of these variables, we have undertaken some cautious and preliminary analyses of these data. Given our interest in the 2-step hypothesis posited as an explanation of the correlation between personality and occupational attainment,

we first computed correlations[1] representing the relevant linkages.

These correlations revealed that there were very modest correlations between our career stability measures and the adolescent personality variables included in our models (median r = .075). There were, however, substantial correlations between career stability (thru age 24) and occupational attainment at ages 24, 28 and 32

To assess the impact of this process upon attainment, we have computed the correlations between each personality variable and occupational attainment controlling for the effects of career stability (see Table A4.1.2).[2] It will be seen from this analysis that controlling for the effects of career stability
stability has a very marginal impact upon the correlations observed between personality and attainment variables.

While our conclusion with regard to the two-step hypothesis is generally negative, we should note that there were several social background variables which were closely linked with career stability. In particular, there was a rather strong tendency for children from disadvantaged social backgrounds, and particularly those from large families, who reported a poor home environment, and who were not first-born children, to have held more jobs and followed a greater number of different occupations. Although it is not the point of this analysis, the evidence suggests that the impact of disadvantaged social origins may, in part, be transmitted by disruptions in the normal career patterns.

---

1. Correlations are corrected for attentuation in the manner described in the test. We have assumed that the measurement reliability of the number of jobs and number of occupations variables was of equal magnitude to that for the reporting of occupational status (i.e., +0.89).

2. We chose occupational stability for this analysis since it was highly correlated with job stability and showed a higher correlation to occupational attainment.

Table 4.1.1a: Zero-order correlation of career stability
with personality and occupational attainment.

		Correlation with	
		Number of Jobs	Number of Occupations
Variable	Sample		
Introversion	GS	-.01	-.17
	SM	.05	.05
Neuroticism	GS	.09	-.01
	SM	-.16	-.11
Achievement Orientation	GS	.06	-.09
	SM	-.11	-.10
Conservatism	GS	.06	.16
	SM	-.02	.01
Occupation, age 24	GS	-.22	-.39
	SM	-.10	-.20
Occupation, age 32	GS	-.25	-.38
	SM	-.29	-.26

Table 4.1.1b: Partial correlation between personality and occupational
attainment, holding constant stability of occupational
career

Personality Variable	Correlation	Sample	
		GS	SM
Introversion	Simple	.08	.19
	Partial	.02	.21
Neurotism	Simple	.04	.14
	Partial	.04	.12
Achievement Orientation	Simple	.28	.16
	Partial	.27	.14
Conservatism	Simple	-.17	-.03
	Partial	-.12	-.03

Table 4.1.2: Correlations between social background characteristics and career stability.

Background Variable	Sample	Correlation with	
		Number of Jobs	Number of Occupations
Father's occupation	GS	-.18	-.16
	SM	-.07	-.02
Parents' education	GS	.00	-.02
	SM	-.08	-.02
Ordinal position	GS	.01	-.03
	SM	-.21	-.12
Family size	GS	.07	.16
	SM	.29	.25
IQ	GS	-.01	.05
	SM	-.11	-.16
Family relations	GS	-.10	-.10
	SM	-.21	-.24

Appendix 4.2

Letters of Solicitation for the

Experimental Study

Columbia University in the City of New York | *New York, N. Y. 10027*

DEPARTMENT OF PSYCHOLOGY   **Schermerhorn Hall**

Personnel Survey
Laboratory of Social Psychology
February 16, 1976

Dear ASPA Member,

We are conducting a study of personnel decision-making in America
and Great Britain. In the U.S.A., the research committee of the American
Society of Personnel Adminstrators is cooperating in our work, and we are
requesting your assistance and that of your colleagues in ASPA.

The study for which we request your help is unique in the personnel
field. It builds directly upon a recently completed longitudinal study
of the careers of a large sample of youth who were extensively interviewed
during adolesence, and re-interviewed during the early and intermediate
stages of their careers (covering ages 13 to 37). The insights generated
by this intensive field research have provided an unusually good basis
from which to study the interaction of personnel policy and the experience
of the labor force. Knowledge in this area is of particular value since
it can help inform decision-making by personnel admistrators and improve
our use of human resources by fitting the right worker to the right job.

We need your help in this important joint venture. Specifically,
we ask that you please read the specially constructed biographical and
interview summary we have enclosed, and then answer a few questions concern-
ing the type of work which would best suit the person described in this
summary. After you have finished with the questions, you should return
it to us in the envelope provided.

In return for your cooperation, we will make available a full
summary of our results in the ASPA journal, The Personnel Admistrator.
We earnestly hope that you will find the time to participate in this
attempt to extend the profession's knowledge of its role and functioning
in society.

Yours sincerely,

Charles F. Turner   Professor Richard Christie

in collaboration with:

Dr. G. Semin
School of Social Sciences
University of Sussex, U.K.

Institute of Personnel Management

Central House, Upper Woburn Place, London WC1H OHX
Telephone 01-387 2844.

30 March 1976

Dear Member

The Institute would very much welcome your participation in a cross-national study of personnel decision-making being undertaken with Charles Turner of Columbia University (U S A) and Gun Semin of Sussex University. In Britian the study is being carried out under the aegis of IPM, while a similar investigation is being conducted in the U S A through the co-operation of the American Society for Personnel Administration. The whole project is funded by the National Science Foundation, U S A.

The research, which we are attempting to carry out here, is believed to be unique in the personnel field. It builds on a recent project which has studied the same people over a long period of time (covering ages 13 to 37). The insights generated by this intensive field research have provided an unusually good basis from which to study the interaction of personnel policy and the experience of the labour force. Knowledge in this area is of particular value since it can help inform decision-making by personnel managers and improve our use of human resources by fitting the right worker to the right job.

