TI 2005-032/3
Tinbergen Institute Discussion Paper

Friendship Relations in the School Class and Adult Economic Attainment

*Andrea Galeotti**
*Gerrit Müller***

** Department of Economics, University of Essex, UK,*
*** Department of Economics, Erasmus University Rotterdam, and Tinbergen Institute.*

Tinbergen Institute
The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam, and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

Please send questions and/or remarks of non-scientific nature to driessen@tinbergen.nl.
Most TI discussion papers can be downloaded at http://www.tinbergen.nl.

FRIENDSHIP RELATIONS IN THE SCHOOL CLASS AND ADULT ECONOMIC ATTAINMENT

ANDREA GALEOTTI* GERRIT MUELLER†

March 2005

Abstract

We analyze the impact of adolescents' friendship relations in their final-year class of high school on subsequent labor market success. Based on a typology of network positions we locate each student within the social system of the school class as either: an *isolate*, a *sycophant*, a *broker* or a *receiver*. These positions identify individuals' social standing within the group of classmates and proxy for their interpersonal behavior and social competencies. We offer empirical evidence that differential social standing in adolescence predicts large and persistent earnings disparities over the entire life course. The estimated wage premia and penalties do not appear to be substantially confounded by measures of family and school resources, and materialize largely independent of differences in cognitive abilities, grade rank in class or friends' characteristics. A moderate share of the earnings inequalities is mediated by differential post-secondary human and social capital investment. From a conceptual point of view, we contribute an application of egocentered network methods within conventional labor economic survey research.

JEL Classification: A14, I21, J31
Keywords: friendship ties, social capital, earnings

*University of Essex, Department of Economics, Wivenhoe Park, Colchester, Essex, CO4 3SQ, United Kingdom (agaleo@essex.ac.uk)

†Corresponding author; Erasmus University Rotterdam, Department of Economics, Burg. Oudlaan 50, 3062 PA Rotterdam, The Netherlands, Tinbergen Institute and IZA (mueller@few.eur.nl)

I Introduction

In his seminal essay "The School Class as a Social System" Talcott Parsons [1959] described the school class as an agency of socialization through which individual personalities are trained to be motivationally and technically adequate to the successful performance of their adult roles. When economists study skill formation and the effects of schooling, they often focus on the development of technical skills as measured by scores on reading, writing, and mathematics tests. Important outcomes these may be, the school not only imparts a certain amount of subject knowledge and general problem solving skills. It also internalizes in its pupils the social competencies and behavioral norms that make them function adequately on an interpersonal level. The importance of classmates in this respect should be immediately evident. Classmates constitute *the* primary social system, besides the family, in which any adolescent participates. The focus of our work, then, is on analyzing the effect of students' social relationships with classmates on subsequent economic attainment.

The view of the school class as a social system forms the point of departure for our work in two respects: First of all, it draws our attention to the motivational and behavioral outcomes of the schooling process. It stresses the fact that social competencies and norms for interpersonal behavior are not acquired in the abstract. They develop in the relations to others and are the outcomes of a prolonged socialization process stretching from early childhood in the family and elementary school until the end of high school. Secondly, viewing the school class as a social system has an influence on the methodological approach. To us, the most appropriate way of measuring inherently "relational" concepts is to draw on methods from social network analysis. We use information on friendship ties to study the structure of social associations in which an individual is embedded in his final-year class of high school. In particular, a typology of network positions [Burt 1976, Wasserman and Faust 1994] is constructed that locates each student within the social system of the respective school class as either: an *isolate*, a *sycophant*, a *broker* or a *receiver*. These positions identify individuals' social standing within the group of classmates and proxy for their interpersonal behavior and social competencies.

We are certainly not the first to recognize that behavioral skills, loosely defined, form an important subcomponent of human capital and that schools play a central role in developing such

skills [Bowles, Gintis and Osborne 2001]. In fact, there is a growing number of studies on the role of "noncognitive skills" that document how pre-labor market measures of motivation, social adaptability and interpersonal skills help explaining adult socioeconomic outcomes (e.g. Heckman, Stixrud and Urzua [2004]). Another recent strand in the literature prefers to study the social component of human capital under the heading of "individual social capital" [Glaeser, Laibson and Sacerdote 2002]. Whichever generic term one may favor, both serve as a catchall for acquired behavioral skills, socialized norms of conduct, as well as inborn pro-social character traits. In practice, these individual attributes are lumped together as they are empirically indistinguishable. We follow Glaeser et al. [2002] and adopt their notion of individual social capital since our approach to measurement is deliberately "sociometric" rather than "psychometric".

For our empirical analysis, we employ detailed information on high school friendship relations available from respondents to the Wisconsin Longitudinal Study (WLS). Respondents were asked to report names of up to three best friends from their senior class in high school. We use this information to represent each high school class as a "directed friendship network" where a link from student i to classmate j is established whenever the former claims friendship to the latter. The fact that connections are directed leads to a conceptual distinction: by sponsoring a tie of friendship, a student reveals his affection towards the recipient of the claim, while by receiving a claim of friendship a student is the object of social approval.

Following Burt [1976], we treat the position of individuals in their network as a well defined "set of relations" to and from each actor in the system and construct a typology of four positions (or roles) according to the similarity of their ties. Isolates are individuals who deliberately do not promote ties and who do not receive any social approval either. The position of the sycophant reflects the idea of a person trying to tag along while the attempt to being socially connected is not reciprocated by others. The mirror image of the sycophant is the receiver, also often referred to as occupying a "primary position" in the network of relationships. Receivers represent, somewhat oversimplified, the prototype of socially prestigious actors as they receive social approval without the need to engage in friendship pacts with other classmates. Those who receive and at the same time reciprocate by means of promoting friendship ties are classified as brokers. Brokers are also often referred to as "ordinaries" as they represent the most common position in groups.

Our approach captures the outcomes of a differentiation process during secondary school

in terms of the "social status" achieved by individuals relative to other individuals within the same class. To be precise, by school class we mean the set of classes participated in by the same grade cohort of students in any given school. This broader interpretation is appropriate here since students tend to specialize in elective subjects towards the end of secondary school. Members of the class in one subject need not be the same as in another. Individuals have been systematically exposed to association with different people across various contexts ranging from mathematics class to organized athletics and extracurricular activities. This implies a considerable reshuffling of friendships in which students have drifted into new and out of old relationships over the years. Since association is a choice, the final position in which an individual is observed is highly informative for identifying different types of personalities and behaviors. Drawing again on Parsons [1959], we would like to spend a few more words on what we think it is that adolescents acquire by social interaction with classmates, and why it should matter for their subsequent economic attainment.

The psychological function of social interaction with classmates is that it provides a testing field for gaining acceptance from age-peers, that is from "status-equals". The degree to which an individual is accepted by his peers is related to the extent to which he is able to make positive personal and social adjustments. During secondary school, a social differentiation process takes hold that gradually breaks up the individual's initial fixation on "generation-superiors" such as parents, the class teacher from elementary school and other significant adults. The new reference system is largely independent of adult supervision and approval. Individuals come to occupy differentiated positions within the group as an immediate consequence of their own interpersonal behavior and of what others consider appropriate conduct. An individual's social status is inevitably a direct function of the position he achieves within the school class and this position enters into the definition of his own identity.[1] Large parts of an individual's role performance when adult, as an employee in a team of co-workers for example, will also be in association with status-equals or near-equals. By that time, one has to have understood the "rules of the game" and know how to gain acceptance and social support, whom to trust and when to reciprocate.

[1]In a study of Illinois high schools, Coleman [1961] finds that students identify themselves as belonging to social categories such as nerds, jocks, leading crowd and others. Students tend to differentiate themselves along two major dimensions: 'cognitive achievement' as measured by grades, and 'social approval' as reflected in leadership roles in extracurricular student activities and participation in high school athletics. See Akerlof and Kranton [2002] on "Identity and Schooling" for a review and economic interpretation of the sociological literature on education.

Therefore, it is social interaction within the group of classmates that provides the bridge to the adult world in terms of acquired social skills and norms for interpersonal behavior.

We find that differential social standing in adolescence predicts significant and large earnings inequalities over the adult life course. Two results merit special consideration: students who were socially isolated within their school class earn between 43 and 25 percent less than average 35 years later, depending on the set of controls entered. Considering the opposite end of the social spectrum, we find that receiver types earn a wage premium of 33 to 24 percent compared to an average individual, again, conditioning on different sets of covariates. The estimated wage premia and penalties do not appear to be substantially confounded by measures of family and school resources, and materialize largely independent of differences in cognitive abilities, grade rank in class or friends' characteristics. We do find, though, that a moderate share of the earnings inequalities is mediated by differential post-secondary human and social capital investment.

In summary, using citations as a measure of the interest of citors towards citees, we group individuals into equivalent positions across school classes. The suggested typology is certainly a crude and highly stylized description of individual differences in social capital. And yet, it proves to be a very informative one when it comes to explaining individuals' differential success in the labor market. From a conceptual point of view, we contribute an application of egocentered network methods within conventional labor economic survey research. The remainder of the paper is organized as follows: Section II introduces some elementary concepts of social network analysis, defines our measures and describes the relational data at hand. Section III examines whether in our sample there are significant associations between sociometric position in school class and adult wages. Section IV analyzes the earnings premia and penalties in relation to differential school resources, family background, cognitive ability, grade rank and peer characteristics. Moreover, we try to shed some light on possible channels through which the observed earnings inequalities might have evolved, such as social capital accumulation, post-secondary schooling and occupational sorting. Section V concludes with some thoughts on the policy relevance of our findings, a discussion of potential limitations, and directions for future research.

