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SOCIAL STRUCTURE AND MOBILITY: POLAND, JAPAN, AND THE UNITED STATES

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METHODOLOGICAL STUDIES

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PREFACE

Comparative research in sociology provides a useful strategy for the development and testing of various theories in social science. In recent years, we have witnessed a growing interest in cross-national studies of social structure and mobility. My book belongs to this stream of studies, concentrating on certain aspects of social structure and mobility in three societies: a socialist society (Poland), a non-Western capitalist society (Japan), and a Western capitalist society (the United States). All three societies clearly differ with respect to their political, economic, and cultural systems. However, in the cross-national analyses presented in this book, societies are treated as contexts in which social structure and mobility occur. As Melvin L. Kohn (1987: 4) explains, in such research "one is less interested in particular countries for their own sake than in testing the generality of findings and interpretations about how certain institutions operate." Indeed, this book focuses on cross-national similarities rather than cross-national differences.

Chapter 1 is devoted to two aspects of social structure: relational (class) and distributional (stratification). Social classes are defined in terms of ownership of the means of production and control over the work of others; in this sense classes form social groups and should be considered on a nominal scale. In contrast, social stratification means unequal distribution of such goods as formal education, occupational rank, and job income; it provides a hierarchy. The extent to which social classes are consistently stratified in different societies is considered.

The presentation of this problem is based on analyses of data from the joint project *Position in the class structure and psychological functioning A comparative analysis of the United States, Japan, and Poland* in which Melvin L. Kohn, Atsushi Naoi, Carrie Schoenbach, Carmi Schooler, and I have been involved.

Chapters 2 and 3 deal with the allocation of persons in the system of the division of labor, for which the occupational dimension is of crucial interest to sociologists. In Chapter 2, a new approach to the determination of occupational status, in the statistical sense, is presented. This chapter is an extension of my paper *The attainment of occupational status: A model with multiple indicator constructs,* published in the book edited by Kazimierz M. Słomczyński and Tadeusz K. Krauze, *Social Stratification in Poland. Eight Empirical Studies* (Armonk, New York: M. E. Sharpe). Chapter 3, focusing on the relationship between occupational status and formal education, describes a model of meritocratic allocation of persons to jobs. In this chapter I utilize data from three papers: (1) Tadeusz K. Krauze and Kazimierz M. Słomczyński, *How far to meritocracy? Empirical tests of a controversial thesis* (Social Forces, 1985, volume 63, pp. 623-642), (2) Kazimierz M. Słomczyński and Atsushi Naoi, *Educational meritocracy in Japan in the context of labor market organization* (Department of Human Sciences, Osaka University, 1986), (3) Kazimierz Słomczyński, Tadeusz K. Krauze, and Zbigniew Peradzyński, *The dynamics of status trajectory: a model and its empirical assessment* (European Sociological Review, 1988, volume 4, pp. 1-19).

In the next two chapters, 4 and 5, I analyze the structural and circulatory components of social mobility. The basis for these chapters is my work with Tadeusz K. Krauze, contained in our manuscript *A de-*

compositional approach to social mobility The following papers were also utilized in writing this part of the book: (1) Tadeusz K. Krauze and Kazimierz M. Słomczyński, *Matrix representation of structural and circulation mobility.* (Sociological Methods and Research, 1986, volume 14, pp. 247-269); (2) Atsushi Naoi and Kazimierz M. Słomczyński, *The Yasuda index of social mobility: a proposal for its modification* (Riron to Hoho, Sociological Theory and Methods, 1986, volume 1, pp. 87-99), (3) Kazimierz M. Słomczyński and Atsushi Naoi, *Structural components of educational mobility in Japan, 1955-1975* (Department of Human Sciences, Osaka University, 1986). A continuation of the analyses of structural and circulation mobility can be found in the paper by Kazimierz M. Słomczyński and Tadeusz K. Krauze, *Cross-national similarity in social mobility patterns: a direct test of the Featherman-Jones-Hauser hypothesis* (American Sociological Review, 1987, volume 52, pp. 598-611).

Chapter 6 is focused on separating the psychological effects of status and status-inconsistency. This chapter is based on my paper *Effects of status-inconsistency on the intellective process in the United States, Japan, and Poland,* presented at the 82nd Annual Meeting of the American Sociological Association, August 17-21, 1987, Chicago, Illinois, and subsequently prepared for publication in the volume edited by Melvin L. Kohn, *Cross-national Research in Sociology* (forthcoming).

Although this book is based on previously published papers, it is not a collection of separate articles. The entire book has been written as a new contribution to the sociology of social structure and mobility. It begins with general issues concerning the relationship between social class and stratification, and then proceeds to the static and dynamic problems of allocating persons to positions in the educational and occupational di-

mensions of social structure. The book ends with a specific problem in social-stratification research, namely the psychological effects of status-inconsistency.

Analyses presented in this book involve various data from Poland, Japan, and the United States. An important set of data pertain to cross-national testing of the Kohn-Schooler hypothesis that job conditions are a mediating mechanism for the relationship between social structure and psychological functioning (Kohn, 1969; Kohn and Schooler, 1983). In the cross-national project, Polish and Japanese surveys were conducted in 1978-1979 as a partial replication of the 1964 and 1974 original American studies. In the book I utilize these survey data in Chapters 1, 2 and 6. I would like to thank Melvin L. Kohn, Carmi Schooler, Atsushi Naoi, Krystyna Janicka, and Jadwiga Koralewicz for allowing me to use the data from our joint project.

In Chapters 3, 4, and 5, I analyze the data from the Japanese Social Stratification and Mobility (SSM) surveys. Atsushi Naoi not only provided me with these data but also spent a considerable amount of time on explaining some details involved in the sampling procedure and the construction of variables. In the comparative analysis of meritocracy (Chapter 3) I also utilize official statistics on the relationship between formal education and occupational status in Poland (Central Statistical Office) and the United States (Bureau of Labor Statistics). A secondary analysis of the social mobility data (Chapter 4) involves surveys conducted by Krzysztof Żagórski in Poland in 1972, and by David L. Featherman and Robert M. Hauser in the United States in 1973. The survey data from Łódź, Poland, are used in Chapter 3, with the help of Krystyna Janicka who administered the study.

Computational work for this book was performed mainly in the United States (The National Institute of Mental Health, and The Johns Hopkins University) and Japan (Osaka University and Tokyo University). I acknowledge the support of the Japan Society for the Promotion of Science and the Japan Foundation in pursuing my inquiry of social structure and mobility in Japan. Tomoko Hasegawa assisted me with reviewing Japanese sources.

Some of the analyses presented in this book were performed during my long-standing collaboration with Tadeusz K. Krauze. I thank him for encouraging me to include some of our analyses in this book and for sharing with me his fruitful methodological ideas. At various stages of the work on this book the following friends and colleagues provided helpful comments: Duane Alwin, Henryk Domański, John Goldthorpe, Robert M. Hauser, Grażyna Kacprowicz, Melvin L. Kohn, Grzegorz Lissowski, Bogdan W. Mach, Karl Urlich Mayer, Joanne Miller, Atsushi Naoi, Zbigniew Sawiński, Carmi Schooler, Kazuo Seiyama, Ken'ichi Tominaga, Włodzimierz Wesołowski, and Wojciech Zaborowski.

Antonina Majkowska-Sztange encouraged me to publish this book with the Institute of Philosophy and Sociology of the Polish Academy of Sciences. I thank Robin Krauze for editorial assistance on this book and also for suggesting a number of changes in its original draft.

Finally, my wife, Jerzyna Słomczyńska, is thanked for giving so generously of her time and effort to see this work through to completion.

Kazimierz M. Słomczyński

"In the process of speculating, testing, and speculating anew, cross-national research, properly employed, provides particularly valuable evidence. There is no other evidence so useful for confirming social-structural interpretations, or for discovering their limitations. Either way, cross-national research is of pivotal importance for the development and testing of sociological theory." (Melvin, L. Kohn, 1987: 50).

"The dilemmas of comparative inquiry stem both from the plurality, variety and heterogeneity of ways in which members of various societies envisage social reality to which they belong and from the plurality, variety and heterogeneity of ways in which sociologists envisage social reality from the perspective of various theoretical orientations with which they identify." (Piotr Sztompka, 1988: 209-210)

Chapter 1

Are social classes consistently stratified?

Using the Marxist theory of social change as a point of departure we assume that social classes are defined through economic power which in turn implies specific political and ideological functions in society. In this interpretation, classes are distinguished on the basis of certain *relations* (rather than attributes) and considered as *social groups* having their own history (rather than social aggregates *in statu nascendi*). Ownership of the means of production, control over the work process and economic exploitation are constitutive relationships of social classes. These relationships form the base upon which accrues the political and cultural identity of classes.

By *social stratification* we mean the existence of inequality among persons with respect to generally desired goods. In our approach formal education, occupational rank, and job income are the main dimensions of social stratification. According to Marxist theory, the degree of social inequality is, in the statistical sense, strongly determined by class position. In this framework, stratification can even be identified with a *secondary characteristic of class structure*.

Unquestionably, classes and stratification have much in common. Are they, nonetheless, sufficiently distinct, i.e. is there any reason to differentiate them in empirical analyses? What is the hierarchy of social classes according to average indices of formal education, occupational rank, and job income? To what extent are social classes consistently stratified? Is the pattern of class ordering identical in different countries? These are the central questions of this chapter.

Our analysis is cross-national; it involves Poland, Japan, and the United States. Since social stratification is manifested by inequality in formal education, occupational status, and job income in all three countries, it can be measured on a common basis. In contrast, classes differ among countries and should be considered in their nation-specific context. Thus, we develop indices of social class that are attuned to the particular histories and politico-economic systems of the three countries.

Samples and methods of data collection

Data for Poland and Japan come from partial-replication surveys of an American study on social structure and psychological functioning (Kohn, 1969; Kohn and Schooler, 1983). The original U.S. survey was based on interviews conducted in 1964 with a representative sample of 3,101 men employed in civilian occupations throughout the country. The sample, methods of data-collection, and other pertinent information are given in detail in Kohn (1969, Appendix C). Ten years later, in 1974, a representative subsample of 687 of the men in the original survey was reinterviewed (for details, see Kohn and Schooler, 1983: Appendix A). In this

chapter, we focus on the 687 men included in both the baseline and follow-up surveys.

The Polish survey was conducted in 1978 under the auspices and with the financial support of the Polish Academy of Sciences. The sample was designed to represent men aged 19-65 living in urban areas and employed full-time in civilian occupations. Since the rural peasantry was not represented, farmers living in proximity to urban centers have been considered self-employed. A sample of 1,557 men was obtained through a multi-stage probability sampling scheme. For further information about the sampling procedure and quality control of the interview data, see Słomczyński, Miller and Kohn (1981) and Słomczyński and Kohn (1988). Note also that the measures of social stratification come from previous Polish studies (Daniłowicz and Sztabliński, 1977; Słomczyński and Kacprowicz, 1979), where they have been intensively tested.

The Japanese survey, conducted in 1979, was based on a random probability sample of 629 employed men, 26-65 years old, in the Kanto region that includes Tokyo and six other prefectures in north central Japan. Kanto is a mix of urban, suburban, and rural areas. The survey was based primarily on questions translated from the U.S. interview schedule. Extensive pretesting was conducted to ascertain whether the questions were meaningful and culturally appropriate. For details see Naoi and Schooler (1985).

The described data from the United States, Poland, and Japan were used in a cross-national analysis concerning the impact of position in the class structure on psychological functioning. Kohn, Naoi, Schoenbach, Schooler and Słomczyński (1988) tested the hypothesis that men who are more advantageously located in the class structure would be more likely

to value self direction for their children, to be intellectually flexible, and to be self-directed in their orientation than would be men whose class position is less advantageous. This hypothesis was strikingly confirmed and the analysis demonstrated the importance of social class.

Class foundations in a socialist society: Poland

In Poland, detailed and innovative analyses of Marx's theory of social structure in a capitalist society (e.g. Hochfeld, 1967; Ossowski, 1963; Wesołowski, 1967; 1979; Jasinska and Nowak, 1973; Kozyr-Kowalski, 1970) affected various conceptualizations of social classes in the transitional period from capitalism to socialism. Most of the new conceptualizations (Wesołowski, 1979; Ładosz, 1977; Widerszpil, 1978; Hryniewicz, 1983; 1984; Drążkiewicz, 1980; Adamski, 1985) share the premise that at early stages of the development of socialist society class structure is to some extent inherited from the previous formation while to some extent it is formed by factors characterizing centrally planned and state controlled economies. We shall elaborate on those conceptualizations which can be applied in empirical analysis.

In Marx's theory of social structure, the relationship to the means of production is regarded as fundamental because it determines many other social relations. New conceptualizations of class structure of socialist society are based on the assumption that control of the economy by the state reduces the importance of the basic definitional distinction involving ownership of the means of production. The sense of this assump-

tion is that classes such as the working class or intelligentsia are former classes rather than presently existing classes. In the strict sense, in socialist society social classes based on the criterion of the ownership of the means of production should be considered as remnants of the previous socio-economic period, that is capitalism. However, class heritage is long-lasting. In a socialist society, as in a capitalist society, the working class is grouped in factories, thus forming specific production relations. Presently, in Poland, some segments of non-manual workers exhibit internal solidarity in defense of their own interests; their norms and values resemble those of the traditional intelligentsia. Thus, while the socialist revolution eliminated the foundations of the old class structure, some of its characteristics still remain (c.f. Wesołowski, 1979:168-183; Wesołowski and Słomczyński, 1977: 38).

In this chapter we do not consider the complicated situation of Polish farmers -- who although owning the means of production must sell their products to the state monopolist rather than to the individual consumer -- but focus on the urban population only. From the historical perspective Polish city dwellers are divided into two major segments: the working class and the intelligentsia. After the Second World War, the nationalization of industry changed the position of workers dramatically: the capitalist class was eliminated while workers were given new rights in the system, being pronounced the "socialist co-owners" of the means of production. What did not change, however, was the workers' position in the technical system of production, resulting from their relationship to a machine. Neither was their position in the division of labor changed, for

they still remained subordinate hired laborers. Moreover, the social distance to intelligentsia still exists, mainly because the division between manual and non-manual work has been traditionally very strong in Poland. Describing the class situation before the Second World War, a then prominent sociologist wrote: "Nowhere is the social distance between non-manual work, be it of the most inferior kind, and manual work, even though it is constructive, so clearly defined as in Poland" (Rychliński, 1937:180). In everyday life the division between non-manual and manual work still seems very important in Poland.

Polish sociologists often apply the class scheme in empirical analyses of the urban population based on distinguishing between the working class and the intelligentsia. In terms of occupational groups the core of the working class is composed of skilled and unskilled factory workers. The intelligentsia consists of professionals, technicians and office workers. In this division, however, three groups are exluded: (1) foremen; (2) other employees whose jobs combine non-manual and manual work; and (3) small commodity producers and artisans who work using their own means of production. These three groups are treated as an intermediary class, that is a class between factory workers and the intelligentsia. Past empirical research shows that the division of the urban population into a working class, an intermediary class and the intelligentsia captures social inequality expressed in terms of education, occupational status and income (for a review, see Wesołowski and Słomczyński, 1977).

The scheme described above mirrors class divisions which are important from the historical perspective since these divisons are rooted

in the previous socio-economic system; however, they do not stem directly from the social organization of production in socialist society. Some sociologists argue that classes in socialist society should be distinguished on the basis of two features of this type of society: central planning and state control of the economy. We agree with the argument that class structure should be conceived in terms of predominant features of the mode of production in a given society. Therefore we apply appropriate criteria of class divisions in socialist society:

1. *Control over utilization of the means of production* is a crucial class criterion in the nationalized and centralized economy of Poland. Decision making over what is to be produced and what specific methods are to be involved in the production process distinguishes managers from other state employees. Managers form the most influential and decisive group involved in the process of economic planning and, therefore, can be seen as an extension of the state-power apparatus. In contrast to other socio-economic systems, managers in socialist countries implement ideological goals and cannot subjugate them to a technical or economic rationale. The importance of political goals in administering the economic system affects the class interests of managers and their relation to other classes.

2. In the Polish economy, the *immediate control over labor* separates supervisors from supervisees in such a way that the former must defend their actions not only with respect to the latter but also with respect to managers. In socialist enterprises first-line supervisors exercise their power on the basis of an organization of production in which the coordination of work is delegated to them while they have very limited means

of executing power. They are distinguished from managers since they do not decide what should be produced and how work should be done; however, their immediate control over labor identifies them as a class exercising control over others.

3. *The mental component of performed work* is a criterion used to distinguish non-manual subordinates from all manual workers in a nationalized economy. This criterion is understood here in both absolute and relative terms: first, the mental component of work is an asset associated with the autonomy of a job; second, it is "capital" used in contact with people to demonstrate one's value on the labor market. Non-manual subordinates constitute a class which does not have a class antagonistic to it. The class of non-manual subordinates appears alongside other classes and tries to avoid confrontation with them.

4. *Production and non-production work* divides all manual workers of a nationalized economy into manual factory workers (as a *core* of the working class) and the rest (as a *peripheral* element). There are two reasons for conceiving manual factory workers as a separate class; they are political and economic. In Poland, factory workers are the main force in the immediate bargaining process with the state government because of their concentration and the established means of struggle available to them such as strikes and demonstrations. Economically, manual factory workers are the main force of socialist industrialization; this is treated by the government as a factor legitimizing various privileges given to these workers in return for their support.

5 *Ownership of the means of production,* the basic category of Marx's theory of social classes in the so-called antagonistic formations,

does not differentiate people in the socialized economy. In particular, both state and cooperative forms of the ownership of the means of production are of little consequence in presentday Poland. Outside of agriculture, the only class owning the means of production is the petty bourgeoisie. This is a residual class in any socialist country. It should be included into the class scheme not only to complete the division of the population into classes, but, also because of its link with traditional forms of economic activity. However, it must be remembered that in Poland the intervention of the state in small businesses weakens such important assets of private ownership of the means of production as independence in work planning and other economic decisions.

The six classes distinguished and used in analyses in this chapter are then as follows:

1. Managers: employees having top decision-making positions in state and cooperative enterprises, and all those employees who have more than 500 subordinates.

2. First-line supervisors: employees having direct supervisory authority over 2 to 25 workers and having only nonsupervisory workers beneath them.

3. Non-manual subordinates: the core of the broad category of intelligentsia, consisting of professionals, technicians and office workers.

4. Manual factory workers.

5. Non-production manual workers.

6. Petty bourgeoisie: owners of the means of production outside of agriculture and employed members of the owners' families.

Very roughly, managers and non-manual subordinates can be aggregated into the intelligentsia; manual factory workers into the working class; and, first-line supervisors, non-production manual workers, and petty bourgeoisie into the intermediary class. Under this aggregation 18 percent of cases in our sample would be misclassified. This is an argument for utilizing the six-class scheme in further analyses. However, as we have indicated, the theoretical bases of both schemes differ with respect to the extent to which they treat classes as a continuation of the groupings rooted in the past or as a product of specific relationships *hic et nunc*.

Classes in the United States and Japan

In both the United States and Japan classes are built into the capitalist system with the crucial stratifying agents being capital property and market forces. In his provocative analyses of American society, Wright (1976, 1978, 1979) argues that in the United States and other advanced capitalist societies there exist three *basic class locations*: a bourgeoisie, a petty bourgeoisie, and a proletariat. Wright argues that there are, in addition, groups whose situation is more complex, to which he applies the term *contradictory locations within class relations*: between the proletariat and the bourgeoisie is the management, between the proletariat and the petty bourgeoisie is the group of semi-autonomous employees, and between the petty bourgeoisie and the bourgeoisie is the group of small employers. Elaborating on this scheme, Kohn and Schoenbach (1983)

introduced a new conceptualization of social class for the United States. They distingushed six classes:

1. Employers -- owners who employ four or more non-family workers.

2. Self-employed -- owners who employ no more than three non-family workers.

3. Managers: employees who have less than a 20 percent share in the ownership of the enterprise that employs them and who have at least two hierarchical levels beneath them.

4. First-line supervisors: employees who have direct supervisory authority over three or more workers and have only non-supervisory workers beneath them.

5. White-collar workers: nonmanual, non-supervisory employees.

6. Blue-collar workers: manual, non-supervisory employees.

A similar scheme has been developed for Japan (Kohn, Naoi, Schoenbach, Schooler, and Słomczyński, 1988). This is a new scheme which incorporates some class divisions already explored in both Marxist (Ohashi, 1971; for a review of the Marxist approach to class see Mizuno, 1974; see also Steven, 1983) and non-Marxist (e.g. Cummings, 1980: 41-52; Naoi, 1972) approaches. The manner in which the Japanese class structure is depicted takes into account the following criteria: ownership of enterprises, control over capital and labor, employment status, and manual/non-manual type of work. Some features of a dualistic economy (Lockwood, 1968; Taira, 1970), and modernized occupational structure (Cole and Tominaga, 1976; Naoi, 1970) are implicitly included.

In contemporary Japan, as in other capitalist countries, private ownership of the means of production allows the owner of money capital to convert it into productive capital and to receive a business profit. Recently, Steven (1983) has shown how productive capital of the Japanese economy depends on various forms of private ownership of the means of production, and how corporate and individual stockholding shapes the capitalist class. Our approach is narrower: we apply the clasic criterion of class division "owners/non-owners" for identifying those members of the labor force who work for profit rather than for wages or salaries. This approach is consistent with the Japanese tradition of both sociological theory (Ohashi,1971) and statistical accounts (Bureau of Statistics,1970).

One of the most striking features of modern Japan's process of development was the emergence of a *dualistic economy* with the traditional sector centered around property and labor intensive operations and the modern sector centered around advanced technology and trained manpower (Cummings and Naoi, 1974; for a description of the interplay between sector and class see Cummings, 1980: 46-49). In our study, those members of the labor force whose employment status is "owners of the means of production" usually belong to the traditional sector of the economy; they do not represent "big capital" but rather small, entrepreneurial businesses. Among them the main line of differentiation is between those who employ paid workers and those who do not. The first class -- called here *employers* -- is generated by a tangential relationship of capital and labor of the capitalist mode of production. The second class -- called here *self-employed* -- is linked to the simple commodity mode of production. In contemporary Japan, both these classes have similar political interests

and affiliations since they both represent entrepreneurial business.

From an economic and sociological point of view employing 20 workers has a different meaning than employing 2 workers. Indeed, the class of employers is heterogeneous with respect to the number of employed workers and the consequences of this fact should be examined. To allow for such an examination, we distinguish two subgroups among employers: those who have 1 to 4 workers, and those who have 5 or more workers. In the entrepreneurial sector, the first group is close to "petty bourgeoise," and the second -- to "petty and small capitalists" (Steven, 1983: 71). However, both of these groups are treated as representing the same social class and, in consequence, the class of employers differs from its U.S. counterpart.

The self-employed class consists of those persons who run their businesses without labor other than that provided by themselvs and by other members of their families. In Japan the main feature of this class is the family orientation of small enterprises in terms of shared labor and shared profits. Since the formal title of ownership of the family business is often a matter of convenience, unpaid family workers are also included in this class. In our analyses, we do not make a distinction between location or type of enterprise; therefore, we include those engaged in agricultural production as well as those specializing in small scale services. We should note, however, that in contemporary Japan farmers usually operate on small plots with modern equipment using only family labor and in this sense they are similar to other small-commodity producers.

The modern sector of the economy creates bureaucratic structures. Within these structures, executives and managers exercise the power of controlling capital and labor resources. In our analyses executives are defined as those members of the labor force who enjoy the formal status of high-ranking governmental officials and presidents or directors of private companies employing at least 5 persons. This category also includes all managers in private and public organizations who supervise 25 or more workers. We assume that persons in the *managerial class* have assigned responsibility to control and to improve various aspects of the functioning of their firms. Thus the managerial class should be distinguished from first-line supervisors whose role is limited to the direct control over labor.