We need help in this important joint venture. Specifically, we ask you to read the specially constructed biographical and interview summary we have enclosed, and then answer a few questions concerning the type of work which would best suit the person described in this summary.

After you have finished with the questions, you should return it to us in the envelope provided. All replies will be strictly anonymous.

A summary of the results will be published in the IPM Digest in due course. We sincerely hope that you will find the time to participate in this attempt to extend the profession's knowledge of its role and functioning in society.

Due to increased postal cost, we will not be able to send reminders. So please return the completed questionnaire by 14 April 1976.

Thanking you for your assistance.

Yours faithfully

E Tonkinson
Director

Encl: A Company Limited by Guarantee Registered in England No 198002 President T G P Rogers Director Ernest Tonkinson

<u>Appendix 4.3:</u> Description of Procedures used to generate Experimental Resumes.

Appendix 4.3   Generation of Experimental Resumes.

Chapter four contains a verbal description of the procedures used to generate resumes for our experiment. Given the extraordinarily large number of randomizations required in this experiement, as well as the complexity of resume construction and printing, it was inevitable that this process would be automated. Indeed, it would have been beyond the resources of a rather large team of investigators to produce by hand the resumes used in this experiment.

When a computerized procedure is adopted for such a purpose the final determination of the experimental design lies not in a set of verbal descriptions transmitted to assistants, but in a computer program and the data it uses to generate the configuration of experimental variables. For this reason, we have included as documentation of our experiment the text of the computer program used to generate our resumes.

Overview.

The computer program used to generate our resumes was coded in FORTRAN IV; it consists of a main program and eleven subprograms. In addition to these elements, the program also used two standard subroutines (GAUSS and RANDU) from the IBM Scientific Subroutine Package. The latter routines produce pseudo-random numbers with formal and rectangular distributions.

Briefly, each section of our program was designed to accomplish a specific set of tasks. Typically, these tasks involved the generation of a specific section of the resume. Subtasks involved in the generation of a section of the resume might include (1) selection of a subset of items from a large scale, (2) simulation of a pattern of responses for scales and sub-scales, (3) production of special output containing a description of elements and response patterns selected for a given resume, (4) formatting of material

for printing, (5) generation of summary statistics, e.g., correlations, means and standard deviations of independent variables, to insure integrity of design.

Short descriptions of each section of the program follow; appended is a listing of the complete computer program together with the input information used to initialize all data arrays.

Program Elements.

MAIN. The main program accepts as input the text of the Conservatism scale, and the scale construction and item distribution parameters. This routine generates the full text (and associated descriptor cards) for each case up to the maximum number requested. It subsequently calls ANALY, FRAND, INTRO, MACH, ADVNT, SOCBL, NEUR, RESUME, OUTPUT. Program execution is ultimately terminated in this routine.

FRAND. This subroutine inputs the lists of male and female first names and family names and initialises an internal array contain all possible combinations of first and last names with associated prefixes (Mr./Ms.).

ANALY. This routine is called by all routines that generate resume sections. It produces statistics on the items used and their distributional characteristics, as well as information on the internal homogeneity (Cronbach Alpha) of scales used in descriptions.

SQUISH. This subroutine formats output for printing by performing segmentation of print lines (at word boundries) and the elimination of redundant blanks.

INTRO. This subroutine begins construction of the portion of the resume containing the Introversion items. As with other Factor scales, the method of construction requires the selection of a global Introversion score for a resume, then imperfectly correlated subscale scores, and, finally, the

selection of individual items and appropriately correlated response patterns. This subroutine selects the global value and constructs the self-evaluation portion of the resume.

MACH. This subroutine produces the portion of the resume containing the Machiavellianism items.

ADVNT. This subroutine constructs the portion of the resume containing the Achievement Orientation items.

SOCBL. This subroutine uses the global value produced by the INTRO subroutine to Construct the portion of the resume containing the sociability (Gregariousness) subscale from the Introversion factor.

NEUR. This subroutine constructs the portion of the resume containing items from both subscales (Worries and Irritability) of the Neuroticism factor.

RESUME. The RESUME subroutine constructs the portion of the resume containing all background information (Education, Major, IQ, social class of origin, father's occupation).

SQ2. The SQ2 subroutine is a formating routine designed to prepare print lines for output by eliminating blanks and arranging line segmentation. It is similar in function to SQUISH, but its formatting conventions differ.

OUTPUT. This subroutine assembles the output produced by each subroutine to produce a single resume.

Execution Procedure.

The resume generation program executes the full calling cycle of MAIN only once. Intermediate datasets are produced by each of the called subroutines which generate resume sections; these datasets contain 1000[1]

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1. We use 1000 as an example; the total number produced is fixed by an input variable.