II Social Network Analysis: Method, Data and Measures

A The Egocentered Network Method

The network approach conceives the social system as a set of individuals (nodes) and patterns of well specified relations (ties) joining individual members. Network analysis may then be conducted on two levels: the individual "actor level" or the overall "structural level". With the latter, interest usually centers on concepts and measures pertaining to the entire network of relationships, such as its density or connectedness. On an actor level, one would typically be interested in quantifying the popularity, influence or sociometric position of an individual within a given network. Depending on the level of analysis, both, the location of individual actors within the network, as well as the structural properties of the whole social system may then be related to economic outcomes of interest. On the structural level, one prominent example would be the work by Granovetter [1974] on job contact networks in which he relates social structures to market performance. On the actor level, the discussion in Akerlof and Kranton [2002] on identity and schooling is exemplary as it is concerned with group dynamics within the school class context.

Clearly, the chosen level of analysis has implications for the kind of network methods that are appropriate as well as for the type of data required for empirical analysis. If we desire to analyze the structural properties of a network, we need to gather "complete network data": information on all ties linking elements of a closed population. This implies that individual units of observation are not sampled by some standard probabilistic method as in conventional survey designs. Gathering full information on relationships among, say, all inhabitants of a small village may still be feasible, with potential limitations on the inferential side though. As the population of interest widens, data collection efforts become prohibitively complex and expensive for all practical purposes. It is immediately obvious that complete network and conventional survey data are largely at odds with each other.

However, when interest centers on the individual actors within the net of relationships, full network data might not be required. In many instances, one may resort to "egocentered network data": information on sets of ties surrounding sampled nodes.[2] In the present work, for instance,

[2]For an exhaustive discussion of sampling methods in a network context and the analysis of survey network data, see Marsden [1990].

we consider a random sample from a population of high school seniors and ask them to report who are their close friends in class. Data like these do not allow us to map the full network and analyze its structural properties in great detail. But, the data is still relational in character and we can find out that some have close friends while others have none. Knowing this, we are able to understand something about differences in the actors' position in their (local) social structure and can relate these varying positions to variation in economic outcomes. This is the approach taken in our paper.

B High School Friendship Relations in the WLS

We employ detailed information on high school friendship relations available from respondents to the Wisconsin Longitudinal Study (WLS). The WLS consists of 10,317 randomly sampled individuals who graduated from Wisconsin high schools in 1957. Together, these individuals constitute approximately one-third of all seniors in Wisconsin high schools in that year. After the initial wave of data collection, primary respondents were re-interviewed in 1975 and 1992. Together with their parents' interview of 1964, these waves provide information on, among others, socio-economic background, mental ability, educational attainment, family formation, and labor market histories. The original sample is broadly representative of white men and women who have completed at least twelve years of schooling. For more detailed information on the WLS be referred to Sewell et al. [2001] and the references therein.

In the 1975 wave, respondents were asked to report names of up to three best friends from their senior class in high school. The survey design of the WLS bounds the set of nodes by school-class membership: claims of friendship can be done only among students who belonged to the same school and class. Relational quantification is based on individual evaluation: student i has a tie with student j if and only if i claims his friendship to j. Two things are worth noting in this context. The first is that we are considering *dichotomous* relations, either a relation exists or it does not, while the strength of the relation is not defined. The second is that our relations are *directed*, that is, if i claims friendship to j, the reverse is not necessarily true. This leads to a conceptual distinction between a student who receives a claim of friendship and a student who sponsors a claim of friendship. The former is socially approved, while the latter shows general friendliness towards the recipient. There are further three remarks related to measurement of

friendship ties in the WLS.

First, the questionnaire is a combination of *free recall*, respondents write down names, and retrospective *fixed choice*, they may nominate at most three friends belonging to their class. The implication of this design for possible measurement error in observed friendship ties is limited. Indeed, the free recall and the retrospective fixed choice design force the responder to remember the identity of his (or her) friends at high school and to select at most three of them. This assures that claims of friendship are towards individuals with whom the respondent experienced stable patterns of interaction. Second, the information gathered is subjective in nature: the social relation under analysis, friendship, is perceived independently by the parties involved. Third, due to random sampling of nodes, we do not have a full description of all relations among students in any given class. We do observe the full set of ties sponsored by sample members towards individuals both, in- and outside the sample. But, claims of friendship coming from classmates who have not participated in the WLS towards sample members are missing. Moreover, individuals were not sampled randomly on a class level, but sampling occurs at the aggregate level. This implies that even if the size of the sampled classes would on average be one-third of the original, there will be classes with higher and lower proportions of students.

Obviously, the value of our analysis hinges on whether the rules for including and excluding nodes are sensible in the sense of generating indicators that are not artifacts of those rules [see Marsden 1990]. After having introduced our measures, we will return to this issue and address in more detail the consequences of sampling portions of a school class network.

C In-degree, Out-degree and Network Positions

We represent each of the school classes in our data as a directed network, g, where a link from student i to student j is established whenever the former claims friendship to the latter. We denote a link from i to j as $g_{i,j} = 1$, while $g_{i,j} = 0$ means that student i does not claim friendship to j. Figure 1 illustrates one of the classes in our data; a link from i to j is represented by a line with an arrow pointing to j. Receiving and sponsoring links may be formalized using two graph-theoretical notions: the *In-degree* and the *Out-degree*. Formally, the Out-degree of student i, denoted as y_i, is the number of claims of friendship he or she sponsors, that is $y_i = \sum_j g_{i,j}$. The In-degree of student i, denoted as x_i, is the number of claims student i receives from others, that

is $x_i = \sum_j g_{j,i}$. Thus, each actor i is characterized by a bidimensional social vector $e_i = (x_i, y_i)$ and network positions can be constructed by combining the characteristics of such social vectors across actors. With the relational data at hand, this approach allows us to partition the set of sample members into subgroups of people who have the same position within their respective network.[3] Following Burt [1976] and Wasserman and Faust [1994], we define the position of a student in a given school class in the following way:

A student i in a directed network g is: (i) an Isolate if $x_i = y_i = 0$; (ii) a Sycophant if $x_i = 0$ and $y_i > 0$; (iii) a Receiver if $x_i > 0$ and $y_i = 0$ and (iv) a Broker if $x_i > 0$ and $y_i > 0$.

In Figure 1 we exemplify the network positions of students in a fictitious high school class, with numbered circles representing students and arrowed lines indicating the relations among them. At the same time, the figure is illustrative of the issues involved in sampling portions of a school class. Students interviewed by the WLS are drawn inside the large hatched circle, and, broken lines and dotted circles stand for the unobserved ties and nodes. The implications of the sampling scheme for measurement are immediately visible. True receivers may be misclassified as isolates and true brokers as sycophants. True isolates and true sycophants will always be correctly classified, that is, observed as such.

The *isolate* position is occupied by a set of students {13,14,15} who are neither promoting nor receiving citations from other individuals in their network. In network terminology, an isolate is "infinitely distant" from other individuals. A student in the *sycophant* position {4,11,16,19} reflects the idea of a person trying to tag along while the attempt to be socially connected is not reciprocated by others. The mirror image of the sycophant is the *receiver*, also often referred to as being in "primary position". Receivers {3,7,17,18} represent, somewhat oversimplified, the prototype of socially prestigious actors. They are those leader-type of individuals who receive

[3]We have experimented with more complex measures of social status such as "Proximity" and "Power-indices". For an overview and definition of those and alternative measures see Wasserman and Faust [1994]. These indices take into "indirect ties" and they may also distinguish between reciprocated and non-reciprocated ties. Our choice to consider the most basic definition of network positions is due to the imperfection of our data. As already noted, we miss information on claims of friendship coming from individuals outside the sample but within the same class. Further, the survey design constrains each respondent to make at most three claims of friendship. The consideration of indirect and reciprocated ties would only amplify the issue of measurement error in our data. By contrast, the network positions we construct allow us to pin down the nature of the misclassification across positions, yet maintaining their relational nature. For an extensive discussion of different "notions of position" and their applicability in several areas of social network analysis, see Borgatti and Everett [1992].

social approval without the need to promote any ties on their own part. Those who receive approval and are reciprocating in the sense of promoting friendship ties on their own are classified as *brokers*.[4] Brokers {1,2,5,6,8,9,10,12} are also commonly referred to as "ordinaries" as they represent the most frequently occupied position.

D Descriptive Statistics and Some Preliminary Checks

For the construction of the above measures we use information of 8,018 respondents to the 1975 questionnaire who provided names of their best friends in 1957. The average number of individuals observed per graduating class is close to 53 students, ranging from minimally 10 to a maximum of 130. We use all respondents and the corresponding social relations irrespective of individuals' characteristics such as gender, religion or race. This allows us to exploit all the relational information available in our data. Once the relational measures are constructed, we may treat them as personal attributes and restrict our attention to any subsample for further empirical analysis. In order to abstract from gender and discrimination issues in labor force participation and wage determination, we restrict our attention to 2,514 full-time employed males for whom we have information on adult earnings and control variables.

In this context, we would like to emphasize that our focus does not lie on explaining "who links with whom" in terms of characteristics as in Marmaros and Sacerdote [2003] or Alesina and La Ferrara [2002]. This is certainly not for lack of interest in the research question. It is the imperfection in our data -the substantial number of missing nodes and ties in each class- that denies us to get a better handle on this issue. This also implies that we cannot perfectly control for friends' characteristics when estimating earnings differentials and purging our estimates of possible confounding factors. Nevertheless, in Section IV we will make extensive use of information which could potentially explain a student's friendship relations and social status within the group. In the end, since ties tend to occur among persons with similar attributes, conditioning on respondents' own attributes may be largely collinear with conditioning on characteristics of those he is affiliated with.