First line supervisors constitute the bottom link of the hierarchical structure of an organization, transmitting the authority of management. In Japan, the upper limit for direct control over labor seems to be 24 workers per supervisor. Since in that country the supervisor – supervisee relations at the lowest level are not clearly defined and are based on negotiation, the category of first line supervisors does not include those who control the work of a small number of persons (1-3). Thus, the same label *first line supervisors* in Japan and the United States covers slightly different categories.

As in other industrial countries, in Japan one of the key cleavages of society is that between *white-collar and blue collar employees* (e.g. Cole, 1971: 142-145; Cummings, 1980: 46-52). Before the Second World War the distinction between these two groups, known as *shokuin* and *koin*, respectively, was formalized in the status system. Although this system

had been viewed in terms of the technical and organizational division of labor, it contained class aspects as well. In the postwar period the system was abolished and the gap between the two classes narrowed. However, the gap still remained substantial in various objective dimensions during the1960s. At that time in some descriptions of Japanese society white collar workers were treated as the equivalent of the new middle class (c.f. Kishimoto, 1962; Vogel, 1962; Odaka, 1966), and blue collar workers were treated as the equivalent of the working class (c.f. Horie, 1962). Presently, the main criterion of the division is manual/non-manual work.

In our analyses we retain the distinction between white collar and blue collar workers, using respondents' detailed occupational titles as the basis for their classification. In particular, for those members of the labor force having the status of employee and not engaged in supervisory work, we applied the division of occupations into "white collar" and "blue collar" groups according to the scheme previously worked out for the Social Stratification and Mobility survey (Naoi, 1979). The scheme is similar to the one used in the United States, although more occupations devoted to services are classified as white-collar ones. For example, according to the Japanese scheme such occupations as janitors, delivery men, and bill collectors belong to the white collar rather than to the blue collar category.

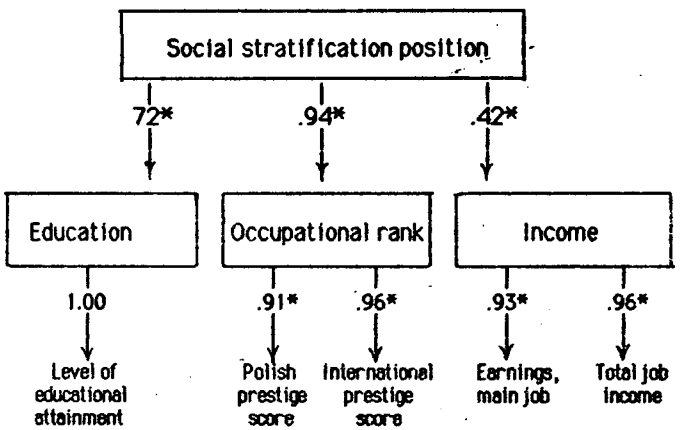
Social stratification

The social stratification position is usually measured on the basis of the relationship among education, occupation, and income. This tripartite relationship can be expressed by the statement that occupation is the intervening force linking education to income. From this point of view, occupation forms a mechanism by which the influence of education is translated into differences in income. In more general terms, work roles in the economy constitute a balance between skills possessed by individuals and the remuneration obtained. To some extent this balance is governed by the labor market in capitalist societies and by central planning in socialist societies.

We measure social stratification -- the hierarchical ordering of society -- by a confirmatory factor analysis. For Poland, Japan, and the United States, we have developed measurement models in which the social stratification position is treated as a *second order construct,* the first order constructs being formal education, occupational rank, and job income (see Figure 1). In this chapter formal education is measured, for each country, by one indicator: the level of schooling completed (for a more complex treatment of education see Chapter 2). The Polish model uses two indicators of occupational rank -- the Polish Prestige Score (Słomczyński and Kacprowicz, 1979) and the International Prestige Score. For income, the indicators are earnings from the main job and total job income.

The Japanese model is essentially the same as the Polish one (the Japanese Prestige Score has been substituted for the Polish Prestige

Score). In the model for the United States, more complex measurement of occupational rank has been used. The indicators include not only international and national prestige scales but also the Hollingshead (Hollingshead and Redlich, 1958) and Duncan (1961) indices. Using both universal and nation-specific indicators we attempted to achieve cross-national comparability without losing inter-country variations.



Standardized coefficients, * ps.05, correlations of residuals not shown.

Figure 1. Measurement model of social-stratification position, for Poland (1978).

The Polish model (cf. Figure 1) shows that standardized paths from first order constructs to their indicators are exceedingly strong ($\lambda \geq .91$). The pattern of the relationships of the social stratification position (measured as the "second order" construct) with education, occupation and income (all measured as first order constructs) is clear: *the relative*

Table 1. Relationship between social-stratification position and education, occupational rank and income, in Poland (1978), Japan (1979), and the United States (1974).

Country	Education	Occupational rank	Income
Poland	.72	.94	.42
Japan	.69	.92	.44
the United States	.81	.88	.49

Note: For Poland and Japan, our estimates are based on recomputation of original data; for the United States see Kohn and Schooler, 1981: Figure 7.1.

importance of occupational rank is highest and the relative importance of job income is lowest There are no inter-country variations in this pattern (cf. Table 1). Thus, we conclude that *social stratification position is much the same in Poland, Japan, and the United States.* The reader can find additional support for this conclusion in Chapter 6.

The relationship between social classes and social stratification

Is social class, as we have measured it, distinctly different from social stratification, not only conceptually but also empirically? Descriptive statistics demonstrate the validity of the argument of class theoreticians that, although social class and social stratification have much in common, they are far from identical (see Table 2). In particular, *the relationships of social class with social stratification and with the components of social stratification are not linear or even ordinal.* For example, in neither the United States nor in Japan do employers rank highest in overall social stratification position; in all three countries, managers do. Managers rank especially high in education, with white collar workers — a category that

Table 2. Relationship of social class to social-stratification position, for men employed in civilian occupations, in Poland (1978), Japan (1979), and the United States (1974),

	Social-stratification position (status)[ab]	Status components		
		Formal education [b]	Occupational rank [b]	Job income [b]
		Poland (1978)		
Managers	1.00	1.00	1.00	1.00
First-line supervisors	.53	.55	.53	.51
Non-manual subordinates	.62	.76	.60	.27
Factory workers	.05	.01	.05	.18
Non-production workers	.00	.00	.00	.00
Petty bourgeoisie	.34	.21	.36	.61
Eta coefficient	*.82*	*.69*	*.78*	*.43*
		Japan (1979)		
Employers				
(a) with 5 or more employees	.95	.79	.96	.78
(b) with 1 to 4 employees	.60	.34	.62	.41
Self-employed	.41	.20	.43	.05
Managers	1.00	1.00	1.00	1.00
First-line supervisors	.75	.80	.75	.54
White-collar workers	.64	.93	.65	.22
Blue-collar workers	.00	.00	.00	.00
Eta coefficient	*.75*	*.49*	*.75*	*.40*
		the United States (1974)		
Employers	.94	.80	.99	1.00
Petty bourgeoisie	.60	.35	.74	.38
Managers	1.00	.97	1.00	.73
First-line supervisors	.59	.47	.65	.23
White-collar workers	.99	1.00	.96	.18
Blue-collar workers	.00	.00	.00	.00
Eta coefficient	*.72*	*.51*	*.71*	*.47*

Notes: (a) Measured on the basis of confirmatory factor analysis.
(b) Average value standardized by its maximum and minimum.

includes professionals — outdistancing both employers and the self-employed. But employers do rank very high (more so in the United States than in Japan) in job income. Blue collar workers rank lowest on all components of social stratification in all three countries, but by a wider margin for occupational status than for income and education. In all three countries, first line supervisors rank lower than white collar workers in education, and in the United States and Japan in occupational status, but in all three countries they rank higher in income. In short, these descriptive data justify the contention that social classes constitute discrete categories and are not arranged on a continuum.

Nonetheless, the correlation between social class and social stratification — expressed in terms of η, the correlation coefficient appropriate to the non-ordinal classification of social class — is very sizeable: .72 for the United States, .75 for Japan, and .82 for Poland. Although these correlations are a good deal less than unity, there can be no denying that social class and social stratification have a great deal in common. Similarly, the correlations (η's) of social class with the components of social stratification, particularly with occupational status, are well below unity, albeit substantial.

The sharp differences in the social stratification positions of blue collar and white collar workers, in all three countries, suggests that our treating blue and white collar workers as distinct social classes contributes to, and might even explain, the correlation between social class and social stratification. Indeed, the blue collar *versus* white collar distinction contributes to the magnitude of those correlations; but even if we were to combine all non-supervisory employees into a single social

class, the proletariat, the correlation between social class and social stratification would remain substantial for all three countries: .41 for the United States, .55 for Japan, and .57 for Poland.

The relationship between social class and social stratification is not simply a function of the white collar *versus* blue collar distinction, but results primarily from different statuses, incomes, and, to a lesser degree, educational levels of the men who have different positions with respect to the ownership and control of the means of production and the control of the work of others. We need to recognize that class and stratification are *empirically related*. However, we should also recognize that *classes are not consistently stratified*. Moreover, the pattern of the relationship between class and stratification is not cross-nationally invariant.

Chapter 2

Attainment of occupational status

In this chapter we consider the model of status attainment, formulated by Blau and Duncan (1967) which was subsequently modified and extended (Duncan, Featherman, Duncan, 1972; Sewell and Hauser, 1975; Featherman and Hauser, 1976; Sewell, Hauser, and Featherman, 1976). In the original version of the model, the occupational status of an individual at a given time was represented as a linear function of that individual's occupational status at the beginning of his/her work career, that individual's education, and two variables characterizing the "inheritance" of social position: father's occupational status and father's education. We apply this model to Polish data, incorporating non-observable variables inferred from multiple indicators, and then compare the results for Poland with analogous results for Japan and the United States. We estimate all coefficients of the model on the basis of variance-covariance matrices of observed variables, according to the maximum likelihood method. Two computer programs, LISREL (Jöreskog and Sörbom, 1978) and MILS (Schoenberg, 1981), are used.

In his provocative paper, Campbell (1983: 59) notes: "We must realize that status attainment models provide a sophisticated numerical answer to questions about the balance between ascription and achievement at a

particular point in time in a society with a particular structure and culture. Perhaps the most theoretically interesting questions one can ask involve the conditions under which the balance will change." We show that in Polish society at the end of the 1970s ascription variables (father's education and status) affect achievement variables (son's education and status) primarily at the beginning of the son's occupational career. A relatively weak correlation between father's and son's statuses -- weaker than has been found for Western European countries and the United States -- indicates that in Poland the balance between ascription and achievement has already been changed. We provide new empirical evidence allowing for speculation about the conditions under which this change occurs.

One of the recent refinements introduced into status attainment models is the use of multiple indicators to increase the reliability of measurement (e.g. Alwin and Jackson, 1980; Featherman, Jones, and Hauser, 1975; Hauser, Tsai, and Sewell, 1983). Kerckhoff (1984) considers this refinement in the context of cross-national comparative studies. He points out that "comparative research would use indigenous [occupational] scales." Referring to education, he writes: "using the LISREL approach to multivariate analysis, it is possible to use multiple indices of a single concept and to derive a single effect estimate for the combination. It is thus possible to define educational attainment in ways that are consistent with each society's definition and still produce results that are compatible across societies" (p. 150). In this chapter we use various indigenous (Polish) occupational scales and various indicators of educational attainment appropriate for Poland.

Data

As in Chapter 1, Polish empirical data are taken from a study on the psychological consequences of the work situation. Let us note that the Polish study has been based on a representative sample of men, aged 19 to 65, living in urban areas (N = 1,557). For comparative purposes, in the last section of this chapter, we also use the data for Japan (a replication of the Kohn and Schooler study, see Naoi and Schooler, 1985) with a sample of 695 men and the data for the United States (Kohn and Schooler follow-up study, see Kohn and Schooler, 1983) with a sample of 656 men.

Measurement of occupational status

The detailed classifications of occupations range from a dozen or so to several hundred categories; these classifications serve as the basis for scales characterizing jobs in specific terms. Relevant examples include prestige scales (e.g. Rauhala, 1966; Siegel, 1971; Goldthorpe and Hope, 1974; Treiman, 1977; Jackson, 1976) and socio-economic status scales (e.g. Duncan, 1961; Nam and Powers, 1968; Ellery and Irving, 1972; Blishen and McRoberts, 1976). Recently sociologists have also focused on scales describing other aspects of occupational differentiation such as job requisites (e.g. Temme, 1975) or complexity of work (e.g. Speath, 1979; Kohn, 1969; Kohn and Schooler, 1983). Still, two theoretical questions remain open: which "dimensions" of occupational status should be distinguished, and at which level of the division and organization of labor should they be examined?

In this chapter we consider three occupational scales: (1) skill requirements, (2) complexity of work, and, (3) socio-economic rewards. All three scales are defined for the narrow occupational categories contained in *Social Classification of Occupations* (Pohoski and Słomczyński, 1978; see also Domański, 1985); a full description of these scales can be found in Słomczyński and Kacprowicz (1979) and in Słomczyński (1980).

A. The scale of skill requirements

To construct a scale of skill requirements we utilized scores of "general educational development" (GED) and "specific vocational preparation" (SVP), originally provided in the *Dictionary of Occupational Titles* (U.S. Department of Labor, 1965). These scores were assigned to the categories of the Polish *Social Classification of Occupations* using information on the U.S. census classification (Temme, 1975). In addition, we took a variable describing the educational level required for a given occupation from the 1973 Polish labor force data (Graczyk, 1975). In these data 122 occupations were classified as requiring college or university education, 63 as requiring secondary education, and 168 as requiring vocational education. We applied this distribution to the *Social Classification of Occupations*.

Correlation among the three variables was high ($r \geq .61$). The obtained correlation coefficients were used in a confirmatory factor analysis to compute weights for constructing the synthetic variable -- the skill requirement scale. Generally, this scale differentiates occupations with respect to the cognitive abilities and achievement needed

for the satisfactory performance of jobs in these occupations.

B. The scale of the complexity of work

To establish the degree of the complexity of work that involves people, symbols, or things, two major sources providing descriptions of work activity typical for given occupations were employed: *Systematyczny słownik zawodów* (*The Systematic Dictionary of Occupations*) by the Central Statistical Office (Collective work, 1970), and *Encyklopedyczny przewodnik: zawody i specjalnosci w szkolnictwie zawodowym* (*The Encyclopaedic Guide to Occupations and Specializations in Vocational Schools*) [Collective work, 1973]. Final coding was based on results obtained from three sources: (1) the original coding of all categories of the *Social Classification of Occupations,* done by specialists; (2) transferring symbols of an analogous code from categories in the *Dictionary of Occupational Titles* (U.S. Department of Labor, 1965); and (3) the expertise of work study specialists who conducted analyses for certain categories.

Scores describing the complexity of work with people, symbols, and things were used to obtain a regression equation in which the dependent variable was the arithmetic mean of the substative complexity of work, defined as in Kohn and Schooler (1983), and computed on the individual level. Using this equation scores of the substantive complexity of work were estimated for all occupations. The scale shows the degree to which work in a given occupation requires thought and independent judgment.

C. The scale of socio-economic rewards

In constructing a scale of socio-economic rewards we utilized data collected in studies in Koszalin, Szczecin, and Łódź during the period 1964-67 (Wesołowski, 1970; Słomczyński, 1972; Słomczyński and Wesołowski, 1973; Kobus-Wojciechowska, 1977) and repeated on a smaller scale in 1976 (Wesołowski and Słomczyński, 1977). For 34 narrow occupational categories seven variables were determined: (1) monthly wages; (2) the prestige score; (3) the index of housing standards; (4) the index of ownership of durable goods; (5) the score of occupational position in the organization of work; (6) the score of cultural consumption; and (7) the number of years of schooling.[1] The value of each of these variables was an arithmetic mean of the values found in the given population. A description of variables 1, 2, 5, and 7 is provided in Słomczyński, 1972 (54-71, 85-93, 100-20), and of variables 3, 4, and 6 -- in Kobus-Wojciechowska, 1977 (78-87, 97-101, 206-9). These variables were used to conduct an exploratory factor analysis. In effect, for each of the 34 occupational categories a value of the socio-economic rewards index was calculated as a sum of the values of the standardized variables multiplied by their factor weights.

The calculated index was then regressed on the average educational level and average earnings of the matching occupational categories from

[1] Althougth the original socio-economic scale includes education as one of its composite variables, it is not substantially changed without this variable (Słomczyński and Kacprowicz, 1979: 92-3).

the 1973 labor force census. Using the resulting equation, the values of the index for all occupational categories were computed. Słomczyński and Kacprowicz (1979) demonstrated the validity of the scale for the 1960s and 1970s. They also showed that the index could be interpreted in the same terms as Duncan's (1961) SEI.

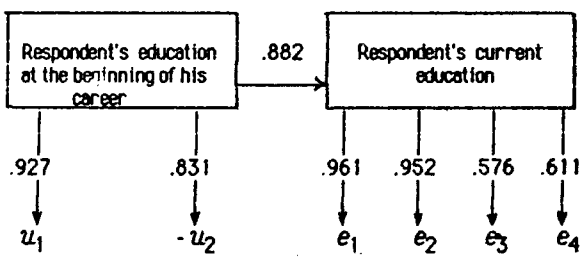
The multiple indicator measurement of educational level

In Poland significant progress has been recorded in recent years in using survey research to obtain information about the basic characteristics of a respondent's social position. This occurred largely because of the effort made to standardize questions pertaining to personal background (Wesołowski, 1974; Lutyński, 1977). In a monograph written by Daniłowicz and Sztabiński (1977) a proposal was put forward to define the content and form of questions that would deal with a respondent's educational level. The recommended battery of questions was adopted in a national study of the psychological consequences of the work situation. We discuss one possible way of analyzing data collected with this method.

We constructed four variables which measure the current educational level of the respondent; these include: (1) number of years of schooling; (2) type of education completed; (3) costs of education; and (4) age at which formal education ended. Years of schooling are supplemented by the type of education completed to account for credentials recognized on the job market. The costs of education define an indicator adopted mainly in the economics of education (Kluczyński, 1968; Andrzejak, 1979; Charkiewicz et al., 1968). The age at which a respondent

completed his formal education has also been used in some studies (e.g. Treiman and Terrell, 1975).

These four variables were subjected to the factor-analytic measurement model of the respondent's educational attainment, as presented in Figure 1. The model includes educational attainment at the beginning of the respondent's work career, measured by only two indicators: the number of years of schooling and the type of schooling completed. The model fits the data well, with the ratio of chi-square to the degrees of freedom equal 4.6.



u_1, e_1 - years of scholing

u_2, e_2 - type of education

e_3 - cost of education

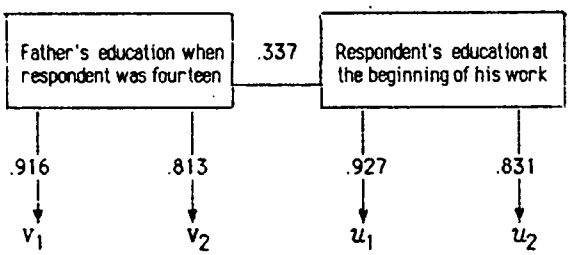
e_4 - age at which education was completed

Figure 1. Measurement model for educational attainment in two time points, for Poland (1978).

The number of years of schooling and the type of education completed are very strong indicators of the current level of education. However, the path coefficients from the construct of educational attainment to two other indicators -- the costs of education and the age at which formal

education was completed -- are also statistically significant, suggesting that these variables jointly measure the common latent variable[2].

The indicators which have the highest values of the path coefficients for the current educational level are included in the measurement of the respondent's educational level at the beginning of his work career. Since the path coefficients are large for two time points ($\rho \geq .831$), the correlation between overall constructs for these points should be considered reliable. The level of education at the beginning of the work career explains about seventy five percent of the variance of present educational attainment. This approximates findings presented in Pohoski's (1979) study.



v_1, u_1 - years of scholing

v_2, u_2 - type of education

Figure 2. Measurement model for father's education and respondent's education, for Poland (1978)

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[2] The correlations among four indicators of educational attainment in our study are stronger than are the correlations among another four indicators of educational attainment analyzed by Kerckhoff, Campbell, and Trott (1982) for Great Britain. In Poland, the cost of education and the age at which formal education ended may function as implicit credentialing criteria; but these variables are indicators of the financial and psychological investment in the educational process.

In this chapter we examine the impact of the father's educational attainment as well as the educational attainment of the respondent at the beginning of his work carrer on the respondent's occupational status. For each person's educational attainment we use the two most reliable indicators, i.e. years of schooling and type of education. Figure 2 shows that path coefficients for these indicators are very high and similar for both generations -- that of fathers and sons. Using this measurement, the correlation between the educational levels of fathers and sons is .337.

The basic model of status attainment

Let us denote father's educational level by V; father's occupation at the time the respondent was fourteen by T; respondent's educational level at the beginning of his work career by U; respondent's first occupation by W; and respondent's present occupation by Y. The educational levels of father and respondent (V, U) are expressed by two indicators: years of schooling (v_1, u_1) and type of schooling (v_2, u_2). The variables of occupational status (T, W, Y) are expressed on three scales: skill requirement (t_1, w_1, y_1), complexity of work (t_2, w_2, y_2), and socio-economic rewards (t_3, w_3, y_3).

Table 1 presents the means, standard deviations, and correlations for father's and son's occupational status. On each of the three scales -- skill requirements, complexity of work, and socio-economic rewards -- the present status of the respondent (Y) is much higher than his status at the beginning of his career (W) or than that of his father (T). Since the respondent's initial status (W) and the father's status (T) have similar

Table 1. Means, standard deviations, and correlations of scales for father's occupation and respondent's first and current occupation, for Poland (1978)

Variables and occupational scales	Mean	Standard deviation	Correlation: Respondent's first occupation (W)	Correlation: Respondent's current occupation (Y)
A. Skill requirements				
Father's occupation (T)	39.3	18.4	.259	.213
Respondent's first occupation (W)	32.5	19.8	1.000	.543
Respondent's current occupation (Y)	43.7	22.3	.543	1.000
A. Complexity of work				
Father's occupation (T)	41.9	14.0	.274	.235
Respondent's first occupation (W)	40.9	15.8	1.000	.545
Respondent's current occupation (Y)	48.4	15.9	.545	1.000
A. Socioeconomic rewards				
Father's occupation (T)	21.0	17.1	.320	.275
Respondent's first occupation (W)	23.2	17.2	1.000	.592
Respondent's current occupation (Y)	30.4	20.1	.592	1.000

mean values, "intergenerational advancement" (i.e. the difference between Y and T) is an effect of an intragenerational increase in status.

A comparison of the distribution characteristics of variables Y and T, shows that an increase in variance of both these variables accompanies

"intragenerational advancement." If the variance is treated as a measure of distributive inequality (Jencks, 1972; Allison, 1978), we can claim that intergenerational advancement has occurred in the situation of increasing status inequality which was brought about by economic development.

Father's occupation (T) is more strongly correlated with the respondent's first occupation (W) than it is with the respondent's present occupation (Y). However, the difference between correlations is not large: $.039 \leq r_{tw} - r_{ty} \leq .048$, when $.259 \leq r_{tw} \leq .320$ and $.213 \leq r_{ty} \leq .272$. The correlation which expresses *intragenerational stability* is significantly higher: $.543 \leq r_{wy} \leq .592$. In general, such a relation among correlations is consistent with the results of research obtained in various countries, including socialist ones (Safar, 1971).

The correlation between father's occupation (T) and respondent's present occupation (Y) represents the most general *measure of the rigidity of the stratification system.* This correlation, which varies from .213 to .272, does not substantially differ from that which we additionally computed for various national samples. In our computations we utilized data from a study of Nowak (1966), conducted in 1962 on a sample of adult urban males; one of Sarapata (1965), conducted in 1962 on a representative sample of adult urban and rural residents; and one of Zagórski (1976), conducted in 1972 on a sample of working men and women. Moreover, we utilized unpublished data from a study conducted in 1975 among a representative sample of men (see Alestalo, Słomczyński, and Wesołowski, 1978). For all these studies the correlations between father's occupation (T) and respondent's present occupation (Y) range

from .209 to .313. The correlations found in our study are well within this range.