individual segments of a resume. Since each subprogram generates all 1000 segments at one time, the program makes only one pass through the calling sequence of MAIN to generate the full set of resumes. The use of this procedure requires ample scratch storage space in 9 separate but simultaneous accessible datasets.

```
        COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                         SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

ISN 0002        REAL*4  LANS,L1(27),L3
ISN 0003        COMMON/A/ CONS(5,127),LANS(5,147)
ISN 0004        COMMON /B/ OUT(210),L1(170),L2(170),L3(70),X,V,SEX(2,24),ISEX,
               7 NAME(10,20)
ISN 0005        DIMENSION A(PY(9)
ISN 0006        DATA ALBU/0.7,0.3,0.6,0.40.5,0.6,0.7,0.8,0.9 /
ISN 0007        DATA BLANK/' '/,IKNT/0/,NA/0/,BL/9/
ISN 0008        ISN=9999O
ISN 0009        READ(5,500) ISEX,ICASES
ISN 0010  500   FORMAT(5X,I4)
ISN 0011        READ(1,1010) (SEX(1,J),J=1, 24)
ISN 0012        READ(1,1010) (SEX(2,J),J=1, 24)
ISN 0013  1010  FORMAT(24A1)
        C... READ IN ANSWERS FOR ITEMS
ISN 0014        DO 1111 J=1,5
ISN 0015        READ(1,800) (LANS(J,I),I=1,47)
ISN 0016  666   WRITE(6,565) (LANS (J),I),I=1,47)
ISN 0017  800   FORMAT(47X,47A1)
ISN 0018  1111  CONTINUE
ISN 0019
        C..... DATA STRUCTURE FOR SCALE ALPHA FOR SCALE IS
        C.....CARD 1: CRONBACH ALPHA FOR ITEM/QUESTION
        C.....CARDS2-6 : ITEMS, 133 BYTES PER ITEM/QUESTION
        C... R... ALL CARDS HAVE 133 BYTES
        C... ARRAY: 5 ITEMS IN SCALE EACH ITEM HAS 34 WORDS OF STORE
        C     WRD 1: COUNT OF BYTES OF TEXT
        C     WRD 2: MEAN
        C     WORD 3: STD-DEVIATION
        C     WORDS 4-133 TEXT 1BYTE PER WORD
        C
        C...READ IN SCALE ITEMS & ALPHA
ISN 0020        I=1
ISN 0021        READ(1,801) ALPHA
ISN 0022        WRITE(6,667)ALPHA
ISN 0023  667   FORMAT('ALPHA=',F5.3)
ISN 0024  801   FORMAT(F4.3)
ISN 0025        IF(I.5.5)30 TO 22
ISN 0026  668   FORMAT(1X,3F8.4/(X,8124A))
ISN 0027  802   FORMAT(F4.0,1X,F4.8,124A1)
ISN 0028        COUNT = 0 IF OIN BLANK WORDS
ISN 0029        DO 2 I4=5,127
ISN 0030        IF(CONS(I,I4).NE.BLANK) CONS(I,I)=I4+1.0
ISN 0031  2     CONTINUE
ISN 0032        I4=CONS(I)
ISN 0033        WRITE(6,668)('CONS(I,J),J=1,I4)
ISN 0034        I=I+1
ISN 0035        GO TO 1
        C...GET TOTAL ITEM VARIANCE FOR COVARIANCE EQUATION
ISN 0036  22    CONTINUE
ISN 0037        VAPITM=0.0
ISN 0038        DO 33 INDX=1,5
ISN 0039        VARITM=VARITM + (CONS(INDX,3)**2)
```

```
ISN 0042    C.... AVERAGE PRODUCT OF VARIANCES IS REQUIRED TO COMPUTE MEAN
ISN 0043    C.... MEAN CORRELATION COEFFICIENT
ISN 0044          AVGVAR=VARITM/5.0
                  WRITE(6,633) VARITM,AVGVAR
            633   FORMAT(' SUM OF ITEM VARIANCE=',F9.3/' AVG.PROD.OF.SD-S',F8.4)
            C.... GET THE AVERAGE PRODUCT OF S.D.'S S.D.
ISN 0045          PVAR=0.0
ISN 0046          DO 123 I=1,4
ISN 0047          K=I+1
ISN 0048          DO 123 J=K,5
ISN 0049          PVAR=PVAR + (CONS(I,3) * CONS(J,3) )
ISN 0050    123   CONTINUE
ISN 0051          PVAP=PVAR/10.0
ISN 0052          WRITE(6,6123) PVAR
ISN 0053    6123  FORMAT(' TRUE AVERAGED PRODUCT OF SD-S =',F10.4)

            C.........  DATA ARE NOW IN CORE, SO GET GLOBAL & ITEM VALUES

            C.... COMMON VARIANCE DERIVED ACCORDING TO FORMULA FOR MEAN COVARIANCE
            C....     S.D. FOR GLOBAL VALUE IS SQUARE ROOT OF CORRELATION BETWEEN
            C....     FACTOR AND ITEMS.
            C....     THIS IS SO SINCE WE MUST PRODUCE CORRELATIONS
            C....     BETWEEN ITEMS WE WORK TO DERIVED CORRELATION
            C....     THIS EQUALS (AVG CORR FACTOR & ITEM) ** 2)
            C....  COMMON VAR+ITEM VAR =1.0 OF TOTAL VAR
ISN 0054          THJS.S.D.=(VARITM =-3.55)) SQRT(1-AVG.53RD ITER(ITEM.CORR)
            3     TOTCOV=(VARITM =-3.55)) SQRT(1 +(1-.25)(CALPHA-1.251) )
ISN 0055          AVGCOV=TOTCOV/10.0
ISN 0056          AVGCOR=AVGCOV/PVAR
ISN 0057    C..PVAR IS SUM PRODUCT OF STANDARD DEVIATIONS
            C.....     GET MEAN INTER-ITEM CORRELATION
            C.....         THIS SERVES AS RANDOM DEVIATE
ISN 0058          S.ITEM= (1-ISCOR *.500
ISN 0059          TITM= (1-(TC**2) ) ** 0.500
ISN 0060          WRITE(6,601)AVGCOV,AVGCOR,SITEM
ISN 0061    6001  FORMAT(' -AVERAGED COVARIANCE=',F10.4/
ISN 0062          AVERAGED CORRELATION(S.D. COMMON)=',F10.4/
                  S.D. ERROR =',F10.4//)
ISN 0063    3333  CALL GAUSS(ISD, TC ,0.0,GLBR)