In column 1 of table 1, we report descriptive statistics of all sociometric measures. As

[4]Throughout the paper we use the term reciprocation in a very broad sense. Ties need not be directed towards those from whom a claim was received.

mentioned before, we do not observe claims of friendship coming from individuals outside the sample, but within the same school class, towards WLS members. This makes the observed in-degree index, and therefore the network typology we construct, subject to systematic measurement error. In particular, true receivers may be misclassified as isolates and true brokers as sycophants while true isolates and true sycophants will always be correctly classified. Since the observed distribution of types is multinomial, measurement errors are functions of the true values and correction methods based on classical errors-in-variables (CEV) models do not apply directly. However, to the extent that we are able to identify the functional relationship between errors and true values, we are in the position to transform the observed distribution of types such as to make it conform to CEV assumptions.

Our correction method is based on a measurement error model for multinomial random variables [Fuller 1987], detailed in the appendix. The measurement errors are represented by a matrix, each element of which defines the probability that a student whose true type is j, is wrongly assigned to category i. We derive these misclassification probabilities in two steps. In the first step, we estimate the (mis)classification that would occur once the links that students within the sample sponsor towards students outside the sample were ignored. In the second step, we show that the misclassification induced by the limitations of our data is symmetric in nature to the one which we estimated in the previous step. This allows us to derive the functional relationship between the mean of the error variable and the mean of the true variable and to impose the correction matrix in estimation of the earnings effects.

Column 2 of table 1 presents summary statistics for the corrected measures. Comparing column 1 with column 2, we note a number of differences between the observed and corrected classifications. First of all, sycophants and isolates were over-represented while broker and receiver categories were under-represented. Moreover, it is reassuring to see that after the correction brokers (ordinaries) constitute the most frequent type. Isolate and receiver categories are about equal in size and form the two smallest categories. This comes as no surprise. Ranking among the most popular in class can only hold true for a limited number of students simultaneously. There must be a "pack" for the leaders-of-the-pack to exist. Moreover, human beings are social beings. It is therefore also well in line with intuition to find that social isolation is a comparatively infrequent incident.

In column 3 of table 1, we analyze the relation between our sociometric measures and class size. To this end, we simply regress the size of a student's class (in mean deviation form) on the full set of dummy variables representing individuals' various network positions, correcting for misclassification error and omitting the constant term. We find that having zero out-degree is positively and significantly associated with being in a larger class. This is an interesting observation for two reasons. Firstly, the out-degree index is the one we observe without error and, secondly, this finding is perfectly in line with existing evidence on social participation and school size. We shall return to this point in a moment. To finish our description, the in-degree index does not appear to be related to class size at all. For the network typology, we find that being isolated corresponds to being in a larger class. The remaining three categories, in contrast, appear to be unrelated to class size. Interestingly, Postlewaite and Silverman [2004] report that the rate of participation in high school athletics is decreasing in the population of the school. Zero out-degree and being isolated are two alternative indicators for a lack of initiative to participate and interact socially. The fact that we reach similar conclusions with alternative measures supports the view that our variables are sensible proxies for individual social capital.[5]

We finally investigate possible relations between our sociometric measures and the fraction of students sampled on a class level. If the measures were mere artifacts of the rules for including and excluding nodes, we should find sizeable correlations with the fraction of a class sampled. Column 4 of table 1 shows that such effects are virtually absent. Moreover, when later estimating the effects of our measures on earnings, we shall always include dummy variables for each school (class). Since the WLS interviewed students in their final year of high school, that is one class per school, the two notions coincide and shall be used interchangeably throughout. Controlling for school fixed effects absorbs anything that is constant among classmates but varies across school classes. Therefore, we also automatically account for differences in class size or proportion of students sampled. There is another compelling reason for the inclusion of fixed effects. Our

[5]At first sight, isolation and class size being negatively related appears counterintuitive. From a statistical point of view, one would expect the converse: given that individuals match on characteristics, increased class size increases the likelihood that a given student finds another person being sufficiently self-similar. On the other hand, there may be a number of offsetting factors about which we can only speculate: One possible explanation could be that teachers of larger classes adopt pedagogical practices that inhibit social interaction among students to stay in control. Another potential explanation relates to the way students interact among themselves. Larger classes may actually be more "anonymous" due to clique formation and segregation of students into disconnected subgroups [Hallinan and Smith 1989].

measures refer to the social rank of an individual *within* a particular class. Comparison of such relative measures are meaningless across classes. However, in regressions that include fixed effects, they capture differences in social standing within the same high school class.

III Network Position in School Class and Adult Earnings

Let us start off by examining whether in our data there are sizeable correlations between social position in school class and wages earned later in life. We are able to measure wages at a relatively advanced age and thus capture the cumulative effects of differences in network position that have materialized over the entire life course.

Table 2 compares deviations from mean log wages by out-degree, in-degree and network position. We consider male workers only and exclude those who are self-employed, work less than 20 hours per week, and earn less than one dollar per hour. We find that having zero out-degree leads to a marginally significant 6.9 percent pay penalty while having positive out-degree is not associated with any significant pay difference compared to the average. The results for the in-degree measure are distinctly sharper. Not receiving any social approval from class-mates, as reflected by zero in-degree, leads to a statistically significant 11.4 percent penalty while possessing positive in-degree receives a significant premium of 9.1 percent relative to the mean. This amounts to a pay difference of more than 20 percent between individuals who were not mentioned at all and those who received claims of friendship. It is interesting to note that this difference is driven to largely equal extents by the penalty associated with zero in-degree and the reward for having positive in-degree. Overall, we find that receiving (not receiving) has much stronger effects on wages than sending (not sending).

Considering network positions, our primary variables of interest, it is the harsh penalty for the isolate that immediately strikes the eye. Social isolation, in the sense of a voluntary choice of not promoting ties and simultaneously not receiving approval from others, is associated with more than 40 percent lower average wages. Of course, the definition of isolation employed here is a highly stylized one and these strong effects apply to a fraction of workers of approximately 6 percent in our sample. And yet, on an individual level, the economic consequences of social isolation during adolescence appear to be substantial. Turning to the other types, we find that

the wage of sycophants is 9 percent lower than average. Apparently, individuals who cited others without having their choices reciprocated fare much better than isolates, but still earn below average. Individuals who acted as brokers in their respective school class earn 8.6 percent more than the average. Individuals who maintained a primary position -receiving unreciprocated ties- in their class network, earn 33 percent more than average 35 years later. As for the isolates, this large premium applies to only a small fraction of workers in our sample; only 4-5 percent are classified as receivers.

In summary, we observe a clear ordering in terms of the wage premia and penalties. The higher the social approval or the more prestigious the position of an actor, the higher the reward. Those in broker and receiver positions receive a wage premium while sycophants and isolates are being penalized by the market. All specifications control for school fixed effects and thereby absorb any differences in class size or fraction of students sampled. Still, to the extent that network positions depend on relational information available on a class level, the estimated mean log wages for the various network positions might be unduly influenced by outlying observations. These concerns relate specifically to subsets of individuals in small classes or classes of which only a tiny fraction is represented in the data. Columns 4 and 5 provide an informal check on model sensitivity to outliers by deleting small portions of our reference sample. In the specification of column 4 we omit individuals in small classes of five sampled students and less. In column 5 we estimate the model omitting those who were in classes of which less than twenty percent of the students were interviewed. Note that our earlier estimates appear to be largely insensitive to the exclusion of these observations. We therefore decide to work with the earlier, and larger, sample of 2,514 observations in all subsequent analyses.

IV Explaining the Earnings Premia and Penalties

A An Effect of Family and School Characteristics?

In this and the following two subsections our primary focus will be on purging the estimates of the influence of possible confounding factors. In particular, we move on to account for a relationship between the social standing of an individual in his school class and aspects of family background. Growing up in families with less human and financial capital may lead to stigmatization by class

mates and possibly to social isolation. Similarly, being the son of affluent parents may lead to many claims of friendship received, for reasons other than a genuine capability of gathering a large number of affiliates.

Compared to our first, basic, specification (col. 3 of table 2), we introduce arrays of dummy variables for father's and mother's level of education and type of occupation, as well as a continuous measure of respondents' number of siblings. Parents' education and type of occupation should proxy for family resources like wealth and the sibling count controls for the possibility of intersibling competition for scarce family resources. Adding a vector of controls for differences in family characteristics (col. 1 of table 3; detailed estimates omitted) reduces the coefficients for isolates and receivers by approximately 5 percentage points each. The estimates for the sycophant and broker categories are only marginally affected. In relative terms, about 10 percent of the earnings disparities associated with the various positions appear to work through observable differences in family background. The estimation results show that the sociometric measures impact strongly on wages and operate largely independent of family resources and school characteristics.

One may argue that there are unobserved family resources that we are omitting due to the imperfect quality of our measures. It is clearly impossible to control for such unobservable variables. However, inference may be still be drawn about their effects to the extent that these variables are correlated with choice of school. It is plausible that differences in unobserved family-specific characteristics affect the type of school an individual attends. High social-class parents will decide to reside in certain neighborhoods, and thereby school districts, or may even afford their child private school education. However, these potential effects are accounted for by the inclusion of dummy variables for each school class across all specifications. Indirect evidence therefore suggests that the estimated pay differences should not primarily reflect omitted, unobserved family resources. Note, that we also implicitly control away any systematic differences in (unobserved) measures of school quality such as student-teacher ratio, denominational control, gender composition or racial heterogeneity.