Table 2. Correlations between scales for father's occupation and respondent's first and current occupation, for Poland (1978).

Pairs of occupational scales	Father's occupation (T)	Respondent's first occupation (W)	Respondent's current occupation (Y)
Skill requirements and complexity of work	.878	.903	.896
Skill requirements and socioeconomic rewards	.703	.882	.863
Complexity of work and socioeconomic rewards	.842	.903	.903

The value of the father-son correlation depends on the occupational scale. This is a consequence of the fact that the scales are not identical; they measure distinctive aspects of occupational status. Table 2 shows that correlations between occupational scales range from .703 to .903. Generally, for father's status (T) and for both respondent's statuses (W, Y), the skill requirements scale is less strongly correlated with the socioeconomic rewards scale than is either of these two scales with that of the complexity of work.

Table 3 shows that the correlation between each of the two indicators of educational attainment with occupational scales differs. If we consider that each educational measurement can be related to each occupational scale, the difference in estimates of correlations may lead to contradictory conclusions. To substantiate this it seems sufficient to

Table 3. Correlations among educational and occupational variables of respondent's father and respondent, for Poland (1978).

Educational variables	Father's occupation (T)	Respondent's first occupation (W)	Respondent's current occupation (Y)
Education of the respondent's father (V)			
	Skill requirements		
1. Years of schooling	.463	.300	.238
2. Type of school	.465	.271	.219
	Complexity of work		
1. Years of schooling	.583	.311	.266
2. Type of school	.480	.274	.244
	Socioeconomic rewards		
1. Years of schooling	.688	.310	.281
2. Type of school	.689	.279	.258
Education of respondent (U)			
	Skill requirements		
1. Years of schooling	.215	.572	.484
2. Type of school	.212	.575	.477
	Complexity of work		
1. Years of schooling	.268	.590	.520
2. Type of school	.259	.570	.507
	Socioeconomic rewards		
1. Years of schooling	.321	.596	.545
2. Type of school	.302	.624	.553

compare the correlation of father's educational level (V) and his occupation (T) for two pairs of measurement: (1) years of schooling and skill requirements (for which the correlation is moderate, i.e. .463), and (2) type of education and socio-economic rewards (for which the

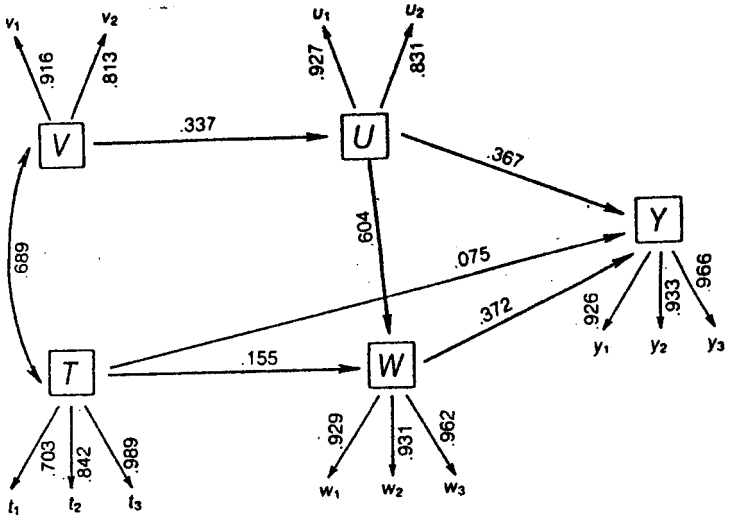
correlation is strong, i.e. .689). The difference in the correlation of father's occupation (T) and respondent's education (U) appears substantial since in some cases it exceeds .100.

It seemed justifiable to incorporate the various indicators of education and the various indicators of status into one common model which would relate the measurement part with the causal part. We included all four variables (v_1, v_2; u_1, u_2) describing education (V, U), and nine variables (t_1, t_2, t_3; w_1, w_2, w_3; y_1, y_2, y_3) describing status (T, W, Y) into the LISREL/MILS program. Since education variables led to linear dependency, we fixed the appropriate measurement coefficient at values given in Figure 2.

Figure 3 presents the final version of our model and it includes both the measurement and causal parts. The measurement part of the model confirms that *all three occupational scales are good indicators of status for both the respondent and his father*. In all instances, the socio-economic rewards scale is the weakest indicator of occupational status. Allowing for some correlation among residuals of the scales modifies path coefficients to only a small extent. Therefore, all correlations of residuals are fixed to zero.

In our model we hypothesize that the education of the respondent (U) affects his first (W) and current (Y) status; status W influences status Y. We also assume that father's education (V) affects respondent's education (U) and that father's status (T) influences both statuses of the son (W, Y). These assumptions are consistent with the basic model of status attainment, developed by Blau and Duncan (1967). The absence of causal influences of father's education (V) on either occupational

statuses of the son (W, Y) will be discussed later. We shall also examine the consequences of weakening these assumptions.



V - father's education
S - father's occupation
U - respondent's education at the beginning of work career
W - respondent's first occupation
Y - respondent's current occupation

v_1, u_1 - years of schooling
v_2, u_2 - years of schooling
t_1, w_1, y_1 - scale of skill requirements
t_2, w_2, y_2 - scale of complexity of work
t_3, w_3, y_3 - scale of socioeconomic rewards

Figure 3. Basic model of status attainment, for Poland (1978).

The model fits the data well, with the chi-square statistic 4.1 per one degree of freedom. Considering the estimates of our model, we should take into account the implied correlations between all constructs (Table 4). According to our model the correlation between father's (T) and son's current (Y) status is low (.229); both these variables have only a little over five percent of variance in common. As can be seen from Figure 3, the direct effect of T on Y is reduced significantly to .075, or by about 33 percent. Since the indirect effect represents about 45 percent of the entire correlation, 22 percent is attributable to a spurious relationship.

Table 4. Correlations among constructs of the basic model of status attainment, Poland (1978).

Constructs of basic model		(V)	(T)	(U)	(W)	(Y)
Father' education	(V)	1.000	.689	.337	.310	.263
Father's occupation	(T)		1.000	.232	.295	.229
Respondent's education	(U)			1.000	.640	.613
Respondent's first occupation	(W)				1.000	.617
Respondent's current occupation	(Y)					1.000

This does not mean, however, that the occupational career of an individual is not determined by variables relating to social origin. Let us note that not only father's education (V) significantly influences the respondent's education (U), but, in addition, the father's occupational status (T) affects the respondent's starting position (W). These two effects (.337 and .155) indicate that life chances at the outset of a career are clearly dependent on ascribed factors.

If we weaken our assumption and allow for the direct impact of father's education on respondent's present occupational status, this impact is found statistically insignificant and the fit of the model is worse. When the value of the coefficient r for the influence of father's occupation on respondent's present occupation is relatively low, the proposition that ascribed values decrease in influence during a career is lent further weight.

For the entire correlation between respondent's education and his first occupational status ($r_{uw} = .640$), a causal effect is clearly dominant ($\beta = .604$) and constitutes over 90 percent. From the beginning of a career both these variables have a similar influence on its subsequent development. *The entire correlation between education and occupational status from the period of the first job to present status is similar* ($.613 \leq r \leq .617$) and it is more or less characterized to the same degree by direct causal relationships ($\beta_{yu} = .367$ and $\beta_{yw} = .372$). Generally, therefore, *not only is the influence of social origin on present occupational status weak; it is further reduced by the impact of the beginning of the work career.*

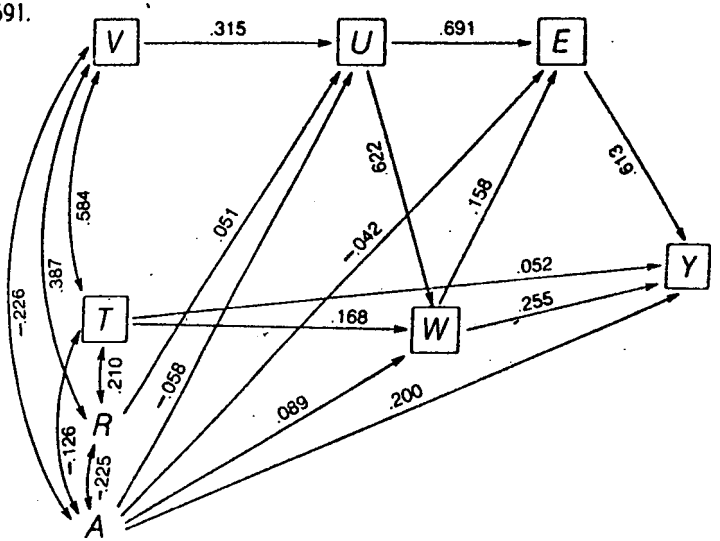
Extended model of status attainment

Critics of the basic model of attaining occupational status may argue that certain important variables are overlooked. In particular, it was obvious that education at the beginning of the work career could be supplemented by current education. In Poland the measurement of educational attainment at two time points seems justified given the significant proportion of the population who increase their further education during the occupational career (Zagórski, 1976). In the remainder of our analysis we shall state the *respondent's current education*, denoted by E, as a synthetic index constructed on the basis of the four weighted indicators included in the measurement model presented in Figure 1. Among the variables that characterize some ascribed factors, we looked at the *urbanness of the place* (denoted by R) *where the respondent was raised till the age of fourteen*. For control purposes we also included the *respondent's age* (A).

In the model presented in Figure 4 we hypothesize that all residual values of variables are not correlated with each other. The model fits the data well, with the ratio of chi-square to the degrees of freedom being 5.6. Table 5 complements Figure 4 and gives correlations for the new variables.

The influence of initial education (U) is strong in relation to both occupational status at the time of the first job (W) and later education (E). In turn, later education (E) affects current occupational status (Y) to almost the same degree to which "starting" education (U) affects occupational status at the first job (W). These are the strongest

relationships in the model; the respective coefficients range from .613 to .691.



V - father's education
S - father's occupation
U - respondent's education at the beginning of work career
W - respondent's first occupation
Y - respondent's current occupation
E - respondent's current education
R - the size of the locality in which the respondent resided when he was fourteen
A - respondent's age

Figure 4. Extended model of status attainment, for Poland (1978).

Occupational status at the first job (W) affects current status (Y) more strongly than present education (E). These effects show the relatively minor role played by starting status on the course of the subsequent educational and work career. In comparison with the basic

model (Figure 3), we notice a *marked reduction of occupational stability.* This results from introducing a measurement of educational attainment at the second time-point into the model.

Table 5. Correlations of constructs of the basic model of status attainment with current education, urbanness, and age, in Poland (1978).

Constructs of basic model		Respondent's current education[a] (E)	Urbanness[b] (R)	Respondent's age (Y)
Father' education	(V)	.288	.387	-.226
Father's occupation	(T)	.185	.210	-.126
Respondent's education	(U)	.882	.160	-.135
Respondent's first occupation	(W)	.603	.109	-.015
Respondent's current occupation	(Y)	.740	.068	.111

Notes: (a) For measurement of current education see Figure 1.
(b) Measured by the size of the community in which respondent resided when he was fourteen.

A father's education (V) has a greater impact on the entire process described by the model than does his occupational status (T). This increased significance is based on the determination of the "starting" education of the son, expressed by $\beta_{uv} = .315$. We should emphasize that both coefficients of "inheritance" of occupational status, β_{wt} and β_{yt}, are low. In particular, the net effect of the father's occupational status (T) on the respondent's current occupational status (Y), is .052 -- low, but

still significant ($p \leq .05$).

The degree of urbanness of the place in which the respondent was raised (R) affects only his education before the first job (U). The impact of age (A) goes in two directions: when the individual is older, his education is relatively lower (U, E) and his occupational status is relatively higher (W, Y). The effect of age on present occupational status (.200) is substantial. At any rate, it is stronger than the effect of father's status (T) on son's status (Y).

The described relationships remain stable if other variables are introduced into the analysis. In further efforts to modify the model we took into account the number of the respondent's children, the educational level of his wife, and membership in voluntary organizations. When these variables were incorporated into the model in a proper cause-effect structure, their direct impact on occupational status was shown to be statistically insignificant.

A comparison of Poland with Japan and the United States

Our analysis has been directed toward an explication of educational and occupational attainment, using multiple indicator conceptualization of both types of attainment. Similar analyses have been conducted for Japan and the United States. In this section we compare the results for three countries.

For Polish men aged 19 to 65, living in cities, the correlation between their occupational status and that of their fathers varies from .213 to .272, depending on the occupational scales used. Employing three scales

-- skill requirements, complexity of work, and socio-economic rewards -- in the multiple indicator model of status attainment -- the implied father-son correlation is .229. This is a lower correlation than the one usually found in Japan and in the United States. In both these countries the correlation is above .300, independent of how occupational status is actually measured.

Since in Poland a father's occupation affects his son's beginning occupational status and because sons do eventually change jobs, the net intergenerational effect on the son's current status is small. In the basic model, where we consider the father's and son's education together with the son's beginning status, this effect is only .075. It decreases even further when we introduce additional variables, such as the respondent's age or the degree of urbanness of the place where he was brought up. The net intergenerational effect on the son's current status is smaller in Poland than in the United States.

In Poland, ascribed variables (father's education and status) have a relatively small influence on the son's current status. The principal source explaining current occupational status of men is their educational attainment. Simultaneously, ascribed variables affect men's achievement at the beginning of their work careers. The relatively strong impact of father's education and status on son's education and first job is caused by close family ties during early adulthood. In particular, many young adults in Poland live with their parents not only during their entire educational careers but also when they start their first jobs and for some years after they marry.

In the model of status attainment presented in this chapter we did not consider psychological variables. Some researchers have been concerned with these variables, especially with the role of intelligence (IQ) as a variable intervening in the relationship between father's and son's statuses (e.g. Jencks, 1972; Psacharopoulos, 1977). We did not include an IQ measurement in our study, but, we did obtain a variable which can be incorporated into the model in place of IQ. This variable is intellectual (ideational) flexibility (IF), the construct introduced by Kohn and Schooler (1978). The measurement model of IF for Polish data is presented in Miller, Słomczyński, and Kohn (1985).

In Poland the correlation between intellectual flexibility and current occupational status is .503; the results for Japan and the United States are similar, although a little higher (.523 and .531, respectively). These results are consistent with the value of the correlation between occupational status and IQ found in a number of studies in many countries (for a review see Klarkowski, 1981: 103-5). However, the correlation between IF and education is somewhat higher in Poland than in Japan and the United States. It is also higher than the average correlation between IQ and education (.650) for thirteen studies conducted in Western Europe and the United States (Klarkowski, 1981:105).

The net effect of intellectual flexibility on occupational status, that is after controlling for other variables, has been analyzed. This effect was statistically significant ($p \leq .05$) in Poland, Japan and the United States. *However, if we take into account intellectual flexibility in Poland, the effect of a father's occupational status on that of a son disappears* completely. In Japan and the United States it was found that the effect of

a father's status remained statistically significant. Therefore, the general proposition that *in Poland the net effect of a father's status on that of the son is lower than in advanced capitalist countries* seems to be valid. However, two qualifications should be made.

First, the process of attaining occupational status in Poland displays a specific structure: a father's occupational status rather strongly determines both the son's education and his first occupational status. Since education and the initial occupational status play a key role in a person's subsequent occupational career, the effect of the father's status is eliminated by these variables. The fact that "inheritance" takes place at the outset of the process of status attainment does not reduce its importance.

Second, after World War II major transformations in occupational structure occurred in Poland. The following question still needs to be answered: in comparison with other countries, is the degree of inheritance of occupational status smaller in Poland simply because of forced structural changes? We cannot preclude the possibility that, in Poland, the net effect of father's status on that of the son would be much higher if persons affected by structural mobility were excluded from comparative studies.

Taking into account the various limitations of our sample and survey design we should exercise caution in interpreting the results of this study in cross-national perspective. However, two results are rather well established differentiating Poland from Japan and the United States: first, in Poland the correlation between father's status and son's status is weaker; and, second, in Poland the impact of educational attainment on

status attainment is stronger. These two results constitute empirical evidence of the change in balance between ascription and achievement, corresponding to the Polish regime's goals of "less inheritance" and "more meritocracy." The conditions under which this change occurred in Poland have not yet been analyzed.

Chapter 3

How far to educational meritocracy?

In the literature, claims are made that meritocratic tendencies are inherent in a highly industrialized society and that post-industrial society, in its logic, is a meritocracy (Bell, 1972; 1973; Husen, 1974; Halsey, 1973; Dahrendorf, 1968). These claims are expressions of the meritocratic thesis according to which, in modern societies, a strong association between individual merit and social rewards exists primarily in order to efficiently utilize the total pool of talent embodied in the labor force. In industrialized countries, formal education -- which provides training in specific skills and in general qualifications appropriate for job requirements -- has been directly implemented as the main criterion for assigning persons to jobs (Thurow, 1975; Tinbergen, 1985: Chapter XII; Ultee, 1980).

In the original presentation of meritocracy (Young, 1958) the selection criterion for occupational positions was "IQ plus effort." The IQ criterion has been subsequently used by some advocates of meritocracy, especially by Herrnstein (1971; for a discussion and critique of his work see Green, 1981; Olneck and Crouse, 1979). However, IQ is a less immediate selection criterion than education for positions available on

the job market. Although in models of status attainment IQ is causally prior to education, and in this context can be considered in discussions of meritocracy, all determinants of education are outside the scope of this chapter.

Ideal-type meritocracy, in which the relationship between education and status is strong, is often seen as a normative construct underlying the labor market of a capitalist system (Bell, 1972; Husen, 1974; Boudon, 1973). However, the argument for meritocratic allocation of persons to jobs, stressing the efficient utilization of human resources, applies to the labor market of a socialist system as well (Shirk,1984; Wesołowski and Krauze, 1981; Wesołowski, 1979 and 1981). We do not agree with Franklin's (1982: 31) view that the aim of the theory of meritocracy is "to justify the bourgeois conception of convergence with historical materialism and to maintain bourgeois hegemony over the proletariat." To the contrary, we think that with the enhancement of educational opportunities for the working class, educational meritocracy serves the proletariat's interests by optimally utilizing human resources.

The meritocratic principle under socialism and capitalism

In a planned and centralized economy, education is a normative criterion for allocating persons to jobs. For example, in Poland there are specific rules specifying the level of education required for a given position. Moreover, education is a criterion for the distribution of social rewards. Wesołowski (1979: 59) notes that "the Polish concept of meritocratic rewards tends to emphasize education as the basis of legitimate differentiation of privileges.... All findings suggest that people

see the meritocratic principle within the wider context of the socialist principle of distribution." Indeed, in Poland the meritocratic principle is commonly interpreted as a specification of the rule according to which rewards are distributed on the basis of effort. In social consciousness education is the *legitimate basis* of receiving rewards.

For different reasons, two leading capitalist powers, Japan and the United States, have been considered as very closely approximating the meritocratic ideal. Meritocracy in the United States is discussed in the context of *technocracy* (Collins, 1979). As Griffin and Kalleberg (1981: 30) state, "the United States has often been singled out... as the society most closely approximating the meritocratic ideal." The meritocratic thesis, when applied to American society, is often taken for granted but also frequently disputed (for a review of opposing arguments see Griffin and Kalleberg, 1981; Bowles and Gintis, 1976; Cohen and Lazerson, 1972; Collins, 1979; Wrong, 1964).

The label "meritocracy" is attached to the United States no less frequently than to Japan. Meritocracy in Japan is discussed in the context of *credentialism,* i.e. *gakureki-shugi* (e.g. Hashizume, 1976; Ushiogi,1978). In recent years, criticism of an allegedly inceasing tendency toward credentialism in Japanese society has prevailed. The term *certificitis*, similar in meaning to the *diploma desease* (Dore, 1976), has been introduced by Bowman (1970) and applied by Bowman, Ikeda and Tomoda (1981) to the discussion of educational choice and labor markets in Japan. There are also other terms, such as *degree-ocracy,* which show the importance of formal education in Japan. Similarly, it has been claimed that "present-day Japan ... is a remarkable 'meritocracy'" (Forbis, 1976: 28).

Referring to the beginning of Japanese modernization after the Meiji Restoration, some historians have concluded that education then became the key to personal advancement. For example, according to Reischauer (1973: 137) Japanese society "within a generation or two ...[moved to the stage] in which prestige and function ... were determined almost entirely by education." However, Cummings and Naol (1974: 254) argued that "such a radical change could not have been possible 'within a generation or two' and is not even the case today." In this chapter we take the position in this controversy and demonstrate that Japanese society, treated globally, is still as far from pure meritocracy as is Poland and the United States.

A model of meritocratic allocation

The meritocratic principle, as understood in this book, requires that more educated persons should not have lower social status than less educated ones. Equivalently, persons at a given level of education should have status levels equal to or higher than the status of persons at a lower level of education. Given a univariate distribution of education and a univariate distribution of status, the meritocratic principle, stated formally, determines a joint distribution of the two. This bivariate distribution, called *meritocratic allocation*, is obtainable according to an algorithm (Krauze and Słomczyński, 1985) which is an operationalization of Thurow's (1975) idea of queuing as a job allocation mechanism. The basic features of this allocation have been known since the work of Anderson (1961; see also Boudon, 1973) and utilized in the context of simulation analysis of the relationship between education and social mobility. In Japan, a formally identical model has been used by Ushiogi (1975).

Some properties of this model are also discussed by Sawiński (1984).

We assume that there are m levels of education and n levels of status. Let e_i denote the amount of formal education at the i-th education level ($i = 1,2,...,m$). Positions grouped at the j-th level of rewards ($j = 1,2,...,n$) have statuses s_j assigned to them. Since both scales are ordinal, the values of each may be represented by any strictly monotonic sequence of real numbers. We assign the largest number of each sequence to the highest level of each scale so that $e_i > e_{i+1}$ for $i = 1,2,...,m-1$ and $s_j > s_{j+1}$ for $j = 1,2,...,n-1$.

The number of persons at the i-th educational level is a_i, ($a_i > 0$), and the number of positions at the j-th status level is b_j, ($b_j > 0$). The sequences of marginal frequencies $(a_1,...,a_m)$ and $(b_1,...,b_n)$ are called distributional constraints. We consider a closed system in which the total number of persons N is equal to the total number of positions. The number of persons at educational level i allocated to positions at status level j is denoted by x_{ij}. We assume that each person is allocated to exactly one position and, conversely, that each position is assigned to exactly one person. It follows that,

$$(1) \qquad \sum_{j=1}^{n} x_{ij} = a_i \qquad a_i > 0 \qquad (i = 1, ..., m)$$

$$(2) \qquad \sum_{i=1}^{m} x_{ij} = b_j \qquad b_j > 0 \qquad (j = 1, ..., n)$$

Meritocratic allocation is defined by the principle that more educated persons should not have lower social status than less educated ones. Using this principle we construct a frequency distribution d_{ij} on the basis of margins a_i and b_j of the observed distribution. The values

d_{ij}, satisfying the marginal constraints (1) and (2), are defined for ordinal scales of education and status. For any $d_{uv} > 0$, $d_{rt} > 0$ (where $u, r = 1,2,...,m$ and $v, t = 1,2,...,n$) the inequality $e_u > e_r$ implies $s_v \geq s_t$.

The values of d_{ij} can be determined sequentially using the given marginal frequencies and formal auxiliary constants $d_{i,0} = d_{0,j} = 0$. The formula for d_{ij}, where $i = 1,2,...,m$; $j = 1,2,...,n$, is

$$d_{ij} = \min \left(a_i - \sum_{k=0}^{j-1} d_{ik},\ b_j - \sum_{k=0}^{i-1} d_{kj} \right) \tag{3}$$

and the terms d_{ik} and d_{kj} refer to the already determined entries of the meritocratic allocation matrix.

Boudon (1973: 6) writes "X can be called a meritocratic society: if a high social position is available, it is much more likely to be filled by an individual with a higher level of education." Similarly, in his empirical analysis of occupational careers, Tachibanaki (1979) uses the probabilistic framework in discussing meritocracy. However, this approach seems to obscure and complicate the definition of an inherently deterministic concept according to which meritocracy results from the exact fulfillment of certain rules of allocation.