            C..  NOW FOR EACH ITEM GET RANDOM ITEM SHOCK AROUND GLOBAL VALUE
ISN 0064          DO 4 ITEM=1,5
            C     RANDOM VARIABLE= ITEM MEAN+(ITEM.DEV+COMMON SD)*ACT.SD)

ISN 0065    C.... CALL GAUSS(ISD,TITM ,0.0,RES)
ISN 0066          XMFAN=CONS(ITEM,2)+ ((GLOB+RES)* CONS(ITEM,3))*0.98511
            C.... N.B. .985 ADJUSTS FOR 2 ALTERATIONS TO VARIANCE
            C....     1) RESTRICTION OF RANGE TO 1-5 WHICH DECREASES S.D.
ISN 0067          IANS(ITEM)=XMFAN+0.500
ISN 0068          IF(IANS(ITEM).LT.1)IANS(ITEM)=1
ISN 0070          IF(IANS(ITEM).GT.5)IANS(ITEM)=5
ISN 0072          IF(IANS(ITEM).NE.3) GO TO 4
ISN 0074          IF(XMFAN.GT. 4.00000)IANS(ITEM)=4
```

```
ISN 0076        IF(XMEAN.LE. 3.0000) TAVS(ITEM)=2
ISN 0078    4   CONTINUE

ISN 0079    C.654.   FORMAT(  'IDSRN     6161
            C...  NOW GENERATE 1000 CASES, AND WRITE OUT
                  IKNT=IKNT+1
ISN 0080          WRITE(9,900)IANS
ISN 0081    900   FORMAT(5I1)
ISN 0082    1301  WRITE(13,1301)IKNT,IANS
ISN 0084          FORMAT(I4,2X,5I1)
ISN 0085          WRITE(21,771)
ISN 0086    771   FORMAT(6A4)  TUDES TOWARD AUTHORITY AND CHANGE.'/)

ISN 0087    7776  DO 7776 IKO=1,4
ISN 0088          OUT(IKO)=SEX(ISEX,IKO)
ISN 0089    7777  DO 7777 I=1,5
ISN 0090    7775  OUT(I)=AL
ISN 0091          DO 7778 K2=1,6
ISN 0092    7778  OUT(7+5)=ANS(TANS(IK),IK2)
            C.....GET ANSWER
ISN 0094          I4=CONS(IK,1)
ISN 0095    7779  DO 7779   IK4=4,14
ISN 0096          OUT(56+IK4)=CONS(IK,IK4)
ISN 0097    2828  FORMAT(' ORIG  OUT:',103A1)
ISN 0098          CALL SQUISH(I)   IK,4)
ISN 0099          IF(L.GE.2) WRITE(21,772)  IK,4)
ISN 0100          IF(L.FQ.3) WRITE(21,773) L2
ISN 0102    772   FORMAT(I5,I1,' ',T8,70A1) L3
ISN 0104    773   FORMAT(I8,70A1)
ISN 0105    7777  CONTINUE
ISN 0106          WRITE(21,2101)
ISN 0107    2101  FORMAT('  ')
ISN 0108          IF(IKNT.LT.ICASES)GO TO 3333
ISN 0109          CALL ANALY(CALPHA,IKNT,5)
ISN 0111          CALL FRAND(IKNT)
ISN 0112          CALL INTRO(IKNT)
ISN 0113          CALL MACH(IKNT)
ISN 0114          CALL ADNY(IKNT)
ISN 0116          CALL SOCAL(IKNT)
ISN 0117          CALL NEUR(IKNT)
ISN 0118          CALL RESUME(IKNT)
ISN 0119          CALL OTHER(IKNT)
ISN 0120          IKNT=0
ISN 0121          NA=NA+1
ISN 0122          IF(NA.GE.00)STOP
ISN 0124          REWIND 9
ISN 0125          ALP4A=ALPVINA)
ISN 0126          GO TO 3
            C     DEBUG SURCHK
ISN 0127          END  SURCHK

*OPTIONS IN EFFECT*   NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,

*OPTIONS IN EFFECT*   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF
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COMPILER OPTIONS - NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,V)XREF

ISN 0002          SUBROUTINE FRAND(KNT)
ISN 0003          COMMON/A/ OUT(210),L(170),L2(70),L3(70),X,Y,SEX(2,24),ISEX,
                 *ZNAME(100,20)
ISN 0004          COMMON/FACT/ XINT(2002)
ISN 0005          DIMENSION PREFIX(4)
ISN 0006          DATA PREFIX/'R','A','V','S'/
ISN 0007          IF(ISEX.EQ.2) PREFIX(2)=S
ISN 0009          I=1033
ISN 0010          NICT=1KNT+2
ISN 0011          KNT=1=NFCT
ISN 0012          CALL GAUSS(1,0.7,0.0,RA)
ISN 0013      1   XINT(J)=PA
ISN 0014     20   I=1,10
ISN 0015          READ(1,1100)(ZNAME(I,J),J=13,20)
ISN 0016   1100   FORMAT(      8AI)
ISN 0017          DO 3 I=1,10
ISN 0018          IF(ISEX.EQ.2) REAF(I1,1102)(ZNAME(I,J),J=5,12)
ISN 0020          FORMAT(I10,8AI)
ISN 0022   1102   FORMAT(8AI)
ISN 0023     20   29 K=1,6
ISN 0024     29   ZNAME(I,K)=PREFIX(K)
ISN 0026      3   CONTINUE
ISN 0027          DO 9 I=1,9
ISN 0028          DO 9 J=1,10
ISN 0029          N=(I+10)*I
ISN 0030          DO 8 IRY=1,12
ISN 0031          ZNAME(N,IRY)=ZNAME(J,IRY)
ISN 0032      8   CONTINUE
ISN 0033          DO 81 IRY=13,20
ISN 0034     81   ZNAME(N,IRY)=ZNAMF(I,18Y)
ISN 0035          WRITE(6,600)(ZNAME(N,IRY),IBY=1,20)
ISN 0036    600   FORMAT((IX,20AI)
ISN 0038      9   CONTINUE
ISN 0038          RETURN
ISN 0039          END
                C DEBUG SUBCHK

*OPTIONS IN EFFECT*    NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
*OPTIONS IN EFFECT*    SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

*STATISTICS*   SOURCE STATEMENTS =     38 ,PROGRAM SIZE =     1040
*STATISTICS*   NO DIAGNOSTICS GENERATED

******  END OF COMPILATION ******          84K BYTES OF CORE NOT USED
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COMPILER OPTIONS - NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