B A Proxy for Intelligence or Grade Rank in Class?

Another potential reason for disparities in the average adult outcomes across network positions may be correlation with some productive unobservable related to ability. The WLS has a com-

prehensive measure of adolescent cognitive ability collected in the initial survey year. Adding standardized scores on the *Henmon-Nelson Test of Mental Ability* to the previous specification as proxy for individual differences in intelligence reduces our estimates further (col. 2 of table 3). The coefficient for isolates drops by another 5 percentage points, while the estimates for the other types are only marginally altered. Despite this reduction, an isolate still faces a significant and very large penalty of 32.6 percent compared to the wage of an average individual. Compared to our first, basic, specification (col. 3 of table 2), this indicates that roughly 80 percent of the adverse effects of adolescent social isolation work independently of family background, school characteristics and cognitive ability.

One may object that while cognitive ability may be accurately observed by the econometrician, it is not by class mates. And, since our relational measures are based on social interaction, conditioning on alternative measures of ability that are readily observable to the individuals under study might be more sensible. Suppose now that our sociometric measures were proxying for a student's relative position in terms of grades within his class. The WLS reports rank in high school graduating class by percentiles. Comparisons of this variable across high schools -much alike our network positions- are meaningless. However, in regressions that include high school fixed effects, it captures differences in academic performance within the same high school class. Accounting for differences in class rank (col. 3) has very similar effects to conditioning on IQ-scores. Moreover, introducing both measures simultaneously (col. 4) shows that class rank adds very little to explaining the estimated penalties and premia beyond the specification with only IQ-scores. We interpret these results as to suggest that a substantial portion of the pay differences is not due to selection on cognitive traits. Rather, our results indicate that social rank in school class may have an economically substantial direct influence on later wages.

C An Effect of Friends' Characteristics?

Controlling for high school fixed effects absorbs anything that is constant among classmates but varies across school classes. We thereby purge our estimates of the possible confounding influences of peer characteristics at a fairly general contextual level. This means that we implicitly account for variables such as peers' average IQ, the percentage of classmates that is planning college, and peers' household characteristics such as average parental income and education. Having said this,

one may argue that we are ignoring a contextual level that is more influential than classmates. This second level of context refers to characteristics of the subset of classmates who are being considered friends by the individuals in our sample. The most natural approach would of course be to take averages over characteristics of those classmates who were mentioned as friends by our primary respondents. Due to the missing data issue we opt for a different route.

The WLS allows us to partial out these effects to some extent through detailed information on an alternative question asking "what most of respondent's friends in 1957 were going to do: attending college, getting jobs, going into military service, or doing something else". Column 5 of table 3 presents results from a regression in which we add to our reference specification (col. 1) a set of indicator variables for what respondent's friends were doing. The coefficients should be interpreted as estimated payoffs relative to an omitted reference category in which we pooled all those who were doing something else or had missing information. We find that friends' characteristics, mainly through the decision to attend college, have an independent positive impact on respondents' wages. However, compared to column 1, the effect of controlling for friends' characteristics on the estimated pay differences is negligible. This finding is consistent with the fact that social ties tend to occur among persons with similar attributes. Conditioning on respondents' own attributes is likely to capture most of these potentially confounding influences.

D Does it Work through Social Capital Accumulation?

So far, we did not control for variables such as postsecondary schooling, marital status, or occupation which are choice variables and therefore endogenous. Instead, we looked at reduced-form wage equations that conditioned on variables determined before post-secondary education and pre-labor market: school resources, family background, cognitive ability, grade rank and friends' characteristics.

Here, we depart from that route and start investigating the channels through which position in school class influences later wages. A channel that is likely to be of great importance is the accumulation of social capital in the course of one's labor market career. Joining a social network may be one of the most common forms of social capital investment. These networks could be anything ranging from labor unions, political clubs and hobby groups to broad classes of individuals with a common social characteristic such as the same nationality. In all cases,

organizational participation diminishes social distance between the individual and some social group. This leads to information flows, which usually serve both the investor and the other members of the network.

The empirical work on social capital often uses survey responses about the number of organization or group memberships and the frequency of contact with friends and family members as proxies for social capital [Glaeser et al. 2002, Durkin 2000]. The WLS asked respondents about the extent of their social participation in a variety of different groups, associations, clubs and organizations. The data set also contains detailed information on frequency of contact with friends and relatives. We are therefore in the fortunate position to be able to disentangle how much of the effects of adolescent social capital on market outcomes work through *current* social participation.

First, we construct a variable representing the total number of group memberships. This variable is based on a simple count of memberships, ignoring the intensity of participation. In forming this measure, we exclude the subset of organizations with a strong consumption component.[6] This ensures that our measure properly reflects the current stock of an individual's social capital investments. Second, we derive an alternative measure that tries to capture variation in the extent to which people are active in the various groups. We simply weight the number of memberships by the intensity of participation.[7] As mentioned earlier, another very common set of proxy variables for social capital is related to the frequency of contact with friends and family members. The WLS collected information on how many times, if at all, during the past four weeks respondents have gotten together socially with friends and relatives, respectively.

Table 4 presents results from regressions in which we add to our set of explanatory variables various measures proxying for the current stock of individuals' social capital. All specifications

[6]Our measures include any participation in church, church-connected groups, labor unions, veterans' organizations, business or civic groups, parent-teacher associations, community centers, organizations of people of same nationality, youth groups, professional groups, political clubs, neighborhood improvement organizations, charity and welfare organizations. We follow Glaeser et al. [2002] and exclude fraternal organizations and lodges, sport teams, country clubs, and hobby groups. If there was some missing data and some valid data on participation items, the missing data was counted as not being involved in that organization. If the entire social participation section had missing data codes, individuals were treated as not being involved. However, we included a flag for these observations in our regressions in order to distinguish them from non-participating respondents. This and all subsequent log transformations of participation counts are done as follows: $\log(n+1)$. Of course, this is not a fully accurate treatment of non-participation, but it is an approximation that may be sufficient for our purposes.

[7]For intensity weighted participation, the WLS coded the degree of activity in the following way: no involvement (0), very little (1), some (2), quite a bit (3), a great deal of involvement (4).

control for school fixed effects, differences in family background and IQ, that is, those factors that have been shown to be of relevance in earlier specifications. Detailed results of this baseline model are presented again in column 1 for ease of comparison (c.f. col. 2 of table 3). Adding the log number of memberships (col. 2) reduces the coefficient for the isolates by 3.7 percentage points and the premia for receivers by 2.3 percentage points. The remaining two categories are only weakly affected, the estimates being reduced by less than half a percentage point. Using the alternative membership measure that weights participation by the intensity of involvement (col. 3) leaves this picture virtually unchanged. Our estimations also indicate that the wage disparity among types is certainly not due to current frequency of contacts with friends and relatives (cols. 4 and 5). The estimated effects are almost identical to what they were in the absence of conditioning on contacts. In sum, this suggests that about 10 percent of the pay differences for receivers and isolates are mediated through their current stock/lack of social capital (col. 6).[8]

E Other Channels

The model underlying our empirical results views the network position youths maintain by their late teens as a predetermined initial condition that shapes the future path of human and social capital accumulation and, hence, wages. In this last subsection we look at an array of alternative channels like post-secondary schooling, marriage, job finding and type of occupation through which the earnings gaps might develop. Detailed regression results are presented in table 5. As before, all specifications control for school fixed effects, differences in family background and IQ (see col. 1 of table 4 for the baseline model).

Post-Secondary Schooling.— The positive relationship between social capital and human capital variables is one of the most robust empirical regularities in the social capital literature; see for example, Helliwell and Putnam [1999]. One explanation for this connection is that schooling plays a central role in developing such skills [Bowles and Gintis, 2002]. Another possible explanation is that the marginal value of social participation is increasing in the level of individual human capital. Since our sample is based on a cohort of equal age individuals who all completed high

[8]Receivers, along with brokers, are those individuals who are most frequently involved in organizations. Interestingly though, receivers appear to have much less contact with friends and relatives than any other type (see table A1). One reason might be that receivers -earning the highest wages- have a high opportunity cost of time and substitute away from family and friendship ties towards organizational memberships.

school, differences in human capital accumulation are identified by differences in post-secondary educational attainment. Including the years of schooling completed as a control variable in our regression (col. 1 of table 5) shows that there are some complementarities between initial levels of social capital and subsequent human capital accumulation. Overall, the nature and magnitude of the effects is very similar to what we found when conditioning on social participation variables.

Marriage.— Finding a partner for life and getting married is "relational" in the most literal sense. Virtually all cross-sectional wage studies find that currently married men earn a premium in the labor market, holding other characteristics constant [e.g. Korenman and Neumark, 1991]. This finding is relevant for the present work to the extent that our measures of adolescent social capital impact on later marriage decisions. The results presented in column 2, conditioning on being currently married, show only insignificant changes in the estimates. The largest change occurs for the isolate with a 1.6 percentage point reduction compared to the reference specification. The direction of the effect suggests that those who were isolates during high school tend to be married less frequently at later ages. However, the extent to which this mediates the wage gap compared to other types is very moderate.