An empirical example

We shall explain the application of formula (3) by means of an empirical example given in Table 1. Panel A shows the bivariate distri-

bution of men, aged 21 to 65, employed in Lodz in 1976, by education and status. For the given marginal distributions, we determine

$$d_{11} = min(a_1 - 0; b_1 - 0) = min(124; 127) = 124,$$

which provides the starting point for finding entries of meritocratic allocation in Panel B.

Table 1. Observed and meritocratic allocation of economically active men, aged 21 to 65, living in Lodz (1976),[a]

Education	Status (high) S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	(low) S_9	Total
					A. Observed allocation (Y)					
e_1 (high)	106	1	17	0	0	0	0	0	0	*124*
e_2	21	75	63	54	12	41	16	4	1	*287*
e_3	0	0	5	26	8	72	30	7	5	*153*
e_4	0	0	4	31	31	166	51	41	37	*361*
e_5 (low)	0	0	0	2	2	26	10	7	28	*75*
Total	*127*	*76*	*89*	*113*	*53*	*305*	*107*	*59*	*71*	*1000*
					B. Meritocratic allocation (D)					
e_1 (high)	124	0	0	0	0	0	0	0	0	*124*
e_2	3	76	89	113	6	0	0	0	0	*287*
e_3	0	0	0	0	47	106	0	0	0	*153*
e_4	0	0	0	0	0	199	107	55	0	*361*
e_5 (low)	0	0	0	0	0	0	0	4	71	*75*
Total	*127*	*76*	*89*	*113*	*53*	*305*	*107*	*59*	*71*	*1000*

Note: (a) Size of the sample (N=926) standardized to 1000.

To illustrate the application of (3), let us determine d_{35} already knowing the values d_{3j} for $j < 5$ and d_{i5} for $i < 3$. We find $d_{35} = \min [(153 - 0), (53 - 6)] = 47$. A close inspection of other entries in Panel B should clarify the operation of the algorithm.

Under strict meritocracy the expected value of status at a given level of education is equal to the conditional mean (average):

$$\bar{s}_i(M) = (1/a_i) \sum_{j=1}^{n} s_j d_{ij} \qquad (i = 1, 2, ..., m). \tag{4}$$

The set of values $\bar{s}_i(M)$ defines *meritocratic status* for all educational levels. These values are identified with meritocratic status since they are obtained from meritocratic allocation which maximizes the covariance between schooling and rewards for given scales of education and status (Krauze and Słomczyński, 1985: 632). Moreover, if meritocratic allocation (d_{ij}) and the values of status (s_j) are given, then the values $\bar{s}_i(M)$ maximize the correlation between status and education for all possible scores of the educational scale (cf. Lyons, 1971). As in the case of similar constructs used in research on occupational careers (e.g. Tachibanaki, 1979), meritocratic status is a hypothetical variable. Conceptually, this variable expresses a particular form of a return to education.

In our data, the information on all jobs was sufficient to apply the classification of over 200 occupational categories for which the scores of the *socio-economic index* are available (Słomczyński and Kacprowicz, 1979; see also Chapter 2). This index was constructed in the same way as in Duncan's (1961) classical work. Using this index, for each educational level we computed average status under both the observed and

meritocratic allocations (see Table 2).

Table 2. Average status for educational levels in the observed and meritocratic allocations, for economically active men, aged 21 to 65, living in Łódź (1976).[a]

Education (in years)	Observed distribution $\bar{s}(Y)$	Meritocratic allocation $\bar{s}(D)$	Difference $\bar{s}(D) - \bar{s}(Y)$
16 or more	92.0	95.0	+ 3.0
12 - 15	68.5	72.7	+ 4.2
9 - 11	45.3	47.3	+ 2.0
7 - 8	39.9	38.5	- 1.4
6 or less	29.4	11.5	-17.9

As noted in the literature, persons at high educational levels gain from a transition toward meritocracy while those at low levels lose. Indeed, college educated persons would experience status advancement as well as those with complete high school. It is interesting to note that the demotion which would occur at the level of eight years of schooling is much smaller than the one that would occur at the level of six years or less of schooling.

Are Poland, Japan, and the United States closer to meritocracy than to lottery?

In order to assess "how far to meritocracy?" from empirical reality we develop the following research strategy. We begin by analyzing a given observed distribution $Y = (y_{ij})$, classified by education and status, for which two ideal type distributions are constructed, namely the meritocratic allocation $D = (d_{ij})$ and the random allocation $R = (r_{ij})$.

The entry r_{ij} of the random allocation is given by $a_i b_j/N$, a formula well known in tests of statistical independence.

The transition from the observed distribution Y to the two ideal type allocations, that is D and R, requires that some persons change their status. The educational level of each person is held constant since increasing the education of any person would imply, in view of (1) and (2), the impossible situation of decreasing another person's education. Thus status mobility occurs within educational groups. It is not difficult to demonstrate that the minimum number of persons who must change their status to accomplish a transition from the observed distribution Y to any other allocation X, both satisfying (1) and (2), is given by

$$d(X,Y) = 1/2 \sum_{i=1}^{m} \sum_{j=1}^{n} |x_{ij} - y_{ij}|$$

This formula (the index of dissimilarity) is also the distance function for bivariate distributions and more generally for matrices; therefore, it clearly shows how far these bivariate distributions are from each other. The hypothesis that the observed distribution Y is closer to meritocratic allocation D than to random allocation R can be expressed as $d(Y,D) < d(Y,R)$. This inequality may be interpreted in terms of distances between allocations, in the metric of the minimum number of mobile persons.

Tables 3-5 contain the bivariate distributions of persons, by education and status, for Poland, Japan and the United States. For these countries, the commonly used five categories of education are used. The four status levels include the manual-nonmanual division; internal

Table 3. Observed, meritocratic and random distributions of persons according to education and status, for Poland (1977), standardized to N=1,000.[a]

Education	Status s_1 (high)	s_2	s_3	s_4 (low)	Total
		A. Observed distribution (Y)			
e_1 (high)	55	10	5	5	*75*
e_2	9	88	20	18	*135*
e_3	15	41	31	18	*105*
e_4	13	48	136	40	*237*
e_5 (low)	9	21	139	279	*448*
Total	*101*	*208*	*331*	*360*	*1000*
		B. Meritocratic distribution (D)			
e_1 (high)	75	0	0	0	*75*
e_2	26	109	0	0	*135*
e_3	0	99	6	0	*105*
e_4	0	0	237	0	*237*
e_5 (low)	0	0	88	360	*448*
Total	*101*	*208*	*331*	*360*	*1000*
		C. Random distribution (R)			
e_1 (high)	7	16	25	27	*75*
e_2	14	28	45	48	*135*
e_3	11	22	35	37	*105*
e_4	24	49	78	86	*237*
e_5 (low)	45	93	148	162	*448*
Total	*101*	*208*	*331*	*360*	*1000*

Note (a): Data from a sample of *Spis Kadrowy* [Census of Personnel].

Table 4. Observed, meritocratic and random distributions of persons according to education and status, for Japan (1975), standardized to N=1,000[a]

Education	Status s_1 (high)	s_2	s_3	s_4 (low)	Total
		A. Observed distribution (Y)			
e_1 (high)	59	58	8	0	*125*
e_2	20	14	7	5	*46*
e_3	66	135	139	39	*379*
e_4	25	60	215	84	*384*
e_5 (low)	1	9	32	24	*66*
Total	*171*	*276*	*401*	*152*	*1000*
		B. Meritocratic distribution (D)			
e_1 (high)	125	0	0	0	*125*
e_2	46	0	0	0	*46*
e_3	0	276	103	0	*379*
e_4	0	0	298	86	*384*
e_5 (low)	0	0	0	66	*66*
Total	*171*	*276*	*401*	*152*	*1000*
		C. Random distribution (R)			
e_1 (high)	21	34	51	19	*125*
e_2	8	13	18	7	*46*
e_3	65	105	151	58	*379*
e_4	66	106	154	58	*384*
e_5 (low)	11	18	27	10	*66*
Total	*171*	*276*	*401*	*152*	*1000*

Note (a): Social Stratification and Mobility Survey (1975 : Table 23), Słomczyński and Nasr (1986: Table 1).

Table 5. Observed, meritocratic and random distributions of persons according to education and status, for the United States (1977), standardized to N=1,000.[a]

Education	Status				Total
	s_1 (high)	s_2	s_3	s_4 (low)	
			A. Observed distribution (Y)		
e_1 (high)	135	27	3	3	*178*
e_2	52	56	51	8	*167*
e_3	58	126	183	30	*397*
e_4	12	26	98	23	*159*
e_5 (low)	6	7	65	21	*99*
Total	*263*	*242*	*410*	*85*	*1000*
			B. Meritocratic distribution (D)		
e_1 (high)	178	0	0	0	*178*
e_2	85	82	0	0	*167*
e_3	0	160	237	0	*397*
e_4	0	0	159	0	*159*
e_5 (low)	0	0	14	85	*99*
Total	*263*	*242*	*410*	*85*	*1000*
			C. Random distribution (R)		
e_1 (high)	47	43	73	15	*178*
e_2	44	41	68	14	*167*
e_3	104	96	163	34	*397*
e_4	42	38	65	14	*159*
e_5 (low)	26	24	41	8	*99*
Total	*263*	*242*	*410*	*85*	*1000*

Note (a): U.S. Department of Labor (1977:Table J), Krauze and Słomczyński (1985: Table 1).

distinctions within these two broad categories preserve the ordering which is common to various occupational scales. The data are not strictly comparable across countries: Polish data refer to an ecomomically active population employed in a nationalized economy, that is outside of individual farming and privately owned enterprises; Japanese data are restricted to men, aged 20 to 69; American data refer to the total labor force.

In tables 3-5 Panel (A) shows the observed distribution while Panel (B) shows the meritocratic distribution. For each country the discrepancy between these distributions is susbtantial not only in absolute terms but in relative terms as well, that is by comparing the observed distribution with the random one, presented in Panel (C).

Table 6. Minimal proportion of status mobile persons required by the transition from observed distribution to meritocratic and random allocations, for Poland (1978), Japan (1975), and the United States (1977).

Level of data aggregation and country	Proportion of mobile persons required by the transition from observed distribution to	
	Meritocratic allocation	Random allocation
A. High level of data aggregation[a]		
Poland	.298	.306
Japan	.360	.212
the United States	.315	.240
B. Low level of data aggregation [b]		
Poland	.381	.389
Japan	.424	.223
the United States	.493	.247

Notes: (a) 5 educational categories and 4 status categories.
(b) 5-8 educational categories and 8-14 status categories.

We provide a precise answer to the following question: how far is the observed matrix X to both baselines, the meritocratic allocation D and the random allocation R. For Poland, Japan and the United States, we computed the minimum proportion of mobile persons by means of a formula for distance between matrices. The results are given in Table 6 and refer to two levels of data aggregation: high (consisting of 5 educational categories and 4 occupational categories) and low (consisting of 5 to 7 educational categories and at least 8 occupational categories).

On either of the two levels of data aggregation Japan and the United States are closer to "lottery" than to meritocracy. Poland is closer to meritocracy than to "lottery" but by only a small margin. Since the data are not strictly comparable, we do not claim that our results reflect real intercountry differences. We do claim, however, that *each country is far from pure meritocracy.*

The dynamics of meritocracy

Since the distributions of education and status are changing in time, meritocratic allocation changes as well. Boudon (1973) analyzed the effects of 'meritocracy' on the labor market value of education given the situation where the distribution of status is more stable than that of education. He argued that in such a situation rational individuals belonging to successive cohorts attempt to obtain more education since they want to improve their competitive positions in the labor market; this results in a *cohort-dependent* devaluation of education. Moreover, in each cohort some persons are dissatisfied with the level of their education and continue to receive formal schooling after entering the labor market; this

results in an *age-dependent* devaluation of education.

In Poland the distribution of status is more stable than the distribution of education (Haller and Mach, 1984). Thus, in accord with Boudon's (1973) reasoning, two effects of applying the meritocratic principle over time can be expected: first, for a given number of school years younger cohorts receive lower meritocratic status than older cohorts; second, in each cohort a given number of school years is exchangeable for higher meritocratic status at earlier rather than later stages of the occupational career. Are these effects observable in a restricted labor market of a particular city?

Our model is applied to data gathered in Łódź in 1976 and 1980 (Słomczyński 1983; Janicka 1986). Both surveys used random samples ($N_{1976} = 926$ and $N_{1980} = 958$) of economically active men, who were heads of households and aged 21 to 65. During the interview, each respondent provided information about his complete *educational career*, including the general and vocational training obtained after entering the labor market. The respondent also described *all his consecutive jobs*, beginning with the first full-time job which lasted at least three months.

We focus on cohorts entering the labor market in three periods: (a) before, during or just after the Second World War (1945 or earlier), (b) at the time of the major post-war reconstruction (1946-1950), and (c) at the beginning of the rapid industrialization of the 1950s (1950-1955). The periods of entry into the labor force correspond to important distinctions in *generational experiences* in both political and economic developments.

The majority of men in the two oldest cohorts completed their elementary education before or during the Second World War. However,

those who entered the labor force in 1945 or earlier had a qualitatively different work experience from those belonging to the next cohort (1946-1950.) Members of the oldest group were confronted with the most demanding tasks of the post-war reconstruction. Although those who entered the labor force in 1946-1950 also participated in the post-war reconstruction, they have been usually identified with a generation of "forced industrialization." In contrast, men in the youngest cohort can be described as those whose occupational careers were shaped by the so-called "complementary" or "transitional" stage of the development of the Polish economy (Szczepański 1978; Tellenback 1975). They completed their pre-work education in the unified school system already well established under the socialist regime.

For every five years of the period of 1945-1980 we constructed the meritocratic allocation [according to equation (3)] and, for all educational levels, we computed the mean values of meritocratic status [according to equation (4)]. Each individual was assigned the value of meritocratic status on the basis of detailed information about his education at a given time. Table 7 presents the values of meritocratic status in seven time points of the occupational career for three educational levels: completed elementary school, completed high school and completed college. The overall trend is that the decline in the effective value of education is faster for lower levels of education and slower for higher levels of education (see also Słomczyński, 1983).

Since the effective value of education diminishes in time, the scores of meritocratic status for cohorts confirm our expectations based on the theorizing of Boudon (1973). In particular, for a given educational level the younger cohort receives a lower meritocratic status than the

older one. Moreover, for all three cohorts a given level of education results in higher meritocratic status at earlier rather than later stages of an occupational career. Both *cohort* and *age* are relevant for the dynamics of meritocracy.

Table 7. Expected status under meritocratic allocation, for three educational levels, by duration of work career and period of entry into the labor force. Combined data from the Łódź surveys in 1976 and 1980.[a]

Duration of work career in years	Period of entry into the labor force		
	1945 or earlier	1946-1950	1951-1955
	A. Completed elementary education (7-8 years of schooling)		
0	45.9	42.7	39.8
5	43.5	40.6	37.9
10	42.1	38.3	35.8
15	41.9	37.5	34.5
20	40.2	35.6	31.4
25	39.3	34.4	[29.7]
30	38.2	[33.8]	
	B. Completed high school (11-12 years of schooling)		
0	91.5	84.4	78.7
5	86.7	79.9	73.3
10	82.1	76.0	69.8
15	79.4	74.4	69.1
20	76.9	72.2	66.6
25	75.3	71.1	[65.7]
30	74.8	[71.0]	
	C. Completed college or university (16-18 years of schooling)		
0	95.0	95.0	95.0
5	95.0	95.0	95.0
10	95.0	94.8	93.1
15	95.0	94.7	92.1
20	94.6	92.7	91.3
25	94.1	92.7	[91.1]
30	93.8	[91.5]	

Note: (a) Averages in brackets were estimated from the 1980 data only.

Additional analyses show that in Poland persons advanced in their careers are closer to meritocracy than those beginning their careers. In the United States the distance to meritocracy does not vary with age (Krauze and Słomczyński, 1985). In Japan we found that age is also an important factor in the relationship between education and status, particularly when considered separately for various segments of the labor force.

Segments of the Japanese labor force

It has been argued that the strength of the *relationship between formal education and occupational status differs in various segments of the Japanese labor market* (e.g. Słomczyński and Naoi, 1986). In distinguishing the relevant segments we take into account the status of employment and the size of the work organization. In accordance with the theory of modernization, we demonstrate that among employees of large organizations, advanced in their carreers, meritocratic tendencies are stronger than in other segments of the labor force.

In order to develop tools for investigating the relationship between education and status in terms of the meritocratic model, we strengthen our previous ordinal assumptions and use both e_i and s_j as values on interval scales. In our notation the covariance correlation coefficient, Pearson r, can be written as

$$r = \sum_{i=1}^{k}\sum_{j=1}^{k}(e_i - \bar{e})(s_j - \bar{s})x_{ij} \Big/ \Big[\sum_{i=1}^{k}(e_i - \bar{e})^2 a_i\Big]^{1/2} \Big[\sum_{j=1}^{k}(s_j - \bar{s})^2 b_j\Big]^{1/2}$$

where $\bar{e}$ and $\bar{s}$ are arithmetic means of education and status, respectively. Assuming fixed scales and distributional constraints, the correlation

coefficient depends only on the covariance which can be expressed as

$$\sum_{i=1}^{k}\sum_{j=1}^{k} e_i s_j x_{ij} - \bar{e}\,\bar{s}\,N$$

Since the product $\bar{e}\,\bar{s}\,N$ is constant, the values x_{ij} which maximize the correlation coefficient, must maximize z where

$$z = \sum_{i=1}^{k}\sum_{j=1}^{k} e_i s_j x_{ij}$$

The maximum value of the correlation coefficient can always be determined as a solution of the linear programming problem in which the objective is to maximize, under distributional constraints, the function z which is linear for the fixed scales. The initial feasible solution of the problem can be found by the "northwest corner method" (Dantzig, 1963; Wagner, 1969). Equivalently, the distribution x_{ij} giving the maximum value of r is given by (3).

In studying the impact of distributional constraints on the unexplained variance of one variable by another, the following decomposition is useful:

$$1 - r^2_{(observed)} = [1 - r^2_{(maximal)}] + [r^2_{(maximal)} - r^2_{(observed)}]$$

On the right-hand side, the first component, $1 - r^2_{yx(maximal)}$, cannot be explained for any bivariate distribution $X = (x_{ij})$ with given distributional constraints and fixed scales; this component is not only

unexplained but also unexplainable. The second component, $r^2_{(maximal)} - r^2_{(observed)}$, can be reduced to zero under the same conditions, that is with fixed marginal distributions and fixed scales; this component is unexplained, although explainable.

From our point of view this second component is the most important: it measures the distance of a given bivariate distribution to the meritocratic one, determined by equation (3). Taking into account this measure, we can examine the relationship between education and status among various segments of the labor force.

Table 8. The relationship between formal education and occupational status according to employment status and the size of organization, in Japan (1975).

Groups and subgroups		(r)	r^2	$r^2_{(maximal)}$	$r^2_{(maximal)} - r^2$	(N)
A. All employees						
Aged	20 to 35	(.463)	.214	.756	.542	(770)
	36 to 55	(.523)	.274	.811	.537	(669)
	56 to 69	(.636)	.405	.858	.453	(125)
Employees of large organizations						
Aged	20 to 35	(.532)	.283	.766	.483	(360)
	36 to 55	(.557)	.311	.774	.463	(332)
	56 to 69	(.661)	.437	.851	.414	(50)
Employees of small organizations						
Aged	20 to 35	(.242)	.059	.768	.709	(405)
	36 to 55	(.499)	.249	.888	.639	(327)
	56 to 69	(.600)	.360	.895	.535	(75)
B. Non-employees						
Aged	20 to 35	(.368)	.135	.781	.646	(259)
	36 to 55	(.370)	.137	.849	.712	(493)
	56 to 69	(.467)	.218	.961	.743[1]	(203)

Employees are closer to meritocracy than non-employees. In addition, employees working for large organizations and more advanced in their

careers are closer to meritocracy than employees working for small organizations and less advanced in their careers. Note that for one subgroup $r^2_{(maximal)} - r^2_{(observed)}$ is smaller than $r^2_{(observed)}$; cf. .414 and .437 for employees of large organizations, aged 56-69. In this single case the observed allocation of persons to jobs is closer to meritocracy than to random allocation.

Table 9. Average status under observed and meritocratic distributions for the graduates of college and high school, for Japan (1975).

Subgroups	$\bar{s}(Y)$	$\bar{s}(M)$	$\bar{s}(M)-\bar{s}(Y)$
A. College, 16 and more years of schooling			
Employees of large organizations			
Aged 20-35	55.2	58.1	2.9
36-55	58.5	62.5	4.0
56-69	55.9	62.5	6.6
Employees of small organizations			
Aged 20-35	51.7	58.4	6.7
36-55	55.2	62.5	7.3
56-69	53.1	62.5	9.4
B. High school, 12 years of schooling			
Employees of large organizations			
Aged 20-35	47.9	47.8	-0.1
36-55	52.5	50.6	-1.9
56-69	55.9	52.1	-3.6
Employees of small organizations			
Aged 20-35	42.2	46.4	4.2
36-55	49.6	57.5	7.9
56-69	48.9	53.1	4.2

Table 9 presents data on gains under pure meritocracy, for specific groups of employees. Among employees with college education, those working for large organizations would gain less in status than those working for small organizations. However, independently of the size of

the organization, the gains would be larger for older workers than for younger ones. It is also evident that among employees with high school education, only those who work for small organizations would gain under meritocracy. It is not in the interest of high school graduates working for large organizations to support meritocracy as a system of status distribution because they would lose under such a transition.

Conclusion

Seriously considering the thesis that present-day industrial societies are meritocratic, we have compared the data with an ideal-type model allocating persons to jobs strictly on the basis of their education. Cohen and Lazerson (1972: 162) noted that "the extent to which the meritocracy actually worked, and the value of merit selection and its implications for equality, have been in dispute." Indeed, despite of the proponents of the thesis that modern societies are meritocratic (Bell, 1973; Halsey, 1973) some writers maintain that meritocracy is chiefly an ideological notion which poorly corresponds to reality (Bowles and Gintis, 1976; Collins, 1979). The largely nonempirical context of the dispute has resulted from a lack of interest in the tools and basic data sources needed to verify the thesis.

The model of meritocracy presented in this paper strictly implements the meritocratic criterion for the distribution of the labor force with respect to education and status. Advocates of the meritocracy thesis are likely to concur that under pure meritocracy more educated persons should not have lower social status than less educated ones. The constructed meritocratic allocation allows one to pose and answer the

empirical question: How far is the observed distribution of the labor force from the meritocratic ideal? Comparison with a random assignment gives a reference framework for the assessment of this distance.

Comparison of observed and meritocratic allocations shows that in order to achieve meritocracy, in Japan and the United States at least 30 percent of persons in the labor force would have to change their status. Transition to random allocation would require less mobility (around 25 percent). Although the figures for Poland show that the observed distribution is closer to meritocratic allocation than to a random one, the difference in the distances to both ideal-types are negligible. Thus the hypothesis that the observed distribution of education and status mirrors "meritocracy" must be rejected not only for two capitalist societies but for one socialist society as well.

For Japan and the United States, the meritocratic thesis can also be questioned on the basis of the correlations of status with education. The correlations are of medium strength ($.5 \leq r \leq .6$) and the proportion of explained variance of status (r^2) is smaller than the remaining proportion $r^2_{(maximal)} - r^2_{(observed)}$ while $.85 \leq r^2_{(maximal)} \leq .95$). Thus the strength of the observed relationship between education and status is closer to statistical independence, which implies $r = 0$, than to complete determination by the meritocratic criterion.