```
ISN 0002        SUBROUTINE ANALYS(ICALPHA,IKNT,ITMS)
ISN 0003        COMMON/A/ CONS(5),ZI?(ITMS)
ISN 0004        DIMENSION SUM(5),SOSUM(5),D(5),XMEAN(5),VAR(5)
ISN 0005        REWIND 9

          C...  GET SUMS
          C...  FIRST ZERO ACCUMULATORS
ISN 0006        DO 1 I=1,ITMS
ISN 0007        SUM(I)=0.0
ISN 0008        SOSUM(I)=0.0
ISN 0009     1  TSUM=0.0
ISN 0010        TSOSUM=0.0
ISN 0011     2  READ(9,900,END=61) D
ISN 0012   900  FORMAT(5F1.0)
ISN 0013        T=0
ISN 0014        DO 3 I=1,ITMS
ISN 0015        SUM(I)=SUM(I)+D(I)
ISN 0016     3  T=T+D(I)
ISN 0017        TSUM=TSUM+T
ISN 0018        GO TO 2
ISN 0019    61  REWIND 9
ISN 0020        DO 226 I=1,ITMS
ISN 0021  2261  XMEAN(I)= SUM(I)/IKNT
ISN 0022   226  TMEAN= TSUM/IKNT
ISN 0023    22  READ(9,900,END=222) D
ISN 0024        DO 223 I=1,ITMS
ISN 0025        XX = D(I)-XMEAN(I)
ISN 0026        SOSUM(I)= SOSUM(I) + (XX*XX)
ISN 0027   223  T= T + D(I)
ISN 0028        YY= T-TMEAN
ISN 0029        TSOSUM = TSOSUM + (YY*YY)
ISN 0030        GO TO 22
ISN 0031   222  VARSUM=0
ISN 0032  6262  WRITE(6,6262) SUM,SOSUM,TSOSUM,TSUM
ISN 0033        FORMAT(' SUM=',5F10.2/' SOSUM=',5F10.2/' TSO', TSUM=',2F10.2)
ISN 0034    20  SD(I)=(SOSUM(I)/IKNT) ** 0.500
ISN 0035        VAR(I)=SD(I)**2
ISN 0036        VARSUM=VARSUM+VAR(I)
ISN 0037    62  CONTINUE
ISN 0038        TSD=(TSOSUM/IKNT)** 0.500
ISN 0039        TV=TSD**2
ISN 0040        XWGHT= ITMS
ISN 0041        XWGHT= XWG-T/(XWGHT-1.0)
ISN 0042        A=XWGHT *(1.0 - (VARSUM/TV) )
ISN 0043   601  WRITE(6,601) CALPHA,IKNT
ISN 0044        FORMAT('0ALPHA =',F10.4/' SAMPLE =',I6/
               1HO,' QUSTN.    ',T10,'MEAN',T18,'S.D.',T26,'VAR'/
               1H ,'----------',T10,'----',T18,'----',T26,'---')
ISN 0045        DO 63 I=1,ITMS
ISN 0046        WRITE(6,602) I,XMEAN(I),SD(I),VAR(I)
ISN 0047   602  FORMAT(T5,I1,T9,F6.3,T18,F6.3,T25,F6.3)
ISN 0048   603  WRITE(6,603) TMEAN,TSD,TV
               FORMAT(T2,'TOTAL',T9,F6.3,T18,F6.3,T26,F6.3)
```

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```
ISN 0050          WRITE(6,604) VAPSUM,A
ISN 0051      604 FORMAT(1H0,'SUM OF ITEM VARIANCES=',F10.4/' ACT.ALPHA =',F8.4)
ISN 0052          REWIND 9
ISN 0053        C RETURN
                  DEBUG SUBCHK
                  END
ISN 0054        C

*OPTIONS IN EFFECT*   NAME= MAIN,OPT=02,LINECNT=56,SIZE=0000K)

*OPTIONS IN EFFECT*   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

'STATISTICS*   SOURCE STATEMENTS =      53 , PROGRAM SIZE =      1476

*STATISTICS*   NO DIAGNOSTICS GENERATED

******* END OF COMPILATION *******                          84K BYTES OF CORE NOT USED
```

```
COMPILER OPTIONS - NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
                   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

ISN 0002        SUBROUTINE SQUISH(L)
ISN 0003        REAL*4 L1(2),L2,L3
ISN 0004        COMMON /R/ OUT(210),L1(70),L2(70),L3(70),X,Y,SEX(2,24),ISEX,
               8 ZNAME(100,20)
ISN 0005        DIMENSION INDEX(210)
ISN 0006        DATA RL/7H ,BRO/7H /
ISN 0007        K=0
ISN 0008        WRITE(6,6234) OUT
               C
         6234   FORMAT(' SQUISH ENTRY, OUT:',T20,100A1/T20,100A1)
ISN 0009        DO 2 I=1,210
ISN 0010      1 IF(OUT(I).NE.RL) GO TO 1
ISN 0012        IF(OUT(I+1).EQ.RL) GO TO 2
ISN 0014        K=K+1
ISN 0015        INDEX(K)=I
ISN 0016      2 CONTINUE
ISN 0017      3 OUT(I)=OUT(INDEX(I))
ISN 0018        K=K+1
ISN 0020        DO 4 I=K,210
ISN 0021      4 OUT(I)=RL
               C...END BLK REMOVAL
               C
ISN 0022        DO 44 I=1,70
ISN 0023        L1(I)=RL
ISN 0024        L2(I)=RL
ISN 0025        L3(I)=RL
ISN 0026     44 CONTINUE
               C...NOW SEGMENT LINE 1
               C
ISN 0027        DO 5 K=1,20
ISN 0028        IP=72-K
ISN 0029      5 IF(OUT(IP).EQ. RL) GO TO 6
ISN 0031      6 CONTINUE
ISN 0032        IP=IP-1
ISN 0033      7 L1(I)=OUT(I)P
ISN 0034      7 L1(I)=OUT(I)
               C.... NOW LINE 2
               C
ISN 0035        IPO=IP+3
ISN 0036        IF(OUT(IPO).EQ.PRO)GO TO 81
ISN 0038        IF( OUT(IPO).EQ.BL).AND. (OUT(IPO+1).EQ.BL) ) GO TO 81
ISN 0040        IP=IPO+72
ISN 0041        DO 21 K=1,72
ISN 0042        IP=IP-1
ISN 0043        IF(OUT(IP).EQ.RL) GO TO 22
ISN 0045     21 CONTINUE
               C..THIS GETS OUT IF THERE IS  NO SECOND LINE
ISN 0047     22 IP=IP-1
ISN 0048        K=1
ISN 0049        DO 23 I=IPO,IP
```

```
ISN 0050    23    L2(K)=OUT(I)
ISN 0051          K=K+1
            C.... NOW DO 3RD LINE
ISN 0052          IP=IP+2
ISN 0053          IF((OUT(IP).EQ.BL).AND.(OUT(IP+1).EQ.BL)) GO TO 82
ISN 0055          IF((OUT(IP).EQ.PRD) GO TO 82
ISN 0057          K=0
ISN 0058          IPX=IP+70
ISN 0059          DO 31 I=IP,IPX
ISN 0060          K=K+1
ISN 0061    31    L3(K)=OUT(I)
ISN 0062          L=3
ISN 0063          RETURN
ISN 0064    82    L=2
ISN 0065          RETURN
ISN 0066    81    L=1
ISN 0067          RETURN
ISN 0068    C     DEBUG SUBCHK
                  END

*OPTIONS IN EFFECT*   NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
*OPTIONS IN EFFECT*   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF
*STATISTICS*   SOURCE STATEMENTS =   67,PROGRAM SIZE =   1914
*STATISTICS*   NO DIAGNOSTICS GENERATED
*****  END OF COMPILATION ******          84K BYTES OF CORE NOT USED
```