Job Finding.— It is well recognized that the social ties of an individual may play an important role for the kind of search methods that are used by job seekers [e.g. Montgomery, 1991; Granovetter, 1974]. Many workers make use of informal contacts to former co-workers and acquaintances in their job search, instead of relying on employment agencies or direct application. Montgomery [1991], to quote one example, reports that approximately 50 percent of all workers currently employed found their jobs through informal channels, with the frequency of alternative job-finding methods varying somewhat by gender and occupation. Based on a question about how WLS respondents' got to know that their current job was available, we constructed an indicator variable for their job-finding method. Responses are classified into two categories; informal contacts like friends or acquaintances, former co-workers, teachers, clergypersons, relatives, and formal channels like employment agencies, newspapers and professional meetings or conferences. We note that the job-finding method does not appear to impact on wages itself and is also not mediating much of the wage disparities across types (col. 3).

Occupation Choice.— To investigate the correlation between pre-labor market measures of interpersonal skills and the distribution of workers across occupations, we condition directly on

single-digit occupation codes based on the Bureau of the Census classification system (cols. 4 and 5). Our results document that the earnings differentials among types are not complementary with any particular vocational path. This lends little empirical support to a productivity model in which more socially skilled workers are observed in greater proportions in occupations where such skills are rewarded. Our measures appear to proxy some social attribute that is generally valued in the labor market, irrespective of an individual's occupation.

V Discussion

This study was motivated by a growing interest in the behavioral outcomes of the schooling process and their relevance for individuals' subsequent success in the labor market. We adopted the view of the school class as a social system in which classmates assume important socialization functions. They provide an environment of status-equals in the absence of direct adult supervision and control. Social interaction and voluntary informal association with classmates may be viewed as a kind of early on-the-job training in the business of interpersonal behavior. This contrasts sharply with top-down instructions from generation superiors in the familial context but also through teachers in formal class room situations. Even though the school remains largely adult-controlled and teachers play a role of outstanding importance, it is the dimension of social interaction among equals that we consider fundamental to the development of behavioral skills valued in the labor market.

Based on detailed information on adolescents' friendship relations, our network approach allowed us to utilize a number of sociometric measures that position individuals within the social system of their high school class. We presented evidence that differential social standing in adolescence causes large and persistent earnings disparities over the entire life course. The estimated wage premia and penalties do not appear to be substantially confounded by measures of family and school resources, nor are they proxying for differences in cognitive abilities, grade rank in class or peer characteristics. Our results indicate, though, that a moderate fraction of the earnings inequalities is mediated through post-secondary human and social capital accumulation.

Interestingly, the structure of the effects we find corresponds very well with different levels of "youth-culture" that Parsons [1959] identified in his essay: There is a middle level without clear

status-differentiation in which individuals are characterized by "being a good fellow" in the sense of general friendliness and readiness to take responsibility in the informal group when something needs to be done. In our view, individuals in sycophant and broker positions correspond to this middle level. Above this, there is a level of "outstanding popularity" characterized by persons with qualities of "leadership" who are turned to where unusual responsibilities are required. Clearly, these are those who occupy primary positions within the network of relationships, that is, receiver-type of individuals. Below the middle level are those with behavioral patterns bordering on delinquency, withdrawal, and generally unacceptable behavior –the socially isolated in our study. This last level is the one that is clearly "dysfunctional" compared to expectations of appropriate behavior.

The results for the socially isolated deserve special attention. The magnitude of the wage differential, relative to an average person, is enormous: between 40 and 25 percent, depending on the set of controls entered (col. 3 of table 2 and col. 6 of table 5). Much more importantly though, the case of social isolation may be key to understanding what kind of valuable skills are acquired through social interaction with classmates. The graph theoretical notion of an isolate being "infinitely distant" is a lucid illustration. Isolates provide us with the counterfactual of what happens if socialization pressures do not reach individuals. Many research studies have shown that persons with low social acceptability among peers are generally characterized as shy, withdrawing individuals or as noisy, rebellious, socially ineffective persons. They lack the interpersonal skills and social adaptability that others have acquired from working in groups, participating in student clubs and athletics, all of which foster informal association with classmates. These are also the broad conclusions that other authors have drawn before us, using different data and measures. What we contribute to the literature is a parallel set of findings based on a decidedly micro-sociological approach, both in terms of perspective and method.

Related Literature.— There are many studies that emphasize the economic importance of participation in social activities. One very recent and related example is Postlewaite and Silverman [2004], who examine social isolation in terms of voluntary nonparticipation in high school athletics.[9] They conclude that the observed earnings differences are not primarily due to selection

[9]In terms of the layout of our empirical analysis, we borrow fairly generally from their companion paper on teen height and labor market outcomes (Persico, Postlewaite and Silverman 2004)

on predetermined characteristics, but reflect valuable skills acquired through social interaction. Earlier work on the effects of high school athletic participation and education and labor market outcomes includes Barron et al. [2000], and Maloney and McCormick [1993]. We have already mentioned in the introduction that there is a growing literature on behavioral and psychological variables (e.g. Carneiro and Heckman [2004]) and labor market outcomes. This line of work draws a number of important conclusions in relation to our analysis. First of all, despite some differences in naming, it points out the relevance of noncognitive abilities in shaping socioeconomic success. Secondly, it stresses that human capital accumulation (including the social capital components) is a dynamic life cycle process. Behavioral skills, broadly defined, develop in the relations to others and are the outcomes of a prolonged process of socialization stretching from early childhood in the family, through the entire schooling phase, and quite possibly continuing "on-the-job".

Limitations.— There are limitations that our work shares with virtually all studies in the literature. To begin with, what kind of valuable social skills are being identified? The fact that we are still struggling with generic terms like noncognitive skills or individual social capital is indicative of the state of the field. A great variety of individual behavioral and personality attributes are lumped together in practice, for lack of anything better. No single factor has yet assumed a comparable role among the noncognitive abilities as the common g-factor on the cognitive side, and we agree with Heckman and Rubinstein [2001, p.145] that "it is unlikely that one will ever be found". Comparing GED recipients with other high school dropouts and comparing isolates with average students are two alternative routes to identify valuable interpersonal skills. But, it is not entirely clear whether a GED recipient, for instance, is different from other dropouts because this person lacks persistence, discipline and motivation, or because of something else. GEDs might also be those cross-pressured individuals who could potentially be upwardly mobile due to their cognitive skills, but who would need to "burn their bridges" with family and status peers to do so. Social disapproval may pressure them to behave in a regressive manner and to show indifference to their school performance. The upshot of our discussion here is that explanations based on psychological factors are not the whole story and that much of the existing evidence is equally consistent with a micro-sociological interpretation. Both approaches leave it to future studies to examine which factors in particular are being captured.

There remains the related question of how much of individual social capital is due to psycho-

logical dispositions -largely influenced by genetic inheritance- and how much is acquired through socialization pressures? From the point of view of social psychology, it is well-recognized that interpersonal behavior is shaped to a significant degree by the personal dispositions of the individuals involved. Our measures of interpersonal associations may therefore simply reflect differences in inborn personality traits. Fortunately, the personality inventory of the WLS affords us a comprehensive set of variables to address this issue. In regression analyses not detailed here, we have included measures of respondents' character dispositions at age 53, based on the Five-Factor Model (FFM) of personality structure [Costa and McCrae 1992, Goldberg 1990]. According to the FFM, five independent categories are sufficient to describe individual personality differences at the broadest level of abstraction: extroversion, agreeableness, conscientiousness, neuroticism and openness to experience. FFM traits are shown to have a statistically significant and economically important impact on wages [Mueller and Plug, 2004]. We find similar effects here, however, conditioning on these dispositional measures leaves the estimated earnings premia and penalties on sociometric position largely unaffected. Our interpretation of the evidence is that there are valuable skills acquired through interaction with classmates and that subsequent earnings disparities do not primarily reflect selection on predetermined personality traits.

Some Thoughts on Human Capital Policy.— When economists study skill formation and analyze treatment effects of policy programs, they often focus on the development of cognitive skills as measured by performance on ACT or SAT college entrance exams (e.g. Krueger and Whitmore [2001]). In contrast, our analysis emphasizes the importance of the social component in human capital formation and thereby adds another dimension to the outcome space along which interventions have to be evaluated. This point has been made earlier by Carneiro and Heckman [2004]. What we want to add to the discussion is a conceptual consideration that follows directly from our micro-sociological stance.

Let us take the example of a policy that seeks to increase the quality of schooling by means of a class size reduction. The underlying mechanism is of course that a given amount of school resources is shared by a smaller number of pupils, a reduced student-teacher ratio being one example. Whatever the precise setup of the experiment, by focussing on the consequences for performance on cognitive ability tests, one important outcome is left out of consideration: the group structure of the school class is affected. There exists an extensive literature in sociology

of education which examines the effects that classroom characteristics have an impact on the formation of friendships among classmates (see e.g. Hallinan [1979], and Hallinan and Smith [1989]). This work provides strong empirical evidence suggesting that both, pedagogical practices and class size, play a crucial role in the determination of the structural properties of school class social networks. For example, an empirical regularity is that social networks of larger classes exhibit a higher number of disconnected groups, which implies a higher level of segregation within the class.

When discussing the relation between our measures of position and class size we found a positive relation between being socially isolated and being in a bigger class. Such a relation was absent for the other types. It appears that student networks in smaller classes exhibit a higher degree of connectedness with fewer nodes being infinitely distant. Reducing class size means reducing social distance among members and, on an individual level, implies a lower incidence of social isolation. This would avoid its adverse consequences in terms of individuals' earnings and quite possibly many other important life outcomes. Obviously, with our data we cannot provide a proper treatment effect analysis of class size reduction. Nevertheless, our discussion strongly suggests that there may be significant "side effects" affecting the formation of the social capital component in human capital. It is important to recognize that there are multiple channels of influence and a number of outcome dimensions when designing educational policies and evaluating them in terms of their effects, costs and benefits.