A more detailed analysis shows that among various segments of the labor force the correlations between formal education and occupational status vary from .24 to .66. Thus, even the highest correlation does not indicate that a particular segment of the labor market closely approximates pure meritocracy. However, employees of large organizations, at an advanced stages of their careers, are closer to meritocracy

than to random allocation. This fact supports the thesis that the deviation from meritocracy in Japan, to some extent, occurs because of a segmented labor market. Since the correlation between education and status increases in time mainly in the expanding organizational sector (Cummings and Naoi, 1974), it seems that in the future Japan may become a "meritocratic society." Now, however, the distance to pure meritocracy in Japan is greater than in Poland or in the United States.

Using correlational analysis we attempted to assess the existence of a secular trend toward meritocracy. In the diachronic context Halsey (1973: 298) noted that "The trend in most countries is ... from ascription to achievement, a trend in the direction of meritocracy, guided by the tightening link of education and economy." Other authors argue that in modern societies "ascriptive stratification was replaced by meritocratic stratification" increasing the significance of merit in the determination of social status. Usually this thesis is argued on the basis of the expansion of the educational system and increased opportunities resulting from changes in the occupational structure.

According to Jencks (1972: 186), in the United States "[t]he correlation between educational attainment and occupational status has... been stable since the turn of the century." The same author estimated that during this period "education explains about 42 percent of variance in status" among the male labor force. However, the question arises as to what percent of variance, for different periods, is theoretically (i.e., maximally) explainable by distributional constraints and fixed scales of both variables. We computed the maximal correlation between education and status for the male labor force in 1920, 1940 and 1977; the values of $r^2_{(maximal)}$ are .88, .88, .86, and .85, respectively. Jencks' stable value for

these years, $r^2 = .42$, used for such measures as $r^2_{(maximal)} - r^2_{(observed)}$, is the basis for our conclusion that *even controlling for changes in distributional constraints, there was no trend toward meritocracy in American society during the last six decades.* An analogous conclusion applies to Japan for the period 1955-1975 (Słomczyński and Naoi, 1985). In Poland during the1970s the correlation between education and status was higher than in Japan and the United States. Recent years, however, are marked by a process of demeritocratization.

It seems questionable to apply the label meritocratic to a society closer to random allocation than to ideal type meritocracy. The compelling need to reject the hypotheses derived from the meritocratic thesis should lead to its abandonment. Moreover, the foundation of the meritocratic thesis, the functional theory of social stratification, should be modified with respect to some of its assumptions. The statement that "in all societies those positions which receive greater rewards ... will be the ones occupied by the most talented and qualified incumbents" is a part of the "causal, unqualified and minimal assumptions version of the theory" (Huaco, 1963: 802). Insofar as the functional theory implies a specific optimal association between education (as an indicator of talents and qualifications) and status (as an indicator of rewards) it is a description of an ideal type rather than a description of reality.

The discrepancy between the properties of observed and meritocratic allocation is attributable, in the language of functional theory, to dynamic tensions (Moore, 1963). Therefore, explanation of the observed distribution is likely to be provided within a theory focusing on conflicts betwen those segments of society that have opposing interests with respect to the strength of the relationship between education and

status. Insofar as the level of education has a measurable relationship to social class, any policies or programs promoting meritocracy fulfill class interests to a varying extent for different classes since their ensuing benefits or losses differ.

We conclude this chapter with a quotation providing a link among educational meritocracy, social mobility and social inequality -- three important concepts in this book. Although this quatation refers to the United States, it captures some universal characteristics of this link:

"Proponents of the meritocracy ... can be encouraged by the finding that social mobility rates have been rather high in the United States (albeit this is due more to changes in the occupational structure than to structural barriers to status inheritance). Education is the main channel to occupational attainment; and, although the amount of education that children receive is *somewhat* affected by the socioeconomic level of their parents, there still is considerable chance for educational attainment beyond that of the parents. [...]

However, certain social conditions are inconsistent with the ... meritocratic perspective. Consider the linkage of education to jobs ... in the mobility process. Since educational credentials predict job performance poorly for most kinds of work, their use in screening job applicants has the effect of discriminating against talented people, including disproportionate numbers of working-class and minority-group young people, who generally obtain less education. [...] [A] system of selection for jobs based on grades or test scores would probably produce more social mobility than would selection based on educational attainment .... [...]

To those who pefer "equality of result," the belief in meritocracy supports inequality. While, no doubt, many progressive social policies might be designed to improve the chances of the working classes, blacks, women, and other minority youth in achieving more education and better jobs, such policies would likely lead to reducing inequality between groups, but not between individuals. (Vanfossen, 1979: 209-210).

Chapter 4

Components of the social mobility process

In the late 1950s, students of social stratification (e.g. Kahl, 1957; Carlsson, 1958; Hutchinson, 1958) recognized the existence of two components of social mobility: *structural* (called also net, forced, technological, or excess) and *circulation* (called also pure, exchange, individual, or free). Various interpretations of these components commonly assume that the first refers to mobility generated by the difference between origin and destination distributions, while the second refers to 'true' mobility which takes place when the origin and destination distributions are identical. Sociologists involved in empirical research confront the problem of identifying and separating structural and circulation components in the standard 'father-to-son' mobility table. This problem has been frequently discussed in the literature (e.g. Matras, 1961; Capecchi, 1967; Bertaux, 1969; Hazelrigg, 1974; Hauser, Dickinson, Travis, and Koffel, 1975; Bibby, 1975; Noble, 1979; Sobel, 1983; Simkus, 1982; Breen, 1985) and is considered crucial for future work (e.g. Rogoff-

Ramsoy, 1966; Featherman, Jones, and Hauser, 1975; McClendon, 1977; Featherman, 1981; Lissowski, 1987).

Recently, Sobel (1983) demonstrated that neither the traditional approach (utilizing the index of dissimilarity) nor the loglinear modeling approach (utilizing multiplicative terms) provide adequate tools for separating structural mobility from circulation mobility. Concurring with Sobel's criticism of these two approaches, we have already refuted (Słomczyński and Krauze, 1984) his conclusion that "investigators should abandon the structure vs. circulation framework" (Sobel, 1983: 722). In another comment on Sobel's contribution, Jones (1985a) claims that "structural and circulation mobility are alive and well." The discussion continues (e.g. Sobel, 1985; Jones, 1985b; Krauze and Słomczyński, 1986a, 1986b; Sobel, Hout, and Duncan, 1986; Słomczyński and Krauze, 1987, 1988; Hauser and Grusky, 1988; Lissowski, 1987).

In this chapter we propose the *decompositional approach* as a tool for analyzing the mobility table, based on matrix representation of structural and circulation mobility. This approach is applied to the much discussed intergenerational mobility data for Poland (Zagórski, 1976, 1978), Japan (Tominaga, 1979) and the United States (Blau and Duncan, 1967; Featherman and Hauser, 1978). Our analyses present new estimates of the amount of structural and circulation mobility. Using data from the United States, we demonstrate various properties of both kinds of mobility. The analysis ends with a discussion of the openness of Japanese society in terms of the Yasuda index (1964).

Theoretical background

In his influential paper, Duncan (1966: 62-63) provided an unobjectionable interpretation of the 'father-to-son' mobility table. He wrote: "Instead of thinking of the classification of father's occupation as conveying information about a generation of fathers, think of it as describing the origin statuses of sons. ... The father-son mobility table, then, becomes a table showing a cross-classification of origin by destination statuses of the cohort included in the study." Throughout the chapter we use this commonly accepted interpretation of the father-to-son mobility table.

In an empirical mobility table the marginal distribution at origin is typically different from the marginal distribution at destination. It was apparent for early researchers that the mobility table contains two kinds of transitions between status categories: first, transitions which are necessary because of the discrepancy between the margins, and, second, "optional" transitions which are not necessary. This fundamental observation led to distinguishing between "structural mobility" and "circulation mobility" and to posing the problem concerning their operational separation. This "longstanding problem in the subdiscipline" (Featherman, 1981: 369) is important for theoretical and empirical reasons.

From the theoretical standpoint, the distinction between structural and circulation mobility is appealing since it captures an essential feature of the mobility process. Elaborating on this distinction, Featherman, Jones, and Hauser (1975; see also Hazelrigg 1974: 115-6) note that the discrepancy between origin and destination distributions is caused by forces exogeneous to mobility itself; therefore structural mobility does

not reflect the "mobility regime" but rather the impact of some "external" variables. In contrast, circulation mobility is equated with "genotypical patterns" of mobility which are manifested when the origin and destination distributions are identical.

From the empirical standpoint, the distinction between structural and circulation mobility appeared useful in formulating hypotheses about various societal determinants of mobility patterns (e.g. Treiman, 1970; McClendon, 1980; Hazelrigg and Garnier, 1976). These hypotheses reflect Rogoff-Ramsoy's (1966: 233) conviction that "societies, or parts of societies, may be classified as having a high rate of net mobility but a low rate of exchange mobility, or a high rate with respect to both types of mobility, and so on." The well-known Lipset-Zetterberg thesis (1966; Lipset and Bendix, 1959) as reformulated by Featherman, Jones, and Hauser (1975; see also Erikson, Goldthorpe, and Portocarero, 1982; Grusky and Hauser, 1984) states that industrial societies reveal a common pattern of circulation mobility but differ with respect to their patterns of total mobility. This reformulation, called the *Featherman-Jones-Hauser hypothesis* was subjected to a direct test (Słomczyński and Krauze, 1987).

For theoretical and empirical reasons a number of researchers have been motivated to seek a solution to the problem of representing structural and circulation mobility. The protracted search for a solution to this longstanding and intractable problem can be seen as an indicator of its importance. We consider the problem once again using a new approach which seems uniquely suitable and propose a solution that appears to satisfy objections raised against previously obtained solutions.

The decompositional approach

The proposed approach to the analysis of a single mobility table involves identifying and separating two types of mobility which are constituent parts of total mobility. We assume that k mutually exclusive and exhaustive status categories have been distinguished, and that each person is assigned to exactly one of them at origin and, independently, at destination.[1] The cross-classification of these assignments is the matrix of observed mobility $N = (n_{ij})$ which displays the frequencies of transitions from origin categories i to destination categories j ($i,j = 1, 2, ..., k$). The goal of the decompositional approach is to represent matrix N as a sum of mobility matrices S and C corresponding to structural mobility and circulation mobility, respectively.

Postulates

From various definitions and properties of the considered mobility concepts (Matras, 1961; Rogoff-Ramsoy, 1966; Featherman and Hauser, 1978; Blau and Duncan, 1967; Hazelrigg, 1974; Boudon, 1972; Hutchinson, 1958; Bibby, 1975; Noble, 1979; Blau, 1977; Persson, 1977; Sobel, 1983) we have extracted four essential elements. *First,* both structural and circulation mobility are parts of total mobility as implied by phrases

[1] It is beyond the scope of this book to discuss the theoretical principles underlying adequate distinguishing of status categories as well as the procedures involved in their aggregation.

referring to "extracting," "partitioning" or "partialling out". *Second,* circulation mobility contains "exchanges," that is "interchange transitions" formally different from the "excess transitions" of structural mobility. *Third,* structural mobility results from the discrepancy between the origin and destination distributions while circulation mobility requires these distributions to be equal to each other. *Four,* structural mobility is necessitated by "forced" movements and circulation mobility exhausts all "exchanges." Thus, four respective postulates should apply to the matrix representation of both kinds of mobility.

1. Matrices C and S are nonnegative with frequencies not larger than the corresponding ones in matrix N.

2. Formal properties of matrices C and S are interpretable in terms of "interchange transitions" and "excess transitions."

3. The frequencies in matrices C and S are determined on the basis of conditions involving marginal distributions.

4. The frequencies of C and S are determined by an optimization procedure to exhaust all "exchanges" and to account for only necessitated, "forced" movements.

The postulates provide a framework for rigorous definitions of both kinds of mobility. The elements of these definitions correspond to our postulates, and are formalized as equations.

Definitions and equations

In matrix $N = (n_{ij})$, $n_{i.}$ denotes the number of persons in the origin category i and $n_{.j}$ denotes the number of persons in the destination

category j. Consequently, $n_{..}$ is the number of persons in N. Similar dot-notation is used for matrices C and S.

Definition. Circulation mobility is (i) the part of total mobility (ii) consisting of interchange status transitions (iii) which result in identical origin and destination distributions; it is (iv) limited to interchange status transitions and exhausts them.

This definition leads directly to the formulation of conditions for the circulation mobility matrix $C = (c_{ij})$. According to (i) the frequencies c_{ij} to be determined are related to the frequencies of matrix N. In view of the first postulate we have

$$0 \leq c_{ij} \leq n_{ij} \tag{1}$$

The concept of interchange transition can be formalized as a positive element in a binary cyclic matrix. In order to provide an intuitive idea of the cyclic matrix, we first explain the meaning of a cycle. The simplest example of a cycle is the situation of two persons belonging to different status categories in which the first person moves into the category of the second person and vice versa. This is a cycle of direct exchange. Let us next consider the situation of indirect exchange involving three persons who belong to the origin categories 1, 2, 3. The cycle might be: the first person moves from category 1 to 2, the second from 2 to 3, and the third from 3 to 1. The situation of indirect exchange can be generalized for an arbitrary number of persons, not larger than the number of origin categories.

The matrix $P = (p_{ij})$ is a cyclic matrix with a cycle of length n if there exists a sequence $(i_1, i_2, ..., i_n)$ consisting of natural numbers not greater than k and all different such that

$$(2) \qquad p_{ij} = \begin{cases} 1 \text{ for } i = i_m, j = i_{m+1} & m=1, 2, ..., n-1 \\ 1 \text{ for } i = i_n, j = i_1 \\ 0 \text{ for all other pairs } (i,j). \end{cases}$$

Matrix P defines interchange transitions as a particular form of relationship between categories of origin and destination; it can be treated as an elementary qualitative description of circulation mobility. In the terminology of network analysis (for a review see Burt, 1980), matrix P is a morphological characteristic of matrix C. In this sense P operationalizes the second postulate of the decompositional approach.

Condition (iii), corresponding to the postulate on determining matrix C by requirements involving marginal distributions, can be written as

$$(3) \qquad c_{i.} = c_{.j} \qquad \text{for } i = 1, 2, ..., k$$

This condition states that in matrix C the margin of origin is equal to the margin of destination.

The following statement, related to Birkoff's theorem (Hall, 1967), can be proven: If $C = (c_{ij})$ is a nonnegative k by k matrix of nonnegative integers, with identical origin and destination distributions, then there exist cyclic matrices P_i $(i = 1, ..., s)$ such that

$$C = \sum_{i=1}^{s} \alpha_i P_i$$

where α_i are positive integers and $s < k^2$.

The formula shows that C, as a weighted sum of cyclic matrices, consists of interchange status transitions only.

Condition (iv) can be stated as

(4) $$c.. \longrightarrow max$$

It assures that the maximal number of interchange transitions is included in C.

The proposed definition of circulation mobility subsumes immobility. This follows from constraint (2) since the simplest cycle means the "interchange" within a given status category. In this sense immobility is a special case of circulation. In research practice, for various purposes, the immobility matrix U is often extracted from the circulation matrix. In this case we can write $C^* = C - U$ where the immobility matrix $U = (q_{ij}$ $q_{ij})$ and $q_{ij} = 1$ for $i = j$ and $q_{ij} = 0$ for $i \neq j$.

Definition. Structural mobility is (i) a part of total mobility (ii) consisting of excess status transitions (iii) which preserve the difference between origin and destination distributions; it is (iv) limited to transitions necessitated by that difference.

Let us denote by $S = (s_{ij})$ the matrix of structural mobility. The requirement (i) can be stated as

(5) $$0 \leq s_{ij} \leq n_{ij} \qquad i, j = 1, 2, ..., k$$

Excess transitions can be expressed as binary matrices Q_i, $(i = 1, ..., r)$, such that their sum contains no interchange transitions. These matrices

can be weighted and added to give the total matrix of structural mobility.

$$(6) \qquad S = \sum_{i=1}^{r} \beta_i Q_i \qquad \beta_i \geq 1, \quad r \leq k(k-1)/2$$

It follows from the rules of matrix multiplication that the k-th power of matrix S is the null matrix. Substantively, this implies that S contains no cycles.

Condition (iii) can be expressed as

$$(7) \qquad s_{i\cdot} - s_{\cdot i} = n_{i\cdot} - n_{\cdot i} \qquad i = 1, 2, \ldots, k$$

Clearly, the right hand side of (7) gives, for each status category, the excess -- or deficit -- of outflow over inflow. The matrix of structural mobility represents only those transitions which are necessary to preserve imbalance between the observed inflows and outflows. The theoretical requirement for these transitions to be necessary is translated into the mathematical condition that their number be minimal; therefore, according to (iv)

$$(8) \qquad s_{\cdot\cdot} \longrightarrow min$$

Definitions of both kinds of mobility express or imply analytically their essential connotations found in the literature. For this reason they contain some redundancy. Conditions (2) and (6), although not necessary, are included because postulate 2 requires specification of respective mobility transitions. The redundancy seems compensated for by the interpretive potential of the complete definitions.

Solutions: **computation of mobility frequencies**

Matrices C and S can be determined as solutions of linear programming problems formulated as (1), (3), (4), and (5), (7), and (8), respectively. Linear programming (Dantzig 1963) provides a method for finding nonnegative values of variables that maximize or minimize a linear function subject to linear constraints. In the case of circulation mobility, the values of c_{ij} are to be nonnegative, the linear function to be maximized is given by (4), and linear constraints are (1) and (3). Similarly, in the case of structural mobility: for nonnnegative values of s_{ij} the minimization of linear function (8) is subjected to linear constraints (5) and (7). Thus, the independent determination of matrices C and S is exactly formulated in terms of two linear programming problems. The available computer programs based on the classical simplex algorithm or its modifications solve these problems numerically for a given observed matrix N.[2]

It suffices to solve one linear programming problem in order to have the solutions for both since $S = N - C$, or -- equivalently -- $C = N - S$. Note that although the definitions of C and S do not require explicitly

[2] Actually, there is only one linear programming problem rather than two. It can be easily shown that C and S are mutually complementary with respect to N. To see this denote $s_{ij} = n_{ij} - c_{ij}$. Substituting $c_{ij} = n_{ij} - s_{ij}$ into (1), (3), and (4) we obtain (5), (7), and (8), respectively.

that $c_{ij} + s_{ij} = n_{ij}$, this equality can be easily derived (see footnote 2). If the immobility matrix U is excluded from C we have $N = C^* + U + S$ where $C^* = C - U$. Each of these alternative representations of matrix N provides a separation of componental parts of observed mobility within the decompositional approach.

An empirical example: the Polish data

An example of the decomposition of a mobility table is presented in Table 1. The data, based on Zagórski (1978), are from Poland, a country in which the rate of total mobility is typical for Eastern Europe. In Panel I total mobility is displayed; it shows that a great proportion of sons from farmers' families remain on farms. In Panel III the proportion of structural mobility is .279, a larger value than usually computed on the basis of the margins of the original mobility table. The category of farmers is the only one for which $s_{i.} \geq s_{.i}$. Note that $s_{3.} - s_{.3} = 210$ and $s_{.3} = 0$. It would seem that in order to obtain a structural mobility matrix it suffices to distribute the 210 persons originating in the category of farmers. However, the reader can verify that under condition (7), i.e. $s_{i.} - s_{i} = n_{i.} - n_{.i}$ expressing the notion of structural mobility, any such allocation would violate condition (5), i.e. $0 \leq s_{ij} \leq n_{ij}$. For this reason the matrix of structural mobility contains more persons than the one computed on the basis of the index of dissimilarity. We shall return to this point analyzing more complex proplems

The matrix in Panel IV satisfies conditions (1)-(4). Condition (1) restricts the number of circularly mobile persons with a given status change to those for whom this change was observed. Conditions (2) and (3)

Table 1. Decomposition of the intergenerational mobility table into immobility, structural, and circulation mobility components, for Poland (1972)[a]

Social origin	Present occupational status: Non-manual worker	Manual worker	Farmer	Non-manual worker	Manual worker	Farmer
	I. Total mobility (N)			II. Immobility (U)		
Non-manual worker	67	27	2	67	0	0
Manual worker	98	220	32	0	220	0
Farmer	68	176	310	0	0	310
	III. Structural mobility (S)			IV. Circulation mobility (C)		
	W	B	F	W	B	F
Non-manual worker	0	0	0	0	27	2
Manual worker	69	0	0	29	0	32
Farmer	68	142	0	0	34	0

Note: (a) Data based on Zagórski (1978: Table 2) see Krauze and Słomczyński (1986a: Table 1). Sample of 72,179 standardized to 1,000.

assure that these persons could be stayers while condition (4) maximizes their number. The sum of elements (124) in Panel IV is the measure of the amount of circulation mobility. From this panel it is obvious that the amount of circulation mobility is equal to the number of mobiles who would be stayers if and only if $min(s_{i.}, s_{.i}) = 0$.

Panel IV contains a three-element cycle. Two persons moved from white collar origin to farm positions; two persons moved from farm origin

to blue collar positions; and still two other persons moved from blue collar origin to white collar positions. The discussed data exemplify that cycles containing more than two elements are unavoidable. Therefore, the understanding of circulation mobility in terms of two-element cycles, as originally developed by Hutchinson (1958: 115), is artificial and inconsistent with maximizing condition (4), i.e. $c_{..} \rightarrow max$.

In general, it is not true that the matrix of circulation mobility is symmetric. Therefore, contrary to an often expressed opinion (Aron, 1959: 157), Blau, 1977: 277; Svalastoga, 1964: 562; Tyree, Semyonov, and Hodge, 1979: 413), the number of upwardly mobile persons may be unequal to the number of downwardly mobile persons even if the origin and destination distributions are identical. In the case of Polish data there is more upward than downward mobility.

Structural and circulation mobility in the United States

Featherman and Hauser (1978) discussed circulation and structural mobility on the basis of data collected in 1962 and 1973. We use their 5x5 tables (Table 3.14 and Table 3.15) to construct standardized frequencies of mobility from father's occupation to son's present occupation. Tables 2 and 3 display these initial data (Panel A) together with the matrices of circulation and structural mobility (Panels B and C). In our analyses we focus on: (1) the counts of transitions in the structural and circulation mobility matrices, and (2) the cyclical paterns of circulation mobility and the acyclicity of structural mobility.

According to Featherman and Hauser's (1978: 70-71)) definitions, the amount of structural mobility "may be interpreted as the percentage of the

count in the mobility table that necessarily lies off the main diagonal by virtue of the difference between the row and column marginal distributions. [The amount of circulation mobility] is the difference between the overall percentage of cases off the main diagonal and the percentage structurally mobile." The cited authors estimated these quantities utilizing the index of dissimilarity, the traditional measure.