COMPILER OPTIONS - NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
　　　　　　　　　SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

```
ISN 0002      SUBROUTINE INTRO(IKNT)
ISN 0003      DIMENSION SET(0,80),SEANS(3,16),ITMSEL(101,IOUTO(2)
ISN 0004      COMMON /B/ OUT(210),LI(70),L2(70),L3(70),X,Y,SEX(2,24),ISEX,
ISN 0005     *  ZNAME(100,20)
ISN 0006      COMMON /FACT/XINT(2000)
ISN 0007      DATA T567/0/,VSUM/0.37,SDSUM/0.37,IKNT2/0/
              DATA AL/0,0/,NIK/0/
C
C....READ SELF-EVALUATION ITEMS
C
ISN 0008  111 READ(11,111)                       CALPHA
ISN 0009  111 FORMAT( T78,F3.0)
ISN 0010      DO 112 I=1,3
ISN 0011  112 READ(11,121) (SEANS(I,J),J=1,16)
ISN 0012  121 FORMAT(16A1)
ISN 0013  600 WRITE(6,600) CALPHA,((SEANS(M1,M2),M2=1,16),M1=1,3)
ISN 0014  600 FORMAT(6 ALPHA=,F10.3/3(1X,16A1/))
C....READ MEAN, S.D.,        ITEM
ISN 0015      DO 13 ITM=1,10
ISN 0016      READ(11,113) ( SE(ITM,J),J=1,80)
ISN 0017  113 FORMAT(F4.0,(SE(ITM,J),J=1,80)
ISN 0018      WRITE(6,601) ( SE(ITM,J),J=1,80)
ISN 0019  601 FORMAT(1X,2F7.4,5X,78A1)
ISN 0020      VSUM=VSUM+(SE(ITM,2)**2)
ISN 0021      SDSUM=SDSUM+ (SE(ITM,2))
ISN 0022   13 CONTINUE
C.... PVAR = MEAN EXPECTED PRODUCT OF S.D.S
ISN 0023      PVAR=SDSUM/(10.0)**2
C....VARIANCE SUM IS 2/10 OF TOTAL SINCE ONLY 2 ITEMS WILL EBE USED
ISN 0024      VSUM=VSUM/5.0
ISN 0025      SDSUM=SDSUM/5.0
ISN 0026      TOTCOV = (VSUM*(-0.500) * (1+(2.000/(CALPHA-2.000)))
ISN 0027      AVGCOV=TOTCOV/1.00
ISN 0028      AVGCOR=AVGCOV/PVAR
ISN 0029      SDC= AVGCOR*0.500
ISN 0030      SDITM=(1-(SDC**2))         ** 0.500
ISN 0031      WRITE(6,601) VSUM,SDSUM,PVAR,TOTCOV,AVGCOR, SDC, SDITM
ISN 0032  601 FORMAT(1X  AVGCOR, SDC, SDITM:', 3E10.37)
C....
C.... WHICH ITEMS ?
ISN 0033  999 DO 11 I=1,10
ISN 0034   11 ITMSEL(I)=0
ISN 0035      DO 13 I=1,2
ISN 0036   12 CALL RANDU(ISD,IX,R)
ISN 0037      ISD=IX
ISN 0038      R=(R*(0.0)+1.0
ISN 0039      ITM=3
ISN 0040      IF(ITMSEL(ITM).EQ.1)GO TO 12
ISN 0041      ITMSEL(ITM)=1
ISN 0042   13 CONTINUE
C.....CALL GAUSS FOR GLOBAL VALUE
C.... FIRST GET GLOBAL VALUE FOR SET OF QUESTIONS
```