Closing Remarks.— With our paper, we sought to contribute a compelling example of the potential that lies in egocentered network methods for survey-based economic research. Our simple application provided a methodological preview on the wide applicability of social network analysis and economic relevance of sociological concepts. A number of areas for further research open-up from here. First, one could extend our analysis and relate individuals' social status to other economically relevant choices and outcomes. Table A1 is suggestive of the fact that social capital investment and marriage decisions or job search channels are likely to be interesting candidates. From this perspective, the use of egocentered network methods may complement the existing literature on individual social capital in vein of Glaeser et al. [2002] by providing a rich set of alternative measures.

Second, given our strong findings in terms of adult earnings inequalities, it is immediate to ask

which are the idiosyncratic and institutional factors leading to the emergence of differential social standing. In other words, we could treat the sociometric position of a person within a group as the dependent variable. The emergence of individuals' social status may be influenced by the size of the class, by gender composition and racial heterogeneity within the class, or by factors such as type, quality and denominational control of a school. Similarly, classmates' family characteristics, cognitive ability and future plans, among others, may directly influence the decision of students to interact with one another. Such analysis would contribute to the recent literature addressing the determinants of social interaction (Alesina and La Ferrara [2002], Marmaros and Sacerdote [2003]).

Third, network analysis could prove highly instrumental for the emerging field on the importance of sociological concepts within economics (recently summarized by Gibbons [2004]). It equips the economist with a rigorous toolbox to approach many inherently relational concepts of interest, such as trust, identity and social capital. The most problematic aspect is the availability of accurate relational data and -at the same time- measures of relevant economic outcomes. In light of what has been said earlier, we note that complete network data collection and conventional survey designs are not always incompatible. If the social system of interest is bounded to a reasonable size, like the school classes in our study, one could easily collect information on the full set of ties among students. Sampling could then occur on the class instead of the individual level. Moreover, longitudinal data containing repeated observations of social associations among the same set of individuals would allow us to study the formation and evolution of friendship patterns during school time. This would open up the possibility for treatment effect analysis of a variety of policies affecting the structural characteristics of a school or a classroom. In our view, increased efforts to integrate the collection of egocentered network data into conventional survey designs are likely to bear great potential for future work.

Appendix

A Misclassification Error in the Role Typology

The observation process consists of assigning each of the n students in our sample to one of four mutually exclusive and exhaustive categories: isolate, sycophant, broker and receiver. We denote each observation as a vector $\mathbf{A_t}$. If the t-th sample element is placed in the first category ('isolate') of the classification, we write $\mathbf{A_t} = (1, 0, 0, 0)$; if the t-th sample element is placed in the second category ('sycophant'), we write $\mathbf{A_t} = (0, 1, 0, 0)$; and similarly for the remaining two categories. The j-th element of the $\mathbf{A_t}$ vector, denoted by A_{tj} is a binomial random variable that takes the values zero and one. It follows that the observed distribution of $\mathbf{A_t}$ obtained by making a single determination on each student in our random sample is multinomial.

We formalize the measurement error process according to the *right-wrong* model for multinomial variables as outlined by Fuller (1987). According to this model, every student truly belongs to one and only one of the four categories. The measurement error is characterized by a set of misclassification probabilities κ_{Aij}, where κ_{Aij} is the probability that a student whose true category is j is (wrongly) assigned to category i. To give an example, the first column of the $\boldsymbol{\kappa_A}$ matrix contains the misclassification probabilities for the isolate. That is, conditional on truly being an isolate, it contains the probability that a student actually is classified as an isolate, or misclassified as a sycophant, a receiver or a broker. It is assumed that every element in true category j has the same vector of misclassification probabilities, that is, we ignore individual fixed effects in measurement error.

B Correcting the OLS Estimates

It is clear that with multinomial variables, the expected value and the variance of the measurement error are functions of the true values. Therefore, classical errors-in-variables (CEV) models that are useful when continuous variables are measured with additive noise do not apply in this situation. However, if the matrix $\boldsymbol{\kappa_A}$ of misclassification probabilities is known, one can transform the observations $\mathbf{A_t}$ as to make the model conform to CEV assumptions.

Now, consider a simple regression equation where we insert dummy variables based on our multinomial data as explanatory variables. Assume that the vector of true values $\boldsymbol{x_t}$ satisfies the

following linear model

$$Y_t = \boldsymbol{x_t}\boldsymbol{\beta} + e_t, \qquad \boldsymbol{A_t} = \boldsymbol{x_t} + \boldsymbol{\xi_t}, \tag{1}$$

where $\boldsymbol{x_t}$ is a 4-dimensional vector with a one in the jth position and zeros elsewhere when student t is in the jth category. The equation error e_t is assumed to be independent of $\boldsymbol{x_t}$ and independent of the error $\boldsymbol{\xi_t}$ made in determining $\boldsymbol{x_t}$. Then, if we apply the following transformation to the observed vector

$$\boldsymbol{X_t'} = \boldsymbol{\kappa_A^{-1}}\boldsymbol{A_t'}, \tag{2}$$

we obtain $\boldsymbol{X_t} = \boldsymbol{x_t} + \boldsymbol{u_t}$, with $E\{\boldsymbol{u_t}\} = \mathbf{0}$ and $E\{\boldsymbol{X_i} \mid i = t\} = \boldsymbol{x_t}$ for all t. Therefore, the vectors $\boldsymbol{X_t}$, $\boldsymbol{x_t}$, $\boldsymbol{u_t}$ are conform to CEV assumptions of zero mean errors that are uncorrelated with the true values.

Due to the transformation applied, we can now write

$$\boldsymbol{\Sigma}_{XX} = \boldsymbol{\Sigma}_{xx} + \boldsymbol{\Sigma}_{uu}, \tag{3}$$

with

$$\begin{aligned} \boldsymbol{\Sigma}_{uu} &= \boldsymbol{\kappa}_A^{-1}\boldsymbol{\Sigma}_{AA}\boldsymbol{\kappa}_A^{-1\,\prime} - \boldsymbol{\Sigma}_{xx}, \\ \boldsymbol{\Sigma}_{AA} &= diag(\mu_{A1}, \mu_{A2}, \mu_{A3}, \mu_{A4}) - \boldsymbol{\mu}_A'\boldsymbol{\mu}_A, \\ \boldsymbol{\Sigma}_{xx} &= diag(\mu_{x1}, \mu_{x2}, \mu_{x3}, \mu_{x4}) - \boldsymbol{\mu}_x'\boldsymbol{\mu}_x. \end{aligned} \tag{4}$$

This is the classical errors-in-variables decomposition where the variance of the observed values $\boldsymbol{\Sigma}_{XX}$ is modelled as the sum of a true variance ('signal') component $\boldsymbol{\Sigma}_{xx}$ and an error variance ('noise') component $\boldsymbol{\Sigma}_{uu}$. The observed sample proportions and the true population proportions of isolates, sycophants, brokers and receivers are denoted by $\boldsymbol{\mu_A} = (\mu_{A1}, \mu_{A2}, \mu_{A3}, \mu_{A4})$ and $\boldsymbol{\mu_x} = (\mu_{x1}, \mu_{x2}, \mu_{x3}, \mu_{x4})$ respectively.[10] For detailed derivations and proofs see Fuller (1987). Then, a consistent estimator of $\boldsymbol{\beta}$ is

$$\hat{\boldsymbol{\beta}} = (\boldsymbol{X'X} - \hat{\boldsymbol{\Sigma}}_{uu})^{-1}\boldsymbol{X'Y} \tag{5}$$

[10]Knowing $\boldsymbol{\kappa}_A$, an estimator of the vector of true proportions is given by $\hat{\boldsymbol{\mu}}_{\boldsymbol{x}}' = \boldsymbol{\kappa}_A^{-1}\boldsymbol{\mu}_{\boldsymbol{A}}'$. The fact that $\boldsymbol{\mu}_x$ must be estimated, introduces some error into $\hat{\boldsymbol{\Sigma}}_{uu}$ (and therefore into the variance of the estimator of $\boldsymbol{\beta}$) which we have to ignore here.

and the variance covariance matrix of the estimator is obtained as

$$\text{Var}\{\hat{\boldsymbol{\beta}}\} = s^2(\boldsymbol{X}'\boldsymbol{X} - \hat{\boldsymbol{\Sigma}}_{uu})^{-1}\boldsymbol{X}'\boldsymbol{X}(\boldsymbol{X}'\boldsymbol{X} - \hat{\boldsymbol{\Sigma}}_{uu})^{-1}, \tag{6}$$

where

$$s^2 = (\boldsymbol{y}'\boldsymbol{y} - \hat{\boldsymbol{\beta}}(\boldsymbol{X}'\boldsymbol{X} - \hat{\boldsymbol{\Sigma}}_{uu})\hat{\boldsymbol{\beta}}')/(n-p), \tag{7}$$

is the root mean square error and p the number of estimated parameters.

C Derivation of $\boldsymbol{\kappa}_A$

We have shown that if the functional relationship between the mean of the error variable and the mean of the true variable is known, a transformation can be applied to the original observations such as to obtain errors conform to CEV assumptions. The question is of course how to obtain an estimate of $\boldsymbol{\kappa_A}$. We again denote the mean vector for the observed proportions as

$$\boldsymbol{\mu'_A} = \boldsymbol{\kappa_A}\boldsymbol{\mu'_x} \tag{8}$$

where $\boldsymbol{\mu'_x}$ is the vector of true proportions and $\boldsymbol{\kappa_A}$ is the matrix containing the misclassification probabilities conditional on the type. Consider the following two thought experiments.