Table 2. Frequencies of observed, circulation, and structural mobility from father's occupation to son's current occupation for men aged 20 to 64, in the United States (1962).[a]

Father's occupation	Son's occupation: Upper nonmanual	Lower nonmanual	Upper manual	Lower manual	Farm	Total
	A. Observed mobility (N)					
Upper nonmanual	624	184	127	152	13	*1100*
Lower nonmanual	565	311	191	223	22	*1312*
Upper manual	464	320	532	541	23	*1880*
Lower manual	491	406	600	1189	52	*2738*
Farm	306	365	573	1066	660	*2970*
Total	*2450*	*1586*	*2023*	*3171*	*770*	*10000*
	B. Circulation mobility (C-U)					
Upper nonmanual	0	184	127	152	13	*476*
Lower nonmanual	442	0	191	223	22	*878*
Upper manual	34	320	0	541	23	*918*
Lower manual	0	374	600	0	52	*1026*
Farm	0	0	0	110	0	*110*
Total	*476*	*878*	*918*	*1026*	*110*	*3408*
	C. Structural mobility (S)					
Upper nonmanual	0	0	0	0	0	*0*
Lower nonmanual	123	0	0	0	0	*123*
Upper manual	430	0	0	0	0	*430*
Lower manual	491	32	0	0	0	*523*
Farm	306	365	573	956	0	*2200*
Total	*1350*	*397*	*573*	*956*	*110*	*3276*

Note: (a) Data based on Featherman and Hauser (1978). Sample size standardized to 10,000

Table 3. Frequencies of observed, circulation, and structural mobility from father's occupation to son's current occupation for men aged 20 to 64, in the United States (1973).[a]

Father's occupation	Son's occupation: Upper nonmanual	Lower nonmanual	Upper manual	Lower manual	Farm	Total
	A. Observed mobility (N)					
Upper nonmanual	915	176	198	240	16	*1545*
Lower nonmanual	510	194	193	243	15	*1155*
Upper manual	630	247	565	576	26	*2044*
Lower manual	680	357	709	1190	32	*2968*
Farm	381	206	525	850	326	*2288*
Total	*3116*	*1180*	*2190*	*3099*	*415*	*10000*
	B. Circulation mobility (C-U)					
Upper nonmanual	0	176	198	240	16	*630*
Lower nonmanual	379	0	193	243	15	*830*
Upper manual	251	247	0	576	26	*1100*
Lower manual	0	357	709	0	32	*1098*
Farm	0	50	0	39	0	*89*
Total	*630*	*830*	*1100*	*1098*	*89*	*3747*
	C. Structural mobility (S)					
Upper nonmanual	0	0	0	0	0	*0*
Lower nonmanual	131	0	0	0	0	*131*
Upper manual	379	0	0	0	0	*379*
Lower manual	680	0	0	0	0	*680*
Farm	381	156	525	811	0	*1873*
Total	*1571*	*156*	*525*	*811*	*0*	*3063*

Note: (a) Data based on Featherman and Hauser (1978). Panel A is based on the data from the disaggregated Tables E4 and E5
Total sample size standardized to 10,000

We shall discuss the discrepancy between their estimates and the results which follow from utilizing the decompositional approach.

Using the matrices of structural and circulation mobility (see Table 2 and 3, Panel B and C) one can directly count the amount of each kind of mobility. Table 4 displays these results together with Featherman and

Hauser's (1978: Table 3.16) estimates. In comparison with direct counts, the results based on the index of dissimilarity underestimate the proportion of structural mobility and, in consequence, overestimate the proportion of circulation mobility.

Estimates provided by the traditional measure are inadmissible since, for a given matrix of observed mobility, neither of the two separated kinds of mobility is representable as frequencies of transitions between status categories. To demonstrate this, we consider Panel A of Table 3 as an example. According to Featherman and Hauser's (1978: 70-1) method of computation, the margin differences imply a distribution of structurally mobiles, and give 3116 - 1545 = 1571 transitions from farm to upper nonmanual. However, this value exceeds the corresponding value (381) in the observed mobility table, forcing some negative values in the complementary matrix of circulation mobility. A negative value is inconsistent with the concept of mobility transitions since the possible number of movements from i to j is always positive or zero.

Generally, differences between estimates obtained by using the classical approach and the decompositional approach depend on the analytic properties of the matrix of observed mobility; only under certain restrictive conditions the traditional estimates are correct (Krauze and Słomczyński, 1986a). For the American data collected in 1962 and 1973, the bias resulting from the use of the index of dissimilarity is substantial. In particular, the amount of directly counted circulation mobility is smaller than the one repeatedly reported in the literature: 34.1 per cent as compared with 44.9 per cent for 1962 and 37.5 per cent as compared with 49.3 per cent for 1973. Our counts of structural and circulation

mobility add up to total mobility; they should be treated as estimates subject only to sampling error.

The analysis of counts in matrices of structural and circulation mobility may also be used to refine some other conclusions. For example, Featherman and Hauser (1978: 93) wrote: "in both the 5x5 tables structural mobility is entirely accountable to the shift out of farming". Actually this is not the case: for both 1962 and 1973, the matrices of structural mobility implied by Featherman and Hauser's method of computation are not admissible; if these matrices are subtracted from the respective matrices of observed mobility the resulting circulation mobility would contain some negative numbers of mobility transitions. In contrast, the matrices of structural mobility provided in Panel C of Tables 2 and 3 are admissible; however, they contain outflows from all status categories except upper nonmanual. Therefore, the quoted conclusion should be modified.

Table 4. Proportions of circulation and structural mobility based on direct counts and other computations, for men aged 20 to 64, in the United States, (1962 and 1973).

Year	Circulation mobility		Structural mobility	
	Direct counts	Other computations[a]	Direct counts	Other computations[a]
1962	.341	449	.328	.220
1973	.375	493	.306	.188

Note: (a) Featherman and Hauser (1978: Table 3.16).

Featherman and Hauser (1978: 91-2) noticed that the percent of upwardly mobiles in both samples, 1962 and 1973, was very similar (51.6

and 50.9). Our approach can be used to decompose upward mobility into its structural and circulatory components. Between 1962 and 1973 upward circulation mobility increased slightly (from 18.8 to 20.2 per cent) while upward structural mobility decreased slightly (from 32.8 to 30.1 percent).

By expanding the circulation mobility matrix into cyclic matrices, according to formula (2), we exhibit the underlying pattern of mobility transitions. We assume that the weight of a cycle is maximal if the extraction of the weighted cyclic matrix leaves the original matrix with nonnegative values but increases the number of its zero entries. The proposed method of expansion consists of several steps which we illustrate using data from Panel B in Tables 2 and 3. First, we extract all cycles of length two (direct exchange) using their maximal weights. In the next step we analyze cycles of length three (indirect exchange) and determine their maximal weights. After removing the cycle with the maximal weight we recompute the weights for the remaining cycles and repeat the procedure until all cycles of length three are extracted. The extraction of cycles of length four and five follows the procedure described for cycles of length three. The results are shown in Table 5.

This hierarchical procedure, akin to lexicographic ordering, practically assures the uniqueness of the decomposition of the circulation mobility matrix into a sum of weighted cycles. The sum of the products of cycle length and cycle weight gives the total number of circularly mobile persons. Sixteen types of cycles suffice to decompose the circulation mobility matrices for both 1962 and 1973. This is an efficient way of presenting data since, without any restrictions, a 5x5 matrix can be decomposed into 84 cycles with a length of at least two.

Table 5. Hierarchically extracted cycles and their weights for circulation mobility of men aged 20 to 64, in the United States (1962 and 1973).

Cycle[a]	Length	Weight for 1962	Weight for 1973
1,2	2	184	176
1,3	2	34	198
2,3	2	191	193
2,4	2	223	243
2,5	2	-	15
3,4	2	541	576
4,5	2	52	32
1,3,2	3	93	-
1,4,2	3	151	114
1,4,3	3	-	53
1,5,2	3	-	16
3,5,4	3	23	7
1,4,3,2	4	1	54
2,5,4,3	4	22	-
1,4,3,5,2	5	-	19
1,5,4,3,2	5	13	-
$\sum$ (length) (weight)		3408	3747

Note: (a) The digits of each cycle refer to status categories between which the exchange occurs: 1 -- upper nonmanual, 2 -- lower nonmanual, 3 -- upper manual, 4 -- lower manual, 5 -- farm.

For 1962 and 1973 the weights of cycles of length two, i.e. those corresponding to reciprocal direct exchanges, are quite similar; thus, with respect to simple symmetry the matrices resemble each other. The symmetric part of circulation mobility accounts for 71.9 and 76.5 percent of cases of the total of circularly mobiles in respective years. Thus, our analysis reveals that circulation mobility is far from reducible to symmetric exchanges. The variety of asymmetric exchanges is pronounced; this is an inherent characteristic of circulation mobility. Therefore, the models of circulation mobility should not a priori assume symmetry as has

been done by Sobel, Hout, and Duncan (1986).

The definition of structural mobility implies that its matrix contains no cycles. It can be generally proven that in any matrix of structural mobility the status categories can be ordered as follows: the top category does not give outflow to any other; any category in the middle gives no outflow to lower categories and receives no inflow from higher categories; the bottom category receives no inflow. Thus, the acyclicity of structural mobility implies unidirectional flows between status categories. Note that this ordering of categories can always be accomplished by simultaneous permutation of the rows and columns of matrix S. It is apparent from Panel C of Tables 2 and 3 that status categories were already ordered in the required manner, the hierarchy being from upper non-manual (as recipient-only category) to farm (as donor-only category).

The Yasuda index and its application to Japanese data

Using data on the current occupation of men and their fathers, sociologists apply various indices of *intergenerational mobility* to characterize, in a synthetic way, the degree of openness of a society. The *coefficient of openness*, introduced by Yasuda (1964) on the basis of the classic ideas of Benini (1901; cf. Yasuda, 1971; Jones, 1985a), is one of the most popular among such indices. This coefficient, known as the "Yasuda index" or "index Y," has been much elaborated on and discussed (e.g. Yasuda, 1971; Jones, 1975a; Boudon, 1972; Bibby, 1975; Hauser et al., 1975). Major publications in the methodology of social stratification

research refer to Yasuda's original contribution to the measurement of social mobility. In empirical analyses, his index has been applied in Poland (e.g. Janicka, 1978), Japan (e.g.Tominaga, 1969; Tominaga and Naoi, 1978), the United States (e.g. Featherman and Hauser, 1978), and other countries. The index has also been frequently utilized in direct cross-national comparisons (e.g. Yasuda, 1964; Featherman et al., 1975; Jones, 1985b).

In the notation used in this chapter, the original formula for the Yasuda index Y is

$$(9) \qquad Y = \sum_{i=1}^{k} [min(n_{i\cdot}, n_{\cdot i}) - n_{ii}] \Big/ \sum_{i=1}^{k} [min(n_{i\cdot}, n_{\cdot i}) - f_{ii}]$$

where

$$f_{ij} = n_{i\cdot} \times n_{\cdot j} / n_{\cdot\cdot} \qquad (i,j = 1, ..., k)$$

defines a matrix of perfect (hypothetical) mobility $F = (f_{ij})$.

Equivalently, equation (9) can be expressed as

$$(10) \qquad Y = \sum_{i=1, i \neq j}^{k} n_{ij} - \Delta(N) \Big/ \sum_{i=1, i \neq j}^{k} f_{ij} - \Delta(F)$$

where $\Delta(N) = {}^1/_2 \sum_{i=1}^{k} |n_{i\cdot} - n_{\cdot i}|$ and $\Delta(F) = {}^1/_2 \sum_{i=1}^{k} |f_{i\cdot} - f_{\cdot i}|$

In these formulae, the numerator is intended to measure *the amount of pure mobility extracted from the matrix of observed mobility* while the

denominator refers to *the amount of pure mobility in the "perfect mobility situation"*. Pure mobility is understood as mobility unaffected by the difference in marginal distributions, that is a net of $n_{i.} - n_{.i}$ over all i. This is apparent from equation (10) in which the index of dissimilarity Δ is used. Under the original formulation $\Delta(N) = \Delta(F)$ since $n_{i.} = f_{i.}$ and $n_{.i} = f_{.i}$.

Commenting on the index, Yasuda (1964:18) wrote that his *"coefficient of openness ... measures the degree of approximation to perfect mobility...."* A similar interpretation is provided in some other publications (e.g. Boudon, 1972; Bibby, 1975; Jones, 1975a). It is commonly understood that the Yasuda index is a *ratio of the amount of "pure actual mobility" to the amount of "pure perfect mobility"*. Our dispute deals with the measurement of pure mobility as such.

The Yasuda index is deficient because it utilizes an inadequate representation of pure mobility. Note that the amount of pure mobility implied by equation (9) is

$$\delta(X) = \sum_{i=1}^{k} [min(n_{i.}, n_{.i}) - n_{ii}] \tag{11}$$

Simultaneously, the definition of pure mobility requires

$$q_{i.} = c_{i} \tag{12}$$

However, equations (11) and (12) are *inconsistent* under assumptions (1) and (3). The simplest possible example demonstrating this fact would be a 3x3 matrix $N = (n_{ij})$ in which elements $n_{13} = n_{21} = 1$ and the remaining elements are all zero. In view of equation (11) we have

$\delta(N) = 1$. Thus, to fulfill equation (12) matrix C(N) should contain only one entry $c_{ii} = 1$ but this would contradict assumption (1). If for the considered matrix N we determine values c_{ij} which do not violate assumption (1), then equation (11) is incompatible with assumption (3), i.e. $\partial(N) \neq \delta(N)$.

The classical definition of pure mobility requires homogeneity of marginal distributions [as given by equation (12)]; Yasuda accepts this conceptualization in his work and we do as well. However, under the natural assumptions (1) and (3), the above example *proves* that index Y is based on an *incorrect measure of the amount of pure mobility.*

In our reformulation of index Y we define two matrices of pure mobility, Q(N) and Q(F), extracted from the matrices of observed mobility N and perfect mobility F, respectively. Both Q(N) and Q(F) are determined by the solution of the linear programming problem according to equations (1), (3) and (4). The modified version of Y, called Y*, is expressed by the formula:

$$Y^* = c_{..}(N) / c_{..}(F) \tag{13}$$

As in the original version, the index is a ratio of the amount of "pure actual mobility" to the amount of "pure perfect mobility." This differs from Yasuda's formulation, however, in that both these quantities are sums of frequencies in the respective pure mobility matrices. Thus, the meaning of the original index remains unaltered while its defective operationalization of the amount of pure mobility is corrected.

In the absence of pure mobility in the matrix of actually observed mobility index Y* is equal to 0; its theoretical maximum exceeds 1 since, as in the original version, there may be more pure actual mobility than pure perfect mobility. As Yasuda (1964: 18) pointed out, for real societies his index would not exceed 1; the same holds true for the modified version Y*.

Table 6. Values of the Yasuda index and its components, according to the original and modified versions, for samples of men aged 20 to 69, in Japan (1955, 1965, and 1975).[a]

Samples	Original version			Modified version		
	Proportion of pure mobility		Yasuda Index Y	Proportion of pure mobility		Yasuda Index Y*
	Actual	Perfect		Actual	Perfect	
1955	.321	.549	.585	.296	.547	.541
1965	.359	.544	.660	.308	.521	.591
1975	..397	.557	.713	.354	.527	.673

Note: (a) Social Stratification and Mobility surveys 1955, 1965, 1975.

Naoi and Słomczyński (1986) applied a modified version of the Yasuda index to the Japanese data collected in the Social Stratification and Mobility surveys in 1955, 1965, and 1975. The computations involved 8x8 mobility tables. The results show that the difference between the values of the Yasuda index in the original and modified versions are substantial (see Table 6). In particular, it is evident that the original version of the index overestimates the proportion of pure actual mobility and, in consequence, provides index values implying that Japanese society is more open than it actually is.

Discussion and conclusion

Historically, the introduction of the concepts of structural and circulation mobility entailed the expectation that these types of mobility would be presented as separate frequency tables which sum up to observed mobility. Although the concepts became well established and widely used in the formulation of empirical hypotheses the initial expectation has remained unfulfilled. Using the literature dealing with the twin concepts of structural and circulation mobility we distilled their essential properties. The proposed decompositional approach attempted to provide rigorous definitions of structural and circulation mobility and a method of their operational determination. The innovative feature of this approach consists of adapting the technique of linear programming to compute the frequencies for both types of mobility. Patterns of these frequencies constitute what has been for years considered the core of mobility studies. The decompositional approach correctly represents the essence of concepts of structural and circulation mobility and operationalizes them as mobility frequencies[3].

Erikson, Golthorpe, and Portocarero (1982; see also Goldthorpe, 1980) maintain that the distinction between structural and circulation

[3] Some researchers should be reminded that frequencies of structural mobility cannot be larger that those of total mobility. In his Table 4, Lissowski (1987) shows frequencies of total mobility which, according to Krauze and Słomczyński (1986a), can be attributed only to structural change; in this case $n_{ij} = s_{ij}$ and $s_{..} > \Delta$. Using mariginal distributions from Table 4 Lissowski constructs Table 5 so that $s^*_{..} = \Delta$ (for new s^*_{ij}) and claims that Krauze and Słomczyński are "clearly in error." However, in his Table 5 some mobility frequencies ecxeed those in Table 4, that is $s^*_{ij} > n_{ij}$. Thus, in his counter-example Lissowski violates a basic assumtion of any kind of decompostitional approach.

mobility "stem[s] directly from the confusion of levels of analysis." They claim that structural and circulation mobility should not be treated as "two different kinds of mobility, between which the movements of individuals may be divided up" (p. 6). We shall argue that their objections are unfounded; specifically a single level of analysis is involved, and movements of individuals may be divided into structural and circulation *mobility*.

The objections of Erikson, Goldthorpe, and Portocarero (1982) and Goldthorpe (1980) are well taken with respect to the traditional approach in which measures based on the index of dissimilarity are not translatable into actual movements of individuals. In contrast, within the decompositional approach, both structural and circulation mobility are defined in terms of transitions of individuals. In this sense a single level of analysis is involved and expressed in a unified mathematical framework. Moreover, an inspection of the frequency tables (cf. Table 2 and 3) shows that movements of individuals are actually divided into structural and circulatory components. The supplementary problem, not explicitly raised by the cited authors, concerns the identification of individuals who experience each type of mobility.

Two remarks are in order. First, the lack of identifiability of persons experiencing a given type of mobility is not an inherent property of the discussed concepts. In a specially designed study where information about person-position pairs was to be collected at two time points, the identification of all individual structural and circulation mobility movements would be possible. This should be apparent from considering a mobility study within an organization where a complete record of all

positions, persons, and person-position transitions is kept. Second, probabilistic identifiability of individuals experiencing each kind of mobility is possible if the identity of the individuals in each cell of matrix N is known. Note that for all persons in at least $k(k+1)/2$ cells their mobility experience is circulatory. Moreover, for each individual who moves from origin category i to destination category j, the estimate of probability that he experienced circulation mobility is c_{ij}/n_{ij}. Such estimates of probability may be assigned to all individuals allowing for contextual analysis of the determinants and consequences of individual circulatory transitions.

The distinction between structural and circulation mobility is embedded in the tradition of sociological research on the openness of society. For years, circulation mobility has been thought of as a form of societal exchange by which members of a society utilize fixed opportunities in an unaltered social structure. In our conceptualization circulation mobility is considered in terms of cycles. The cycles provide an initial clue for operationalizing the venerable metaphor of circularity (Pareto, 1916; Sorokin, 1927) in the domain of social stratification.

Chapter 5

The structural component of educational mobility

Traditionally, the main dimension of social mobility has been occupational status. Recently, however, more attention has been paid to intergenerational mobility in the educational dimension (e.g. Peschar and Popping, 1985; Peschar, 1984; Peschar, Popping and Mach, 1986; Mateju, 1984). Investigators involved in cross-national studies provide two substantive arguments for this shift in research interest:

"Firstly, education is an important mechanism for learning many occupationally and socially relevant skills and values that are treated as resources and assets in competing for almost all social positions. In this sense ... education could [facilitate] the upgrading of the labour force necessitated by economic development.... Secondly, education is an important mechanism for selecting personnel allocated to differently rewarded social positions. In this sense the educational system tends to serve the interests of organizations that control education and to reproduce the existing social structure" (Peschar, Popping and Mach, 1986: 120).

Bourdieu and Passeron (1970) argue that the main function of the educational system is to ensure that inequality in society is being reproduced from one generation to the next. Bowles and Gintis (1976) have identified this mechanism of social reproduction as a typical feature of the late stage of capitalism. In this chapter we focus on educational

mobility across generations in Japan. At the end of the chapter we discuss comparative results for Poland and the United States.

Educational mobility across generations in Japan: four problems

Since the Meiji government promoted the westernization of the school system in 1872, Japan successively transformed elementary and secondary, and then higher education from an elite to a mass form. For analyses of the historical and social dimensions of modern Japanese education see: Passin (1965), Aso and Amano (1983), Beauchamp (1974), Cummings (1980). A substantial number of publications have been devoted to a detailed description of the *change in the amount of education through time* among Japanese adults. Much less effort has been spent on analyzing *educational mobility across generations*. Although both of these interests are related, neither of them can be replaced by the other. In particular, even unobjectional estimates of the increase of education through time would not be sufficient for inferring the correlation between the educational attainment of consecutive generations.

In this chapter we investigate educational mobility across generations in Japan on the basis of national surveys conducted in 1955, 1965, and 1975. The years of these surveys mark a time when great expansion of the educational system occurred in terms of resources (e.g. public and private expenditures on schooling) and their utilization (e.g. the admissions of new students). The new, better educated labor force had been easily absorbed by the vigorous economy. The first decade, 1955-1965, may be identified with the take-off era of intensive, rapid industrial

growth in post-war Japan; the second decade, 1965-1975, after some prosperous years, ended with an economic recession caused by the "oil shock." Educational expansion contributed to Japan's becoming an economic superpower (Japanese Ministry of Education, 1963; Aso and Amano, 1983).

From an economic point of view, the educational system plays the role of a supplier of qualified labor. From the social point of view it plays the role of a socialization agent. Considering the social rather than the economic point of view, some researchers claim that the latent function of the educational system is to ensure that social inequality is reproduced from one generation to the next (e.g. Bourdieu and Passeron, 1970; Bowles and Gintis, 1976). Given such a theoretical framework, educational mobility across generations should be viewed as the most direct indicator of the reproduction of social inequality.

Taking into account both the economic and social points of view, we focus on four specific problems: The first deals with the *amount of educational mobility and the proportion of its structurally determined component*. By the structurally determined component we mean the part of total mobility which preserves the original disjuncture between distributions of education at the origin and at the destination. The question arises as to whether this component dominates the remaining one which identifies free exchanges.

Two subsequent problems pertain to *intergenerational change in the amount of education across generations*. Utilizing a conventional measure of change between two time points, we compute the weighted sum of squared differences between the number of years of schooling of sons and their fathers. Two relevant research questions may be asked: How much

of this quantity is due to structural mobility, and how much is due to pure mobility? What proportion of the variance in father-to-son changes in the number of years of schooling is explainable in terms of "educational background"?

The last problem concerns the *impact of the distribution of the number of years of schooling at the origin and destination on the relationship between these two variables*. In particular, we show that distributional constraints force the maximal value of the correlation between father's and son's education to be much below one. This result makes it possible to compute the proportion of unexplained variance of son's education which exists solely because of distributional constraints.

In this chapter we treat matrices of educational mobility in the same way as if they were matrices of occupational mobility. In both cases the term *mobility* refers to a change of position through time (Sorensen, 1976), the only difference between these cases being the dimension of that position. There are many similarities between the formal aspects of analyzing occupational and educational mobility. For example, in an analogy with intergenerational occupational mobility (cf. Duncan, 1966), the matrix of father-to-son educational mobility is justifiably interpretable only in terms of transitions from educational background to educational achievement. The reader should be aware that the classification of father's education does not convey information about a "generation of fathers" since the sample refers only to the "generation of sons." Thus, educational mobility across generations" has a special, technical meaning since it involves a comparison of the educational achievement of the eneration of sons with the educational achievement of their fathers who

do not constitute a generation.

Count measure of the structural component in educational mobility

Educational mobility across generations can be analyzed by means of cross-classifications of persons according to their education and the education of their parents. The matrix of educational mobility $N = (n_{ij})$ displays the frequencies of transitions from origin categories i of "educational background" to destination categories j of "achieved education" $(i,j = 1,..., k)$.

Table 1 contains educational mobility matrices for Japan in 1955, 1965, and 1975. The data come from the Social Stratification and Mobility (SSM) surveys and refer to men aged 20 to 69 (Imada, 1979). The origin and destination categories correspond to four levels of education: elementary school, junior-high school, high school, and college or university.[1] For the purpose of inter-study comparability we have standardized the size of each survey sample to one thousand.

Imada (1979) begins his analysis of the educational mobility tables by noting that the proportion of mobiles increased from .618 in 1955 to .702 ÷ .709 in 1965 and 1975. His further analysis is based on the

[1] We apply the same classification for educational background and educational achievement in spite of changes in the educational system after World War II. This classification slightly differs from the one used in the population census: it does not differentiate between college and university education while it makes a distinction between elementary and junior high school education.

Table 1. Men, aged 20 to 69, according to their education and the education of their fathers, in Japan (1955, 1965, 1975).