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```
ISN 0044          CALL GAUSS(ISD,0.,57.,XINT(IKNT2+1),FV)
ISN 0045          CALL GAUSS(ISD,SDC,FV,GLOR)
C...NOW FOR EACH ITEM, GET RANDOM SHOCK

ISN 0046          K=0
ISN 0047          NIK=NIK+1
ISN 0048          IF(NIK.GT.100) NIK=1
ISN 0050          WRITE(25,602) (ZNAME(NIK,IBN),IBN=1,04)
ISN 0051   602    FORMAT('0SELF EVALUATION (ZNAME(NIK,IBN),FV=13,20),TSEX(TSEX,11),11=5,24)
           &      ', ETC. '), COMPARED TO OTHERS THE SAME'
           &      ' AGE ',64A1,8A1,1X,20A1)
ISN 0052          DO 24 I=1,10
ISN 0053          IF(ITSEL(I).EQ.0) GO TO 24
ISN 0055          CALL GAUSS(ISD,SDITM,0.0,RES)
ISN 0056          XMEAN=SE(I,1)+(GLOB+RES)*SE(I,2)*0.80)
ISN 0057          IANS=XMEAN+0.500
ISN 0058          IF(IANS .LT.1) IANS  =1
ISN 0060          IF(IANS .GT.3) IANS  =3
ISN 0062          ITMSEL(I)=IANS
ISN 0063          K=K+1
ISN 0064          IOUT(K)=IANS
ISN 0065          DO 241 J=1,200
ISN 0066   241    IOUT(J)=0
C...INSERT ANSWER
ISN 0067          DO 22 J=1,16
ISN 0068   22     OUT(J)=SEANS(IANS    ,J)
ISN 0069          DO 23 J=3,80
ISN 0070   23     OUT(J+17)=SE(I,J)
ISN 0071          CALL SQUISH(L)
ISN 0072          WRITE(25,604) K, L1
ISN 0073   604    FORMAT(15,I1,', WRITE(8,70A))
ISN 0074          IF(L .GE.3) WRITE(25,603) L2
ISN 0076          IF(L.GE.3) WRITE(25,603) L3
ISN 0078   603    FORMAT(8,70A))
ISN 0079   24     CONTINUE
ISN 0340          WRITE(8,9000) IOUTD
ISN 0081   9009   FORMAT(2I1)
ISN 0082          IKNT2=IKNT2+1
ISN 0083          WRITE(25,2501)
ISN 0084   2501   FORMAT(13,1301) IKNT2,ITMSEL
ISN 0085          WRITE(13,1301) IKNT2,ITMSEL
ISN 0086   1301   FORMAT(14,5(,2X,10I1))
ISN 0087          IF(KNT.LT.KNT) GO TO 9999
ISN 0089          CALL ANALYT(ALPHA,IKNT,2)
ISN 0090          RETURN
           C      DEBUG UNIT(19), INIT, SUBCHK
           C      DEBUG SUBCHK
ISN 0091          END