First, suppose we started from an ideal situation in which we observed all ties, incoming and outgoing. In this case individuals would be classified correctly and there would be no difference between observed and true proportions $\boldsymbol{\mu'_x}$. Now, let us remove all those links that students within the sample receive from students outside the sample and denote the observed proportions by $\boldsymbol{\mu'_{A_1}}$. What can we say about the relation between $\boldsymbol{\mu'_{A_1}}$ and $\boldsymbol{\mu'_x}$, in other words, what is the nature of the misclassification error that occurs if some of the *incoming* links are ignored? Obviously, true isolates and true sycophants will never be misclassified, that is, they are always observed as such. But, a true receiver could be misclassified as an isolate and a true broker could be misclassified as a sycophant. This allows us to define the matrix of misclassification probabilities as

$$\boldsymbol{\kappa_{A_1}} = \begin{bmatrix} 1 & 0 & 0 & \beta \\ 0 & 1 & \alpha & 0 \\ 0 & 0 & 1-\alpha & 0 \\ 0 & 0 & 0 & 1-\beta \end{bmatrix} \tag{9}$$

with $\alpha, \beta \in (0,1)$. In particular, α (resp. β) denotes the probability that a true broker (resp. receiver) is misclassified as a sycophant (resp. isolate).

Second, suppose again to start from the ideal situation with in-degree and out-degree fully observed, $\boldsymbol{\mu'_x}$. However, now we remove the links that individuals within the sample sponsor towards individuals outside the sample and denote the observed proportions by $\boldsymbol{\mu'_{A_2}}$. That is, what can we say about the relation between $\boldsymbol{\mu'_{A_2}}$ and $\boldsymbol{\mu'_x}$ when some of the *outgoing* links are ignored? Here, a true sycophant may be misclassified as an isolate and a true broker as a receiver, while true isolates and true receivers will always be observed as such. Thus,

$$\boldsymbol{\kappa_{A_2}} = \begin{bmatrix} 1 & \gamma & 0 & 0 \\ 0 & 1-\gamma & 0 & 0 \\ 0 & 0 & 1-\delta & 0 \\ 0 & 0 & \delta & 1 \end{bmatrix} \tag{10}$$

with $\gamma, \delta \in (0,1)$. Here, γ (resp. δ) denotes the probability that a true sycophant (resp. broker) is misclassified as an isolate (resp. receiver).

Let us compare the two experiments. Under both schemes, the deletion of links occurs randomly since individuals have been sampled randomly. This implies a clear symmetry in terms of the effects on the observed proportions. Symmetry means that a fraction α of true brokers is misclassified as sycophants after performing the first experiment, a fraction δ of true brokers is misclassified as receivers after the second experiment and $\alpha = \delta$. The same argument can be made for β and γ. Compared to the ideal situation, a fraction β of true receivers will be misclassified as isolates due to deletion of incoming links; a fraction γ of true sycophants will be misclassified as isolates due to deletion of outgoing links. Since deletion occurs randomly, we will have symmetric effects in terms of misclassification probabilities, that is $\beta = \gamma$.

We are now ready to derive the $\boldsymbol{\kappa_A}$ in the following way. First, using all available information in our data we observe $\boldsymbol{\mu'_{A_1}} = [0.080, 0.523, 0.377, 0.020]$; see also column 1 of table 1. Then, we ignore all ties sponsored by sample members to non-WLS classmates and re-calculate the mean proportions, $\boldsymbol{\mu'_{A_3}} = [0.372, 0.231, 0.277, 0.120]$. We observe outflows from the sycophant to the isolate category and from the broker to the receiver category. This comes as no surprise since

the relation between $\boldsymbol{\mu'_{A_1}}$ and $\boldsymbol{\mu'_{A_3}}$ in terms of misclassification probabilities is identical to the one between $\boldsymbol{\mu'_x}$ and $\boldsymbol{\mu'_{A_2}}$. Therefore, solving $\boldsymbol{\mu'_{A_3}} = \boldsymbol{\kappa_{A_2}}\boldsymbol{\mu'_{A_1}}$ allows us to determine $\gamma = 0.558$ and $\delta = 0.265$. As we have shown above, these probabilities equal β and α respectively. This yields the desired correction matrix $\boldsymbol{\kappa_{A_1}}$. The estimates for the unobserved true proportions $\boldsymbol{\mu'_x}$ are provided in column 2 of table 1. The correction of the observed in-degree classification (zero versus positive) follows the same procedure, except that here we simply have two categories instead of four.

Data and Programs

Support for collection and dissemination of data from the Wisconsin Longitudinal Study has been provided by the National Institute on Aging (AG-9775), the National Science Foundation (SBR-9320660), the Spencer Foundation, and the Center for Demography and Ecology and the Vilas Estate Trust at the University of Wisconsin-Madison. Only we bear the responsibility for the further analysis or interpretation of these data. Copies of the computer programs used to generate the results presented in this paper are available upon request. Data and documentation from the Wisconsin Longitudinal Study are available at http://dpls.dacc.wisc.edu/WLS/wlsarch.htm.

References

Akerlof, G. and Kranton, R. (2000). Economics and Identity. *Quartely Journal of Economics*, 3, 715-53.

Akerlof, G. and Kranton, R. (2002). Identity and Schooling: Some Lessons for the Economics of Education. *Journal of Economic Literature*, 40:4, 1167-1201.

Alesina, A. and La Ferrara, E. (2002). Who Trusts Others? *Journal of Public Economics*, 85:2, 207-234.

Barron, J.M., Ewing, T.B., and Waddell, G.R. (2000). The Effects of High School Athletic Participation on Education and Labour Market Outcomes. *The Review of Economics and Statistics*, 82:3, 409-421.

Barry, B., (1998). Social Exclusion, Social Isolation and the Distribution of Income. Centre for Analysis of Social Exclusion Discussion Paper, CASE/12.

Borgatti, S. and Everett, M.G. (1992). Notions of Position in Social Network Analysis. *Sociological Methodology*, 22, 1-35.

Bowles, S. and Gintis, H. (2002). Social Capital and Community Governance. *Economic Journal*, 112, 419-436.

Bowles, S., Gintis, H. and Osborne, M. (2001). The Determinants of Earnings: A Behavioral Approach. *Journal of Economic Literature*, 39, 1137-1176.

Burt, R., (1976). Positions in Networks. *Social Forces*, 55, 93-122.

Carneiro, P. and Heckman, J.J. (2004). Human Capital Policy. In Heckman, J.J., Krueger, A.B. and Friedman, M.B. (eds.) *Inequality in America: What Role for Human Capital Policy?* MIT Press.

Coleman, J. (1961). *The Adolescent Society: The Social Life of the Teenager and Its Impact on Education.* New York: The Free Press.

Costa, P.T. and McCrae, R.R. (1992). *NE0-PI-R Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Durkin, J.T. (2000). Measuring Social Capital and its Economic Impact. Mimeo. NORC, University of Chicago.

Gibbons, R. (2004). What is Economic Sociology and Should Any Economists Care?. Forthcoming in *Journal of Economic Perspectives.*

Glaeser, E.L., Laibson, D. and Sacerdote, B. (2002). An Economic Approach to Social Capital. *The Economic Journal*, 112, 437-458.

Goldberg, L.R. (1990). An Alternative Description of Personality: The Big-Five Factor Structure. *Journal of Personality and Social Psychology*, 59, 1216-1229.

Granovetter, M. (1974). *Getting a Job: A Study of Contacts and Careers.* University of Chicago Press.

Hallinan, M.T. (1979). Structural Effects on Children's Friendships and Cliques. *Social Psychology Quarterly*, 42, 43-54.

Hallinan, M.T. and Smith, S.S. (1989). Classroom Characteristics and Student Friendship Cliques. *Social Forces*, 67, 898–919.

Heckman, J.J. and Rubinstein, Y. (2001). The Importance of Noncognitive Skills: Lessons from the GED Testing Program. *American Economic Review*, 91, 145-149.

Heckman, J.J., Stixrud, J. and Urzua, S. (2004), The Effects of Cognitive and Non-Cognitive Skills on Labor and Behavioral Outcomes. Mimeo. University of Chicago.

Helliwell, J. and Putnam, R. (1999). Education and Social Capital. NBER Working Paper No. 7121.

Maloney, M.T. and McCormick, R.E. (1993). An Examination of the Role that Intercollegiate Athletic Participation Plays in Academic Achievement: Athletes' Feats in the Classroom. *Journal of Human Resources*, 28:3, 555-570.

Marmaros, D. and Sacerdote, B. (2003). How Friendships Form. Working Paper. Dartmouth College.

Marsden, P.V. (1990). Network Data and Measurement. *Annual Review of Sociology*, 16, 435-463.

Montgomery, J. (1991). Social Networks and Labor-Market Outcomes: Toward an Economic Analysis. *American Economic Review*, 81, 1408-1418.

Mueller, G. and Plug, E. (2004). Estimating the Effect of Personality on Male-Female Earnings. IZA Discussion Paper No. 1254.

Parsons, T. (1959). The School Class as a Social System, *Harvard Educational Review*, 29:4, 297-318.