Father's education	Son's (respondent's) education				
	Elementary school	Junior high school	High school	College	Total
		A. SSM survey (1955)			
Elementary school	197	318	90	34	*639*
Junior high school	10	135	73	37	*255*
High school	2	12	22	29	*65*
College	1	3	9	28	*41*
Total	*210*	*468*	*194*	*128*	*1000*
		B. SSM survey (1966)			
Elementary school	81	328	105	32	*546*
Junior high school	11	138	106	48	*303*
High school	1	13	40	34	*88*
College	0	6	18	39	*63*
Total	*93*	*485*	*269*	*153*	*1000*
		C. SSM survey (1975)			
Elementary school	65	230	156	43	*494*
Junior high school	5	106	129	45	*285*
High school	1	17	68	58	*144*
College	0	3	22	52	*77*
Total	*71*	*356*	*375*	*198*	*1000*

distinction between *structural mobility* and *pure mobility*. Using this distinction in the same way as in chapter 4, we explain some fundamental difficulties involved in the *traditional* measurement of the amounts of these two kinds of mobility in the educational dimension.

Structural mobility is understood as resulting from the discrepancy between distributions of fathers' education and sons' education, while circulation mobility refers to "true" mobility which would occur if these distributions were identical. Imada (1979), like many other proponents of the classical approach to mobility tables, explicitly treats structural and pure mobility as exhaustive and exclusive components of total mobility. He estimates the amount of structural mobility by applying the index of dissimilarity $\Delta(N)$. This index measures the discrepancy between marginal distributions. However, as shown in Chapter 4, $\Delta(N)$ is *not a measure of any kind of observed mobility* since it does not refer to those *transitions* from categories i to j which are consistent with the data matrix. The index of dissimilarity provides a correct estimate of the amount of structural mobility *only under very restrictive conditions*.

Are these conditions met in the case of educational mobility in Japan? If they are not, to what extent are they violated? To what extent are estimates derived from the index of dissimilarity biased? Do the new estimates alter Imada's conclusion that the structural component of educational mobility becomes less important through time? To prepare the ground for answering these questions we need to define structural mobility in the educational dimension.

We assume that in the case of educational mobility, the concept of structural mobility should be defined *per analogiam* to the case of occu-

pational mobility, described in Chapter 4. According to our definition, structural mobility is the part of total mobility preserving the difference between the origin and destination distributions; it is limited to transitions "forced" or necessitated by that difference. Let $S = (s_{ij})$ denote the matrix of structural mobility; S(N) means that S is extracted from observed educational mobility N. Note that the matrix S can be used in the equation $C = N^* - S$ where C stands for circulation mobility, $N^* = N - U$, and $U = (u_{ij})$ is the immobility matrix containing nonzero elements on the main diagonal $u_{ii} = n_{ii}$. Matrix C accounts for all observed father-to-son transitions which result in identical distributions of "educational background" and "achieved education."

The amount of structural mobility contained in the matrix S(N) is equal to $s_{..}(N)$; we denote this number by $\nabla(N)$. For data contained in Table 1 the value of $\nabla(N)$ differs from the value of the index of dissimilarity $\Delta(N)$. Consider Panel (A) as an example. According to the method of computation based on the index of dissimilarity, the marginal differences imply a distribution of structurally mobiles, and give 639 - 128 = 511 transitions from the father's elementary school to the son's college education. However, this value (511) exceeds the corresponding value (34) in the observed mobility matrix, forcing some negative values in the complementary matrix of circulation mobility. Table 1 shows that the index of dissimilarity gives estimates of the amount of structural mobility which are much too low. Therefore, all other calculations based on these estimates -- such as the amount of pure mobility or the value of the index of Yasuda (1964) -- also contain some errors. We need to determine how large these errors are.

Table 2. Structural and circulation transitions from father's education to son's education, in Japan (1955, 1965, 1975).

Father's education	Structural transitions: Son's education					Circulation transitions: Son's education				
	Elementary school	Junior high school	High school	College	Total	Elementary school	Junior high school	High school	College	Total
A. SSM survey (1955)										
Elementary school	0	305	90	34	*429*	0	13	0	0	*13*
Junior high school	0	0	55	37	*92*	10	0	18	0	*28*
High school	0	0	0	16	*16*	2	12	0	13	*27*
College	0	0	0	0	*0*	1	3	9	0	*13*
Total	*0*	*305*	*145*	*87*	*537*	*13*	*28*	*27*	*13*	*81*
B. SSM survey (1965)										
Elementary school	0	316	105	32	*453*	0	12	0	0	*12*
Junior high school	0	0	86	48	*134*	11	0	20	0	*31*
High school	0	0	0	10	*10*	1	13	0	24	*38*
College	0	0	0	0	*0*	0	6	18	0	*24*
Total	*0*	*316*	*191*	*90*	*597*	*12*	*31*	*38*	*24*	*105*
C. SSM survey (1975)										
Elementary school	0	224	156	43	*423*	0	6	0	0	*6*
Junior high school	0	0	108	45	*153*	5	0	21	0	*26*
High school	0	0	0	33	*33*	1	17	0	25	*43*
College	0	0	0	0	*0*	0	3	22	0	*25*
Total	*0*	*224*	*264*	*121*	*609*	*6*	*26*	*43*	*25*	*100*

Table 3. Structural and circulation components of educational mobility between generations according to Imada's estimates and direct measures, for Japan (1955, 1965, 1975).

Total mobility and its components	SSM surveys 1955	1965	1975
A. Imada's estimates[a]			
Total mobility (%)	61.8	70.2	70.9
Structural mobility (%)	42.9	45.3	42.4
Circulation (pure) mobility (%)	18.9	24.9	28.5
Yasuda index (original version)[b]			
Elementary school	.167	.289	.148
Junior high school	.886	1.055	.975
High school	.821	.746	.847
College	.368	.446	.411
Total	.631	.787	.770
B. Direct measures			
Total mobility (%)	61.8	70.2	70.9
Structural mobility (%)	53.7	59.7	60.9
Circulation (pure) mobility (%)	8.1	10.5	10.0
Yasuda index (modified version)[c]			
Elementary school	.171	.286	.161
Junior high school	.222	.270	.226
High school	.519	.594	.478
College	.361	.461	.397
Total	.279	.385	.329

Notes: (a) Imada (1979: Table 3.3).
(b) Computed by Imada (1979) according to the original formula of Yasuda (1964).
(c) Computed by the author according to the formula of Naoi and Słomczyński (1986); see Chapter 4.

Table 2 displays the matrices of structural and circulation mobility, S(N) and C(N), computed in accordance with the methods described in Chapter 4. Using these matrices one can directly count the amount of each kind of mobility. Table 3 presents the results together with Imada's

estimates. In comparison with our direct counts, *results based on the index of dissimilarity underestimate the proportion of structural mobility and, as a consequence, overestimate the proportion of circulation mobility.* In the case of the amount of structural mobility in the educational dimension, the differences in the magnitude between Imada's estimates and direct counts are substantial; for 1965 and 1975 they exceed 12 per cent.

The largest differences pertain to Yasuda's (1964) index of openness Y. Imada (1979) computed this index using the original Yasuda formula. However, the formula for Y involves $\nabla(N)$ and is not based on an appropriate representation of pure mobility. As shown in Chapter 4, the Yasuda index can be modified by using a matrix representation of pure mobility. In the case of educational mobility (cf. Table 3), differences of the estimates for the original and modified versions of the index, Y and Y* respectively, exceed 100 percent.

How much of the intergenerational change in the amount of education is due to structural mobility?

The general measure of change (cf. Kessler and Greenberg, 1981: 48) involves a comparison of the values of a given variable in two time points. We compare the value of "educational background" (i.e. father's education) with the value of "achieved education" (i.e. son's education), these being the two indicators of intergenerational change. We assume that the scales of "educational background", $x = (x_i)$, and of "achieved education", $y = (y_j)$, are the same, i.e. $x_i = y_i$ $(i, j = 1,...,k)$.

The overall measure of intergenerational change in the amount of education can be expressed as

$$(5) \qquad Q^2(N) = \sum_{i,j=1}^{k} (y_j - x_i)^2 n_{ij} / n..$$

In equation (5) each difference term enters the sum only after being squared and, therefore, the index $Q^2(N)$ treats an increase in education in the same way as a decrease in education. Although the square root of (5) would provide the measurement in the same units as x and y, we prefer to use $Q^2(N)$ rather than Q(N) since the roots are inconvenient for algebraic manipulation. The relationship between $Q^2(N)$ and Q(N) is analogous to that between the variance and the standard deviation.

Under the assumption that father's and son's education is measured on the same scale, the matrix of immobiles U does not contribute to the overall measure of intergenerational change in education, $Q^2(N)$. The contribution of the matrices of structural and circulation mobility can be established on the basis of the following equality:

$$(6) \qquad Q^2(N) = Q^2(S)s../n.. + Q^2(C)\, c../n..$$

where $Q^2(S) = \sum_{i,j=1}^{k} (y_j - x_i)^2 s_{ij} / s..$ and $Q^2(C) = \sum_{i,j=1}^{k} (y_j - x_i)^2 c_{ij} / c..$

We assigned the following scores to educational background and educational achievement: elementary school - 6 years, junior high school - 9 years, high school - 12 years, college and university - 16 years. Table 4

shows the results.

Table 4. Intergenerational change in education attributed to structural and circulation (pure) mobility, in Japan (1955, 1965, 1975).

Total change and its components	SSM surveys 1955	1965	1975
Total change $Q^2(N)$	13.10	14.62	17.01
A. Due to structural mobility $Q^2(S)$	11.95	13.11	15.64
(Proportion of total)	(.912)	(.897)	(.919)
B. Due to circulation (pure) mobility $Q^2(C)$	1.15	1.51	1.37
(Proportion of total)	(.088)	(.103)	(.081)

Two conclusions are clear: first, the proportion of the change due to structural mobility is very high (around .9), and, second, it remains rather stable for the entire period 1955-1975 (the inter-survey difference is less than .03). Both these conclusions contradict the opinion that after a dramatic increase in educational opportunity, intergenerational shifts in education would involve "free" rather than structural mobility. Our additional analysis of the 1975 data reveals that for even the youngest generation the intergenerational difference in education is almost entirely due to structural mobility.

Decomposition of the intergenerational change in the amount of education: Kessler-Greenberg model

Kessler and Greenberg (1981) provide a convenient decomposition of the overall change, measured by $Q^2(N)$. In our notation this decomposition can be expressed in the following form:

$$(7) \qquad Q^2(N) = (\overline{Y} - \overline{X})^2 + \sum_{i,j=1}^{k} [(y_j - x_i) n_{ij} - (\overline{Y} - \overline{X})]^2 / n..$$

where $\overline{Y} = \sum_{j=1}^{k} y_j \, n_{.j} / n..$ and $\overline{X} = \sum_{i=1}^{k} x_i \, n_{i.} / n..$

In equation (7) the first term represents the contribution of the difference between the arithmetic means of education among sons ($\overline{Y}$) and among their fathers ($\overline{X}$). This term is constant for all individuals in the sample and, therefore, involves only the aggregate measure of change. In contrast, the second term represents the contribution of the variance of individual change in the education of sons in comparison with their fathers. It is defined over all transitions of the educational mobility matrix and takes into account the distance each person crossed from "educational background" to "achieved education."

As Kessler and Greenberg (1981: 49) point out, the relative magnitude of both terms "provides information about the character of change: how much is due to change that affects all cases equally, and how much is due to change relative to others." We assume that the arithmetic mean and/or standard deviation "affect all cases equally" while the "change

relative to others" may be inferred from higher moments of bivariate distribution. We further extract structural constraints on individual changes in father-to-son mobility according to the amount of education.

Table 5. Distributional components of intergenerational change in education, for Japan (1955, 1965, 1975).

Distributional components	SSM surveys 1955	1965	1975
Son's (respondent's) education			
$\bar{Y}$	9.85	10.60	11.30
σ_Y	3.03	2.86	2.90
Father's education			
$\bar{X}$	7.56	8.07	8.49
σ_Y	2.51	2.81	3.04
Total change in education			
$Q^2(N)$	13.10	14.62	17.01
A. Due to shift in $\bar{Y}$ and $\bar{X}$			
$(\bar{Y} - \bar{X})^2$	5.24	6.40	7.90
(Proportion of total)	(.400)	(.438)	(.464)
B. Due to shift in σ_Y and σ_X	.27	.00	.02
(Proportion of total)	(.021)	(.000)	(.001)

Table 5 shows the distributional components of an intergenerational change in education. The component occurring due to the shift in arithmetic means is substantial and ranges from 40 per cent in 1955 to over 45 per cent in 1975. Note that this component can be solely attributed to structural mobility as defined by the matrix S(N). Making use of the fact that the differences between marginal distributions are the same in S as in N ($n_{i\cdot} - n_{\cdot i} = s_{i\cdot} - s_{\cdot i}$), and that the scale of education

is the same for sons and fathers ($y_i = x_i$), we can write the equation for the difference between the means as

$$\overline{Y} - \overline{X} = \sum_{i=1}^{k} (s_{i.} - s_{.i})\, x_i / n..$$

McClendon (1977) applies a broader definition of distributional components of change associated with mobility than the one previously discussed. His definition includes not only the squared difference of means but also the squared difference of standard deviations. The data in table 5 show that in the case of sons' and fathers' education, the standard deviations are not very different. Thus, the overall conclusion from the Japanese data for 1955-1975 is clear: *The distributional component of change is almost entirely due to the shift in the means; it is substantial and gains in importance over time.*

Let us consider the non-distributional component of change, that is the variance of individual differences in father's and son's education. We denote this variance by $\sigma^2_{(y-x)}$, and use the following equation:

(8) $$\sigma^2_{(y-x)} = b^2_{(y-x,\, x)}\, \sigma^2_x + \sigma^2_e$$

In this equation the variance of intergenerational differences in education is expressed as a sum of two terms. The first is a weighted regression coefficient which indicates how much the father-to-son change depends on the father's education; the second is the variance of the son's

education which is not related to father's education. Kessler and Greenberg (1981) identify the first term with "structural change." They write: " By structural change, we mean change that can be predicted from initial scores. Change that is not determined by initial scores is 'individual' change. Thus, that part of change in income that is predicted by earlier income is structural..." (p. 50). The example of change in income can be easily rephrased for the case of intergenerational change in education.

Table 6. Decomposition of the variance of intergenerational change in education, for Japan (1955-1975).

Variance of change and its decomposition	SSM surveys 1955	1965	1975
Total variance of change $\sigma^2_{(y-x)}$	7.86	8.22	9.11
A. "Structural component" $(b_{(y-x,x)}\sigma_y)^2$	.99	1.98	2.67
(Proportion of total)	(.126)	(.241)	(.293)
B. "Individual component" σ^2_e	6.87	6.24	6.44
(Proportion of total)	(.874)	(.759)	(.707)

Table 6 presents the decomposition of variance of intergenerational change in education into the "structural component" and the "individual component" -- both components defined according to Kessler and Greenberg's model. In Japan, during the period 1955-1975, the *proportion of "the structural component" in the total variance of education more than doubled.*

Distributional constraints on the unexplained variance of men's education

Assuming fixed scales of son's and father's education, y and x, we can consider the set of nonnegative matrices $M = (m_{ij})$, which have the same marginal frequencies as the observed matrix of educational mobility $N = (n_{ij})$. Thus, we require $m_{ij} \geq 0$, $n_{i.} = m_{i.}$, and $n_{.j} = m_{.j}$ where $i, j = 1, 2, ..., k$. Under these conditions the value of the correlation coefficient (r) depends only on the covariance of variables; as a consequence, the values m_{ij} which maximize r, must maximize $z = \sum\sum y_j x_i m_{ij}$. As we noted in Chapter 3, the maximum value of r can be determined as a solution of the linear programming problem.

Considering social mobility, researchers commonly assume that the maximal value of the correlation between scales of origin and destination equals one (e.g. Blau and Duncan, 1967; Taubam, 1979: 71-77). In making this assumption they overlook, however, the role of distributional constraints in limiting the maximal value of correlation. Table 7 shows that in the case of educational mobility the value of maximal correlation is around .9 but it changes in time. We demonstrate the consequences of this fact.

The total proportion of unexplained variance in men's education by the education of their fathers increases during the period 1955-1975, indicating that educational attainment became increasingly predetermined by ascriptive characteristics. However, this state of affairs was achieved in part due to distributional constraints which appeared to be substantial not only in 1955 but also in later years. Only the part of the relationship

Table 7. Effects of distributional constraints on unexplained variance in son's (respondent's) education, for Japan (1955, 1965, 1975).

Decomposition of unexplained variance	SSM surveys 1955	1965	1975
Correlations			
$r_{(observed)}$	.499	.491	.485
$r_{(maximal)}$	.853	.901	.875
Total unexplained variance $1-r^2_{(observed)}$	.751	.759	.765
A. Due to distributional constraints $1-r^2_{(maximal)}$	.272	.188	.234
(Proportion of total)	(.362)	(.248)	(.306)
B. Due to other sources $r^2_{(maximal)} - r^2_{(observed)}$	.479	.571	.531
(Proportion of total)	(.638)	(.752)	(.694)

of father's and son's education which cannot be attributed to distributional constraints measures the true equality of opportunity. This indicator, $r^2_{yx(maximal)} - r^2_{yx(observed)}$, declined between 1965 and 1975. Japanese men acquired their education with increasing independence from their educational background for reasons other than equality of opportunity.

Discussion and conclusion

We presented our analysis of educational mobility matrices for Japan in 1955-1975 by demonstrating that the traditional way of accounting for structural mobility was flawed. As in the case of occupational mobility, the index of dissimilarity provides biased estimates of

the amount of structural mobility. Applying a new method, based on linear programming, we have established more reliable estimates of the amount of structural mobility and corrected some other findings. In particular, we have found that structurally induced transitions account for 54 percent in 1955 and 61 percent in 1975. Recomputed values of the Yasuda index range from .279 to .385 for total samples, indicating that Japanese society is less open than it has been previously claimed (Imada, 1979).

The decomposition of educational mobility matrices into non-negative additive components identified with structural and circulation mobility proves to be useful in analyzing intergenerational change in the amount of education. Straightforward analysis shows that in Japan the magnitude of this change depends mainly on structural mobility; the contribution of circulation mobility ranges from only 8 to 10 percent. It should be added that this result is stable with respect to various ways of scoring the levels of education.

Father-to-son change in the amount of education is substantially affected by the difference in the mean number of years of schooling in respective generations. In Japanese data for 1955-1975, this difference accounts for 40 to 45 percent of overall change, depending on the study. The rest, that is from 55 to 60 percent, is attributable to the variance in individual father-to-son differences in the amount of schooling. Some portion of that variance is predetermined by educational background (father's education). We should note here that in Kessler and Greenberg's (1981) model of analyzing change this predetermined portion of variance is labeled the "structural component." We have also demonstrated that the structural factor affects the relationship between father's and son's

education.

The main conclusion of this chapter is that *during the period 1955-1975 Japanese men were subject to a high rate of educational mobility across generations mainly due to the structural factor -- the intergenerational difference in the shape of educational distributions.* All findings which pertain to the father-to-son change in the amount of education reflect the importance of the structural factor in inducing educational mobility.

Using other methods, Peschar, Popping and Mach (1986) found that in Poland the structural factor is also substantial in accounting for educational mobility. Moreover, in Poland -- as well as in Hungary and in Czechoslovakia (Mateju, 1984) -- the association between fathers' and sons' education has diminished over time while the mean level of schooling has risen. Our comparative analysis, based on the same set of data and linear programming methods, led to the same conclusion.

Contrary to popular belief, in Japan the *structural factor narrows the range of equal opportunities for educational advancement* and affects the father-to-son change in the amount of schooling. If the structural factor is taken into account, it is evident that *equal opportunity for educational achievement of persons with different educational backgrounds increased substantially in the decade 1955-1965, but slightly decreased in the decade 1965-1975.* This kind of decrease in equal opportunities has also been noted for Poland on the basis of cohort analysis (Peschar, Popping and Mach, 1986) for later years. The similarity between Japan and Poland can be attributed to the fact that the expansion of the educational system in Japan had its functional equivalent in state educational policies

in Poland. The role of both the expansion of the educational system in Japan and the state educational policies in Poland has diminished in recent years.

Our findings for Japan can be discussed in the context of the status attainment process. Boudon (1973) claims that for this process occupational structure is determined mainly "exogeneously" while educational structure is mainly determined "endogeneously." This distinction is based on the assumption that individuals' motivations, preferences and choices while not influencing the occupational structure do shape the educational structure. According to the theory, occupational structure is a function of the technological and capital supply; educational structure is a function of the job market and people's demands. Does the change in these structures differ with respect to the amount of mobility they induce? What is the proportion of occupational structural mobility in comparison with the proportion of educational structural mobility? In additional analyses, we have determined the structural component of occupational mobility according to the method used in this chapter for educational mobility. We conclude that in Japan the *relative amount of structural mobility is smaller in the case of occupational mobility than in the case of educational mobility.* A similar result, obtained using a different method, has been reported for the United States (McClendon, 1977).

Chapter 6

Psychological effects of status-inconsistency

In the late 1970s some scholars suggested abandoning the concept of status-inconsistency "after nearly 30 years of less than fruitless usage" (Crosbie, 1979; see also Blocker and Riedesel, 1978a, 1978b). In the mid-1980s, the proceedings of a conference of the Research Committee on Social Stratification of ISA, *Status Inconsistency in Modern Societies* (Strasser and Hodge, 1986) indicate a revival of interest in both the theory of status-inconsistency and research on it. Reading these proceedings suggest that not all usage of status-inconsistency may be "fruitless" and that a vivid theoretical debate on the functions of status-inconsistency (for both society and individuals) continues. Moreover, recent methodological innovations (e.g. Sobel, 1981), free of previously noted shortcomings (e.g. Blalock, 1966), may inspire new research in this clasic area of social stratification.

This chapter not only elaborates a new method for analyzing the effects of status-inconsistency on psychological functioning but also provides substantive cross-national results. We show how status-inconsistency can be measured so that it does not interact with status. As in Chapter 1, by *status* we mean a construct located along a "vertical dimension" of social stratification, which "captures" most of the variance

of the components of status: formal education, occupational rank, and job income. By *status-inconsistency* we mean a construct indexed by the same components but located orthogonally, that is as a "non-vertical dimension" of social stratification. In presenting our method we utilize Hope's (1975) interpretation of Lenski's (1954) original definitions. Within this approach, *status-inconsistency effects* are conceived of as those over and above the effects of status. We examine these effects in a crucial area for psychological functioning: the intellective process, which is indicative of logical reasoning and open-mindedness. Two measures of the intellective process are: ideational flexibility and authoritarian-conservatism (Miller, Słomczyński and Kohn, 1985).

Our analysis uses data from Poland, Japan, and the United States. These data were collected to test the Kohn-Schooler hypothesis that job conditions are a mediating mechanism for the relationship between social stratification and psychological functioning (Kohn, 1969; Kohn and Schooler, 1969; 1983). For all three countries, it is well documented that people of higher social status are intellectually more flexible; they are also less authoritarian than are people of lower status (Słomczyński, Miller, and Kohn, 1981; Naoi and Schooler, 1985; Kohn, Naoi, Schoenbach, Schooler and Słomczyński, 1988). However, the Kohn-Schooler hypothesis leaves the following question open: How does status-inconsistency affect psychological functioning? We consider the effects of status-inconsistency in the context of the relationships among social stratification, job conditions, and psychological functioning. In this chapter, we ask: does status-inconsistency explain ideational flexibility and authoritarian-conservatism over and above not only status but also job conditions?

Theorizing about positive aspects of status-inconsistency

More than a decade ago, Słomczyński and Wesołowski (1977) developed the idea that social policies productive of status-inconsistency result in a *reduction of global social inequality.* In this paper, "general status" was defined as an additive function of an individual's position in such dimensions as formal education, occupational rank, and job income. They argued that combining a high position in one dimension with a low position in other dimensions "regresses" general status to the middle of the social ladder and, therefore, produces some equality. Indeed, if a measure of inequality is applied to general status, a weak relationship between status components implies more equality than does a strong positive relationship. Taking this observation as a point of departure, Słomczyński and Wesołowski (1977; Wesołowski, 1979; Słomczyński and Wesołowski, 1988) posed two questions particularly relevant to socialist societies that attempt to reduce social inequality: (1) Are individuals with inconsistent status "deviant cases" or do they fit the usual patterns of distribution of status characteristics? (2) If status-inconsistency is frequent among individuals, does it produce symptoms of stress and frustration or does it, rather, lead to innovative ways of thinking and acceptance of social diversity?