*OPTIONS IN EFFECT*   NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,

*OPTIONS IN EFFECT*   SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

*STATISTICS*   SOURCE STATEMENTS =    90 ,PROGRAM SIZE =    5898

*STATISTICS*   NO DIAGNOSTICS GENERATED
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COMPILER OPTIONS - NAME= MAIN,OPT=02,LINECNT=58,SIZE=0000K,
SOURCE,EBCDIC,NOLIST,NODECK,LOAD,NOMAP,NOEDIT,ID,NOXREF

```
ISN 0002        SUBROUTINE MACH(IKNT)
ISN 0003        REAL*4 MCH,MANS,LI,L2,L3
ISN 0004        DIMENSION MCH(20,49),MANS(5,46),ITMSEL(20),NEG(20)
ISN 0005        COMMON/B/ OUT(210),OUT(170),L3(170),X,Y,SEX(2,24),ISEX,
ISN 0006      * ZNAME(100,20)
ISN 0007        DATA ISEX/8H(17,VSUM/0.0/,SDSUM/0.07,IKNT/2707

C....READ ITEMS

ISN 0008        CALPHA=0.70
ISN 0009        DO 112 I=1,5
ISN 0010  112   READ(5,112) (MANS(I,J),J=1,46)
ISN 0011  600   FORMAT(46A1)  CALPHA
ISN 0012        WRITE(6,600) ALPHA=',F10.4/5(1X,48A1))
ISN 0013  600   FORMAT(6 ALPHA=',F10.4/5(1X,48A1))

C....READ ITEM MEANS
ISN 0014        DO 113 I=1,20
ISN 0015  113   READ(1,113) (MCH(ITM,J),J=3,142),(MCH(ITM,J2),J2=1,2),NEG(ITM)
ISN 0016  113   FORMAT(133A1/TIL,14A1,TIL,F4.0,1X,=4.0,1I1)
ISN 0018        WRITE(6,601) (MCH(ITM,J),J=1,49)
ISN 0019        IF(NEG(ITM).EQ.1) WRITE(6,622)
ISN 0020  601   FORMAT(6 X,2F7.4,2(T20,30A7)))
ISN 0021  622   FORMAT(6 * ** REVERSAL ***))
ISN 0022        VSUM=VSUM+(MCH(ITM,20))
ISN 0023        SDSUM=SDSUM+(MCH(ITM,22))
ISN 0024  10    CONTINUE

C....PVAR = MEAN EXPECTED PRODUCT OF S.D.S
ISN 0025        PVAR=(SDSUM/20.0)**2

C.....SINCE VARIANCE SUM IS ESTIMATED ACROSS 20 ITEMS, BUT ONLY
C..    5 WILL BE USED, WEIGHT VSUM BY 0.25
        VSUM=VSUM*0.250
ISN 0026        TOTCOV=(VSUM-(-0.501) * (1+(1.25)/(CALPHA-1.250)))
ISN 0027        AVGCOV=TOTCOV/PVAR
ISN 0028        SDC =AVGCOV*0.500
ISN 0029        SDITM=(1-(SDC**2)) ** 0.500
ISN 0030        WRITE(6,601) VSUM,SDSUM,PVAR,TOTCOV,AVGCOV,SDC,SDITM
ISN 0032        FORMAT(6 VSUM,SD SUM,PVAR,TOTCOV;',4F10.3/
ISN 0033      * AVGCOR, SDC, SDITM;', 3F10.3)

C....WHICH ITEMS ?
ISN 0034  9999  DO 11 I=1,20
ISN 0035  11    ITMSEL(I)=0
ISN 0036  20 13 I=1,5
ISN 0037  12    CALL RANDU(ISD,IX,R)
ISN 0038        ISK=IX
ISN 0039        R=IR*20.01+1.0
ISN 0040        ITM=R
ISN 0041        IF(ITMSEL(ITM).EQ.1)GO TO 12
ISN 0042        ITMSEL(ITM)=1
ISN 0044  13    CONTINUE

C....CALL GAUSS FOR GLOBAL VALUE
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ISN 0045        CALL GAUSS(ISD,SDC,0.0,GLOB)
          C...NOW FOR EACH ITEM, GET RANDOM SHOCK
ISN 0046        K=0
ISN 0047        WRITE(23,602)
ISN 0048  602   FORMAT('0ATTITUDES TOWARD INTERPERSONAL RELATIONS, ETC.',)
                *
ISN 0049        DO 24 I=1,20
ISN 0050        IF(ITMSEL(I).EQ.0) GO TO 24
ISN 0052  2345  CALL GAUSS(ISD,SDITM,0.3,RES)
ISN 0053        XMEAN=MCH(I) + ((GLOB+RES)*MCH(I,2)*0.78)
ISN 0054        IF(NEGI).EQ.0) XMEAN=MCH(I,1) - ((GLOB+RES)*MCH(I,2)*0.78)
ISN 0056        IANS =XMEAN+0.500
ISN 0057        IF(IANS.F2.3) GO TO 2345
          C.... NO INDIFFERENTS, ETC.
ISN 0059        IF(IANS .GT.5) IANS =5
ISN 0061        IF(IANS .LT.1) IANS =1
ISN 0063        K=K+1
          C...REVERSE: OUTPUT SCORE SO THAT ALPHA VALUES ARE MEANINGFUL
          C...         FOR NEGATIVE QUESTIONS RESCORE ANSWERS
ISN 0064        IOUT(K)=IANS
ISN 0065        IF(NEGI).EQ.1) IOUT(K)=6-IANS
          C...THIS GIVES TRUE ANSWER FOR OUTPUT PARAMETER CAPD
ISN 0067        ITMSEL(I)=IANS
ISN 0068  241   J=1,700
ISN 0069        OUT(J)=A(700
          C...RESET SFX
ISN 0070        DO 6969 I1=1,14
ISN 0071  6969  XOUT(I1)=SEX(I1)SFX,I1)
          C...INSERT ANSWER
ISN 0072        DO 22 J=1,146
ISN 0073  22    OUT(J+4)=MANS(IANS   ,J)
ISN 0074        DO 23 J=3,149
ISN 0075  23    OUT(J+51)=MCH(I,J)
ISN 0077        CALL SQUISH(L)
ISN 0078  604   FORMA (23,604) K, L1,L8,70A1
ISN 0079        IF(L.GF.2) WRITE(23,603) L2
ISN 0081        IF(L.GE.3) WRITE(23,603) L3
ISN 0083  603   FORMAT(8,70A1)
ISN 0084  24    CONTINUE
ISN 0085        WRITE(9,9009) IOUTD
ISN 0086  9009  FORMAT(5I1)
ISN 0087        IKNT2=IKNT2+1
ISN 0089  2301  WRITE(23,2301)
                *FORMAT('  ')
ISN 0090  1301  WRITE(13,1301) IKNT2, ITMSEL
ISN 0092        FORMAT(I2,(3,2X,20I1) GO TO 9999
ISN 0093        IF(IKNT2.LT.IKNT) GO TO 9999
ISN 0094        CALL ANALY(CALPHA, IKNT,5)
ISN 0095        RETURN
          C     DEBUG UNIT(19), INIT, SUBCHK
ISN 0096        DEBUG SUBCHK
                END
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