Persico, N., Postlewaite, A. and Silverman, D. (2004). The Effect of Adolescent Experience on Labor Market Outcomes: The Case of Height. *Journal of Political Economy*, 112:5, 1019-1053.

Postlewaite, A. and Silverman, D. (2004). Social Isolation and Inequality. PIER Working Paper No. 04-017.

Korenman, S. and Neumark, D. (1991). Does Marriage Really Make Men More Productive. *Journal of Human Resources*, 26, 282-307.

Krueger, A.B. and Whitmore, D.M. (2001). The Effect of Attending a Small Class in the Early Grades on College Test Taking and Middle School Test Results: Evidence from Project STAR. *Economic Journal*, 111, 1-28.

Sewell,W.H., Hauser, R.M., Springer, K.W., and Hauser, T.S. (2001). As we age: The Wisconsin Longitudinal Study, 1957-2001. In Kevin T. Leicht, ed., *Research in Social Stratification and Mobility.* Greenwich, Conn.: JAI Press.

Wasserman, S. and Faust, K. (1994). *Social Network Analysis: Methods and Applications.* Cambridge University Press.

TABLE 1
Distribution of Out-degree, In-degree, Network Positions and their Relation to Class Size and Fraction of Class Sampled

	Observed Proportions	Corrected for Misclassification	Class Size %Δ *to average*	Fraction Sampled %Δ *to average*
		A. Out-degree		
zero	.099	.099	.235	– .030
			(.055)	(.010)
positive	.901	.901	– .026	.003
			(.018)	(.003)
		B. In-degree		
zero	.603	.443	.026	– .010
			(.032)	(.006)
positive	.397	.557	– .021	.008
			(.027)	(.005)
		C. Network Position		
Isolate	.080	.056	.346	– .030
			(.102)	(.019)
Sycophant	.523	.387	– .025	– .006
			(.034)	(.006)
Broker	.377	.514	– .027	.010
			(.028)	(.005)
Receiver	.020	.043	.092	– .031
			(.124)	(.024)

Note.— The sample consists of 2,514 full-time employed (white) male workers in the WLS for whom we have information on friendship ties, hourly wages at age 53 and covariates (see Table A1 for descriptive statistics).

TABLE 2
OLS Estimates ln(Wage) Equation for Adult, Male Workers, WLS, at Age 53

Covariate	(1)	(2)	(3)	(4)	(5)
Out-degree 0	– .069				
	(.039)				
Out-degree >0	.008				
	(.012)				
In-degree 0		– .114			
		(.027)			
In-degree >0		.091			
		(.022)			
Network Position					
Isolate			– .426	– .416	– .417
			(.110)	(.109)	(.102)
Sycophant			– .090	– .091	– .089
			(.026)	(.026)	(.028)
Broker			.086	.085	.085
			(.021)	(.021)	(.022)
Receiver			.330	.327	.311
			(.139)	(.138)	(.134)
Observations	2,514	2,514	2,514	2,413	2,364
Adjusted R^2	.043	.063	.077	.077	.070
F-statistic typology			26.31	25.07	21.44

Note.— Standard errors are in parentheses. See the note to Table 1. Log hourly wages and controls are in mean-deviation form; the constant term is suppressed. All specifications include a set of dummy variables for each high school class; one reference category omitted. Column (4) excludes individuals in small classes of five students and less. Column (5) excludes all those who were in classes of which less than twenty percent has been sampled.

TABLE 3
OLS Estimates ln(Wage) Equation for Adult, Male Workers, WLS, at Age 53
Controlling for Family Background, IQ, Class Rank and Peer Effects

Covariate	(1)	(2)	(3)	(4)	(5)	(6)
Network Position						
Isolate	– .378	– .326	– .318	– .311	– .354	– .298
	(.110)	(.106)	(.110)	(.107)	(.111)	(.107)
Sycophant	– .083	– .068	– .073	– .066	– .080	– .065
	(.026)	(.025)	(.026)	(.025)	(.026)	(.025)
Broker	.079	.061	.066	.058	.074	.056
	(.021)	(.021)	(.021)	(.021)	(.021)	(.021)
Receiver	.289	.304	.280	.299	.291	.301
	(.139)	(.134)	(.139)	(.134)	(.138)	(.134)
IQ-score		.164		.142		.140
		(.012)		(.014)		(.014)
Class rank (*log*)			.116	.042		.038
			(.013)	(.015)		(.015)
Respondent's friends						
planning college					.076	.052
					(.022)	(.021)
getting jobs					.019	.017
					(.022)	(.021)
military service					.007	.018
					(.019)	(.018)
Observations	2,514	2,514	2,514	2,514	2,514	2,514
Adjusted R^2	.109	.177	.142	.180	.118	.182
F-statistic typology	21.44	17.20	16.48	15.97	19.52	15.24

Note.— Standard errors are in parentheses. Log hourly wages and controls are in mean-deviation form; the constant term is suppressed. All specifications control for high school fixed effects and include sets of indicator variables for parental education and occupation as well as continuous controls for the number of siblings (results omitted). See Table A1 for details and summary statistics.

TABLE 4
OLS Estimates ln(Wage) Equation for Adult, Male Workers, WLS
Controlling for Measures of Social Participation and Contacts at Age 53

Covariate	(1)	(2)	(3)	(4)	(5)	(6)
Network Position						
Isolate	– .326	– .289	– .289	– .325	– .325	– .289
	(.106)	(.107)	(.107)	(.106)	(.106)	(.107)
Sycophant	– .068	– .065	– .065	– .067	– .067	– .065
	(.025)	(.025)	(.025)	(.025)	(.025)	(.025)
Broker	.061	.057	.056	.058	.060	.056
	(.021)	(.020)	(.020)	(.020)	(.020)	(.020)
Receiver	.304	.281	.283	.322	.304	.282
	(.134)	(.134)	(.134)	(.134)	(.134)	(.135)
No. of memberships in org. (*log*)		.109				.101
		(.020)				(.021)
No. of memberships in org.‡(*log*)			.086			
			(.015)			
Freq. of contact with friends (*log*)				.060		.056
				(.017)		(.018)
Freq. of contact with relatives (*log*)					– .043	– .065
					(.018)	(.019)
Observations	2,514	2,514	2,514	2,514	2,514	2,514
Adjusted R^2	.177	.190	.191	.182	.180	.195
F-statistic typology	17.20	14.55	14.53	17.50	17.06	14.52

Note.— Standard errors are in parentheses. Log hourly wages and controls are in mean-deviation form; the constant term is suppressed. All specifications control for high school fixed effects and include indicator variables for parental education and occupation as well as continuous controls for the number of siblings and iq-scores (see Table A1 for descriptives).
‡ This variable weights the number of membership in organizations by the intensity of respondents' involvement.

TABLE 5
OLS Estimates ln(Wage) Equation for Adult, Male Workers, WLS
Controlling for Other Outcome Measures, at Age 53

Covariate	(1)	(2)	(3)	(4)	(5)	(6)
Network Position						
Isolate	– .287	– .310	– .329	– .336	– .293	– .244
	(.104)	(.106)	(.106)	(.101)	(.102)	(.105)
Sycophant	– .055	– .064	– .073	– .072	– .061	– .050
	(.025)	(.025)	(.027)	(.024)	(.024)	(.024)
Broker	.050	.057	.055	.064	.053	.043
	(.020)	(.020)	(.023)	(.019)	(.019)	(.020)
Receiver	.268	.294	.298	.316	.290	.248
	(.130)	(.133)	(.135)	(.129)	(.128)	(.131)
Yrs. of schooling completed	.152				.102	.146
	(.014)				(.016)	(.014)
Married		.053			.046	.059
		(.011)			(.011)	(.011)
Job found via informal contact			.013		.019	.021
			(.024)		(.011)	(.011)
Occupation dummies				yes	yes	
Social participation variables						yes
Observations	2,514	2,514	2,514	2,514	2,514	2,514
Adjusted R^2	.224	.185	.177	.266	.286	.244
F-statistic typology	13.42	15.67	17.01	20.88	15.77	10.41

Note.— Standard errors are in parentheses. Log hourly wages and controls are in mean-deviation form; the constant term is suppressed. All specifications control for high school fixed effects and include indicator variables for parental education and occupation as well as continuous controls for the number of siblings and iq-scores (see Table A1 for descriptives).

TABLE A1
Summary Statistics of Selected Control Variables

Variable	Mean	(*Std. Dev.*)	by Network Position: Isolate	Sycophant	Broker	Receiver
Mother's schooling:						
attended high school	.442	(*.497*)	.486	.470	.420	.375
has college degree	.089	(*.286*)	.033	.089	.095	.104
Father's schooling:						
attended high school	.518	(*.500*)	.554	.513	.527	.417
has college degree	.091	(*.288*)	.087	.087	.097	.065
IQ-score	101.94	(*15.14*)	99.40	100.01	103.82	100.13
No. of memberships in org. (*log*)	.936	(*.715*)	.680	.887	.997	.972
Freq. of contact with friends (*log*)	.992	(*.780*)	.879	.962	1.045	.786
Freq. of contact with relatives (*log*)	.913	(*.742*)	.852	.895	.947	.746
Yrs. of schooling completed	14.05	(*2.51*)	13.41	13.74	14.34	14.17
Married	.867	(*.340*)	.801	.848	.884	.917
Job found via informal contact	.408	(*.492*)	.267	.403	.425	.438

Note.— The sample consists of 2,514 full-time employed male workers, WLS, at age 53. Estimated means by network position are corrected for misclassification error.

FIGURE 1 — An Exemplary High School Class