An answer to the first question can be considered in the context of the *ideology of meritocracy,* the most fundamental principle of the legitimation of social inequality not only in Western capitalist societies but in European socialist societies as well. Recently, a German sociologist depicted the relationship between status-inconsistency and meritocracy in the following way:

"According to the formalized version of the meritocratic ideology ..., the individual *ought* to acquire certified qualifications which *ought* to be fully convertible into an adequate occupational position; this occupational position *ought* to be remunerated by a suitable income. If interpreted in this way..., there is *a direct correspondence between the ideological principle of meritocracy and the theoretical concept of objective status consistency.* Consequently, the empirical occurrence of status inconsistencies is to be interpreted as an empirical deviation from the institutionalized general norm of meritocracy." (Kreckel,1986: 194; emphasis in the original).

In contemporary societies, deviation from the norm of meritocracy is, however, considerable. Krauze and Słomczyński (1985) demonstrated that in the United States the allocation of persons according to formal education and occupational position is closer to random allocation than to meritocratic allocation. In this respect, neither Japan nor Poland diverge very much from the pattern established for the United States (cf. Chapter 3). In view of recent findings, the claim that in socialist countries status-inconsistency becomes much more pronounced than in capitalist countries (Słomczyński and Wesołowski,1977) seems to exaggerate actual trends (Covello and Bollen, 1980). Generally, status-inconsistency may be seen as "one of the normal by-products of social differentiation in modern society" (Bornschier, 1986: 205; see also Müller, 1986: 281). Therefore, the answer to the first question is that status-inconsistency is neither unusual nor deviant.

Till the mid-1970s a number of researchers were concerned with the impact of status-inconsistency upon various symptoms of stress and frustration (Jackson, 1962; Jackson and Burke, 1965; House and Harkins, 1975; Hornung, 1977). However, Słomczyński and Wesołowski (1977) argued that status-inconsistency can have a positive impact on psychological functioning, even when an unbalanced position is in opposition to

social norms defining "who should get what" (Malewski, 1966). The main argument is that coping with unmet expectations requires one to be innovative, open, and tolerant. This argument can be strengthened by referring to the theory of the psychological effects of a complex environment:

> "According to the theory, the complexity of an individual's environment is defined by its stimulus and demand characteristics. The more diverse the stimuli, the greater the number of decisions required, the greater the number of considerations to be taken into account in making these decisions, and the more ill-defined and apparently contradictory the contingencies, the more complex the environment. To the degree that the pattern of reinforcement within such an environment rewards cognitive effort, individuals should be motivated to develop their intellectual capacities and to generalize the resulting cognitive process to other situations" (Schooler, 1984: 259-260).

Inconsistency of status is indicative of a complex environment, since it can be interpreted as a set of diverse stimuli. Thus, one can expect that greater status-inconsistency should result in greater ideational flexibility and less authoritarian social orientations. We hypothesize that this would be the case if persons with relatively high levels of schooling and prestigious jobs received relatively small incomes. Such an expectation is consistent with the theoretical justification given by Geschwender (1967; see also Meyer and Hammond, 1971) in terms of an unbalanced reward process. On the one hand, those persons who are "under-rewarded" — that is those most educated and working in prestigious jobs but for little money — need to adjust to their lack of financial success and view it in relative terms. To be "under-rewarded" may not require defensive action but it calls for tolerance with regard to an ambivalent or exceptional situation. On the other hand, persons who are "over-rewarded" — that

is, those who are least educated and working in non-prestigious jobs with high earnings — need to defend their situation against well-established social expectations. Defense of the *status quo*, repeating clichés and invoking tradition can be substitutes for the lack of a convincing argument. Thus, one can claim that the former situation requires more flexible reasoning and less conformity toward social norms than does the latter[1]. We test the hypothesis that particular forms of status-inconsistency result in different psychological outcomes.

Accounting for status-inconsistency effects

In this chapter, we follow and further develop the conceptualization of the effects of status-inconsistency proposed by Hope (1975). His conceptualization is clearly stated for the situation in which y denotes a psychological variable, dependent on x_1 and x_2, two stratification variables:

"In the two-axis case for the investigation of status discrepancy effects, we first find weights b_i such that $(b_1x_1 + b_2x_2)$ is a measure of status and $(b_3x_1 - b_4x_2)$ is orthogonal to it. We then examine the coefficients c_i in the equation $y = c_1(b_1x_1 + b_2x_2) + c_2(b_3x_1 - b_4x_2)$ to see whether the difference term is contributing anything over and above the sum term which represents the vertical axis of general status" (Hope 1975: 327).

Taking this statement as a point of departure, we use principal components analysis as a tool for extracting two constructs: status and status-inconsistency. We assume that status (S) and status-inconsistency

[1] "Under-rewarding" and "over-rewarding" are technical terms denoting two forms of a lack of equilibrium between "investments" (e.g. education) and "rewards" (e.g. income). As technical terms, they do not involve any moral judgment whether this lack of equilibrium is desirable or not. However, social expectations about "who should get what" usually assume a strong relationship between "investments" and "rewards."

(I) can be conceived of as a two-dimensional representation of the *social-stratification space* defined by a set of variables x_i, which are its original coordinates. Both constructs, S and I, can be regarded as newly introduced axes of this space: status is identified with the "vertical" axis while status-inconsistency is identified with the axis orthogonal to it, that is the "non-vertical" axis. The notion of verticality may be operationalized only on a substantive basis.

To avoid complications we take into account variables x_i in their standardized normal form N(0,1) without sampling error. We postulate a linear relation of x_i with S:

$$S = a_1 x_1 + \ldots + a_n x_n \tag{1}$$

where a_i is a weight of x_i. We require that the linear combination (1) has a maximum variance normalized in a such a way that the squared a_i's sum up to unity. Coefficients a_i can be obtained by solving an eigenvalue problem for the correlation matrix R of variables x_i. The first principal component is defined as an eigenvector associated with the largest eigenvalue, which after the normalization to its length gives the value of a_i. The stronger the correlation of variable x_i with all other variables, the greater the weight a_i. Thus, among all variables x_i, some are more important for general status S than are others. However, since weights a_i are constant in the population, a person with a higher value of x_i obtains higher general status than does a person with a lower value of the same variable, other things being equal. This property provides a vertical interpretation of status.

The relation between each x_i and S can be written as $x_i = a_i S + e_i$ where a_i is the first principal component loading and e_i is a residual of x_i. It follows that the status-specific part of x_i is $\hat{x}_i^{(s)} = a_i S$. Agreeing with Hope (1975) that status-inconsistency should be defined by those parts of variables that are not status-specific, we extract the expression $(x_i - a_i S)$ or, alternatively, $(x_i - x_i^{(s)})$. Status-inconsistency is expressed by

$$I = \sum b_i (x_i - \hat{x}_i^{(s)}) \tag{2}$$

subject to the constraints for the second principal component. By definition, the second principal component is the normalized linear combination of x_i that is uncorrelated with the first principal component. Since the second principal component "catches" most of the variation of $(x_i - \hat{x}_i^{(s)})$ we do not consider further orthogonal components. In the considered space, the second principal component implicitly involves comparison of each stratification variable x_i with another status-specific variable $\hat{x}_{i+1}^{(s)}$. We notice that the difference term $(b_i x_i - b_{i+1} \hat{x}_{i+1}^{(s)})$ is a substitute for the term $(x_i - x_{i+1})$, crucial for the definition of status-inconsistency.

The conceptualization of status and status consistency as orthogonal axes of the stratification space can be conveniently used for formulating the regression equation in which both constructs, S and I, are treated as independent variables via-a-vis some other variables y_i. The resulting equation, in a standardized form, is

$$y = \beta_1 S + \beta_2 I \tag{3}$$

where parameters β_1 and β_2 are normalized regression coefficients. Since

S and I are orthogonal, the values of β_1 and β_2 are equal to the correlation coefficients of y_i with S, and y_i with I, respectively. Substituting $x_{i(s)}$ for S and the set of $(x_i - \hat{x}_i^{(s)})$ for I does not lead to linear dependence in equation (3). To demonstrate a *net effect* of status and status-inconsistency on y_i, variables other than x_i should be included in the regression equation. In our analysis, we use a standard set of demographic and background variables, such as age, father's occupation, and the urbanness of the place where the respondent was raised.

Samples and methods of data collection

The Polish and Japanese data were collected in surveys replicating the American study (see Chapter 1) conducted in 1964 and 1974. Both the baseline and the follow-up data from the United States are utilized in our analysis, with samples 3101 and 687, respectively. The Polish survey, administered in 1978, is based on the sample designed to represent men aged 19 to 65, living in urban areas and employed full-time in civilian occupations. The Japanese survey was conducted among 629 employed men, 26 to 65 years old, in the Kanto region.

Both the Polish and Japanese surveys were designed to be exact replications of the main parts of the U.S. study. Questions pertaining to intellectual flexibility and authoritarian-conservatism were directly adopted from the Kohn-Schooler 1964 interview schedule. The initial translation of the U.S. interview schedule into Japanese and Polish involved a thorough assessment of the meaning of entire questions and of particular phrases. Some modification of the original questions appeared necessary to assure their relevance to a given country. For example, a

measure of intellectual flexibility in the Kohn-Scholer study included the following question: "Suppose you wanted to open a hamburger stand and there were two locations available. What questions would you consider in deciding which of the two locations offers a better business opportunity?" Since in Poland people are not familiar with hamburger stands, the question was changed so that the phrase "kiosk" or "news-stand" was used instead. Such modifications were introduced to assure the functional equivalence of indicators. In Poland, the modified questions were pretested in an extensive pilot study.

Measurement of intellective process

We focus on ideational flexibility and authoritarian-conservatism as *two aspects of the intellective process* that allow one to assess the rigidity of an individual in his way of thinking and viewing the world. Both these aspects are measured on the basis of separate sets of indicators, using confirmatory factor analysis. Details of these models can be examined in Kohn and Schooler(1983) for the United States, in Naoi and Schooler (1985) for Japan, and in Miller, Słomczyński and Kohn (1985) for Poland.

Ideational flexibility reflects an ability to think in relative terms and to provide balanced arguments. The measurement model of *ideational flexibility* includes various indicators: ratings of a respondent's answers to simple cognitive problems; the frequency with which a respondent agreed when asked to answer many agree-disagree questions; the summary score for his performance on the Embedded Figures Tests; and, the interviewer's appraisal of his intelligence. Although none of these indicators is assumed to be a completely valid measure of ideational flex-

ibility, taken together they reflect the respondent's flexibility in attempting to cope with the intellectual demands of a complex interview situation. In the United States, Japan, and Poland the standardized factor loadings are substantial and do not differ much among countries.

The concept of *authoritarian-conservatism* is meant to represent an individual's orientation toward authority and tolerance for ambiguity. At one extreme, there is unreflexive conformity to the dictates of authority and rigid conventionality. At the other extreme there is a world view marked by open-mindedness and a sense of social reality as relative and evolving (Kohn, 1977; Gabennesch, 1972). To index this concept, we rely on responses to a set of attitudinal questions aimed at determining one's orientation to authority. For the United States, Japan, and Poland not all of the indicators are the same; some indicators are nation-specific. In comparative perspective, authoritarian-conservatism in Poland is strongly manifested in an orientation toward hierarchically legitimized authority, particularly an authority considered bureaucratically or legally justified. However, the Polish construct is functionally equivalent to the one developed for the United States (Miller, Słomczyński, and Schoenberg, 1981). For the three countries, our measure of authoritarian-conservatism is suited to cross-national analysis (see Naoi and Schooler, 1985; Słomczyński, Miller, and Kohn, 1981; Miller, Słomczyński, and Kohn, 1985).

The principal-components model of status and its inconsistency

The principal-components model of status and status-inconsistency is based on three variables crucial in social-stratification analysis: formal education, occupational rank, and job income. In Poland and Japan *formal*

education is measured on the basis of years of schooling; in the United States a six-point scale of the level of educational attainment is used for the same purpose. In all three countries, *occupational rank* is measured by national prestige scales: Słomczyński and Kacprowicz's (1979) for Poland, Naoi's (1979) for Japan, and Siegel's (1971) for the United States. These national scales are closely related to each other and to the Standard International Prestige Scale (Treiman, 1977), with all correlations above .9. In all three countries, *job income* refers to wages, salary and other forms of earnings from the main job.

The principal-components models of status and status-inconsistency for Poland, Japan, and the United States are presented in Table 1. We consider the model of status first. Occupational rank has the highest loading (from .848 to .894), while job income has the lowest (from .644 to .726). The internal structure of the model is the same for all three countries, not only in terms of the order of loadings but also in terms of the explanatory power. The eigenvalues are similar across countries (from 1.755 to 2.019) and the range of proportions of explained variance in status components — formal education, occupational rank and job income - is small (from .585 to .673). Thus, we confirm previous findings that the same operationalization of status fits data for Western and non-Western capitalist societies and for a socialist society as well (Kohn, Naoi, Schoenbach, Schooler and Słomczyński, 1988; see also Chapter 1).

In the models of status-inconsistency, both formal education and occupational rank load positively, from .355 to .457 for education and from .147 to .223 for occupational rank. However, both variables are dominated by the very strong and negative impact of job income (from -.744 to

-.685). The configuration of the signs of the loadings suggests that the *non-vertical dimension of social stratification* clearly identifies the

Table 1. Principal components analysis of formal education, occupational rank and job income for men employed in civilian occupations, in Poland (1978), Japan (1979), and the United States (1964 and 1974).

Variables	Components loadings: Status	Components loadings: Status-inconsistency
	Poland (1976)	
Formal education	.837	.413
Occupational rank	.894	.163
Job income	.644	-.740
Eigenvalue	*1.940*	*.745*
Proportion of variance	*.646*	*.248*
	Japan (1979)	
Formal education	.784	.457
Occupational rank	.848	.147
Job income	.649	-.744
Eigenvalue	*1.755*	*.784*
Proportion of variance	*.585*	*.261*
	the United States (1964)	
Formal education	.831	.399
Occupational rank	.876	.189
Job income	.687	-.720
Eigenvalue	*1.930*	*.712*
Proportion of variance	*.643*	*.237*
	the United States (1974)	
Formal education	.851	.355
Occupational rank	.877	.223
Job income	.726	-.685
Eigenvalue	*2.019*	*.645*
Proportion of variance	*.673*	*.215*

unbalanced reward process. The most educated persons, who work in prestigious occupations but earn little money, score highest; this is the situation of extreme "under-rewarding." Persons who earn the most, but have little education and work in non-prestigious occupations score lowest; this is the situation of extreme "over-rewarding." In Poland, Japan, and the United States the internal structure of status-inconsistency is the same. Moreover, status-inconsistency explains a substantial proportion of the total variances of formal education, occupational rank and job income (from 21 to 26 percent). The eigenvalue is far from zero showing that the original stratification space is not reducible to one dimension — that of status.

In this section we also address the problem of whether the measure of status utilized in this chapter leaves more room for the effects of status-inconsistency than do other alternative measures of status. In particular, our model of status should be compared with a factor-analytic model for which the impact of status on psychological functioning has already been well established (Kohn and Schooler, 1983; Słomczyński, Miller, and Kohn, 1981; Kohn, Naoi, Schoenbach, Schooler, and Słomczyński, 1988). As we have explained in Chaper 1, in the framework of confirmatory factor analysis, status — called also the stratification position — is conceptualized as a second-order construct with first-order constructs corresponding to the same status components: formal education, occupational rank and job income. In this approach, first-order constructs directly reflect observed indicators such as various occupational scales, or different measures of income. A second-order construct explains observed indicators only by its relationship with first-order constructs, that is indirectly. Does this conceptualization lead to different results

from those of the principal-components solution?

To answer this question, we have performed an analysis, using Polish data, in which there are two measures for education (years of schooling and the level of the educational certificate), three occupational scales (the Polish Prestige Scale, the Standard International Prestige Scale, and the Socio-economic Index), and two indicators of income (earnings from the main job, and the total income derived from work). Using these raw variables we modeled status by a confirmatory factor analysis and by the two-stage principal-components analysis. In comparison with factor modeling, the principal components solution gives higher loadings for income and education while a lower loading for occupational prestige. However, the differences are not dramatic, since the ordering of loadings remains the same. Moreover, the correlation between scores of status computed according to the two methods is close to unity ($r = .963$). Very similar results have been obtained for Japan and the United States. Thus, the measure of status based on the principal-components solution is not likely to exaggerate the effects of status-inconsistency in any of the three countries.

The effects of status inconsistency: small but statistically significant

According to our measure of status and status-inconsistency both these constructs identify orthogonal dimensions of social-stratification space; they are uncorrelated. Thus, if a psychological variable is regressed on only those two constructs, the regression coefficients are equal to the correlations of these constructs with the dependent variable. Table

2 shows not only the total effects (panels A) but also "net effects" under the control for demographic and background characteristics (panels B). In both cases the effects of status are substantial and in agreement with previous findings (Słomczyński, Miller, and Kohn, 1981; Kohn and Schooler, 1983). People having higher status are ideationally more flexible and less conservative. The effects of status- inconsistency are much smaller but still substantial and their direction is the same as is the one for status. The higher the status-inconsistency, the more ideationally flexible people are; they are also less conservative than people who do not have inconsistent status.

With the exception of authoritarian-conservatism in Japan, the effects of status-inconsistency on the intellective process remain statistically significant when controlled for such demographic and background characteristics as age, father's occupation, and the urbanness of the place where the respondent was raised. Moreover, even in Japan the statistically insignificant coefficient is substantial and shows that persons who are well educated and work in prestigious occupations but earn little money are less conservative than persons with substantial earnings, little education and non-prestigious jobs. Thus, we conclude that in Poland, Japan, and the United States status-inconsistency effects are essentially the same: persons who are "under-rewarded" are more intellectually flexible and less conservative than those who are "over- rewarded". These status-inconsistency effects occur over and above the effects of status.

As in the case of all modeling of complex reality, our modeling also leads to a loss of some information contained in the raw data. It is well known that status and status-inconsistency cannot explain more variation of a given external variable than may a full set of variables from which

Table 2. Effects of status and status-inconsistency on ideational flexibility and authoritarian-conservatism for men employed in civilian occupations, in Poland (1978), Japan (1979), and the United States (1964 and 1974).

Variables	Standardized regression coefficients: Status	Standardized regression coefficients: Status-inconsistency	Proportion of variance explained by status and status-inconsistency	Proportion of variance explained by education, occupation and income
Poland (1978)				
A. Without controlling other variables				
Ideational flexibility	.689**	.228**	.527	.546
Authoritarian-conservatism	-.453**	-.265**	.275	.284
B. Controlling other variables[a]				
Ideational flexibility	.651**	.153**	.484	.493
Authoritarian-conservatism	-.405**	.117**	.206	.207
Japan (1979)				
A. Without controlling other variables				
Ideational flexibility	.423**	.167**	.207	.228
Authoritarian-conservatism	-.308**	-.077*	.101	.109
B. Controlling other variables[a]				
Ideational flexibility	.360**	.079*	.110	.119
Authoritarian-conservatism	-.330**	-.052	.080	.084
the United States (1964)				
A. Without controlling other variables				
Ideational flexibility	.730**	.184**	.567	.601
Authoritarian-conservatism	-.543**	-.162**	.321	.339
B. Controlling other variables[a]				
Ideational flexibility	.703**	.168**	.474	.518
Authoritarian-conservatism	-.530**	-.146**	.296	.297
the United States (1974)				
A. Without controlling other variables				
Ideational flexibility	.776**	.165**	.629	.647
Authoritarian-conservatism	-.588**	-.165**	.373	.397
B. Controlling other variables[a]				
Ideational flexibility	.718**	.063**	.586	.599
Authoritarian-conservatism	-.522**	-.058*	.295	.313

Note: (a) includes: age, father's occupation, and the urbanness of the place of origin.
** $p < .01$, * $p < .05$

these constructs have been derived; actually -- they explain less (Hodge and Siegel, 1970; Hope, 1975). The question, however, is: how much less? Comparing the proportion of variance explained by our two constructs (status and status-inconsistency) with the proportion of variance explained by three raw variables (formal education, occupational rank, and job income), one can evaluate the extent to which relying on the constructs diminishes their predictive power. The difference between these proportions in no case exceeds .05 and for most cases ranges from .01 to .02 (see the last two columns of Table 2). Thus, the loss in predictive power would be a weak argument against using the constructs for explaining the intellective process as measured in this chapter. The analysis utilizing status and status-inconsistency is parsimonious; this justifies a small loss in predictive power.

Status, status-inconsistency and occupational self-direction

Kohn (1969: 196) hypothesized that occupational self-direction would play a major part in explaining the relationship of social stratification to values and orientation in "all sizeable industrial societies." Subsequent studies confirmed this hypothesis (for a review of the findings see Kohn, 1977; Kohn and Schooler, 1983): indeed, the relationship between social status and psychological functioning is, to a large extent, attributable to three job conditions which facilitate or deter the exercise of self-direction in one's work -- namely, the substantive complexity of work, the closeness of supervision and the routinization of work. We rely on previously developed measurement models of occupational self-direction (see Słomczyński, Miller, and Kohn, 1981; Kohn and Schooler, 1983; Naoi

and Schooler, 1985).

In Poland, Japan, and the United States the correlation between social status and occupational self-direction is so strong that if both constructs are accompanied by other variables the estimates of their impact on the intellective process become unreliable due to multicollinearity. Słomczyński, Miller and Kohn (1981) proposed a method of dealing with this problem and also demonstrated that in Poland and the United States the effect of social status on psychological functioning is substantially attributable to the effects of occupational self-direction. Since subsequent analysis for Japan leads to the same conclusion (Kohn, Naoi, Schoenbach, Schooler, and Słomczyński, 1988), we focus here on a new issue: Are the effects of status-inconsistency attributable to the effects of occupational self-direction? Our rationale for asking this question is that status-inconsistency is a part of the stratifcation system and can be related to occupational self-direction in a similar way as can status. Specifically, persons who are "under-rewarded" occupy prestigious job-positions demanding high qualifications; because of their location in the job system they are likely to exercise self-direction in their work.

Generally, if status-inconsistency is considered in the context of occupational self-direction, its effect on the intellective process is weaker than in the context of status (see Table 3). Both variables — status-inconsistency and occupational self-direction — explain more than 30 percent of variance of ideational flexibility and 12 or more percent of variance of authoritarian-conservatism. In Poland, Japan, and the United States, the effects of status-inconsistency are not eliminated by the impact of occupational self-direction. In particular, in all three countries

Table 3. Effects of occupational self-direction and status-inconsistency on ideational flexibility and authoritarian-conservatism for men employed in civilian occupations, in Poland (1978), Japan (1979), and the United States (1964 and 1974).

Variables	Standardized regression coefficients: Occupational self-direction	Standardized regression coefficients: Status-inconsistency	Proportion of variance explained by occupational self-direction and status-inconsistency
Poland (1978)			
A. Without controlling other variables			
Ideational flexibility	.655**	.095**	.463
Authoritarian-conservatism	-.537**	-.157**	.342
B. Controlling other variables[a]			
Ideational flexibility	.623**	.061**	.423
Authoritarian-conservatism	-.563**	-.041*	.350
Japan (1979)			
A. Without controlling other variables			
Ideational flexibility	.632**	.133**	.426
Authoritarian-conservatism	-.390**	-.056*	.158
B. Controlling other variables[a]			
Ideational flexibility	.655**	.071**	.372
Authoritarian-conservatism	-.442**	-.034	.149
the United States (1964)			
A. Without controlling other variables			
Ideational flexibility	.639**	.092**	.433
Authoritarian-conservatism	-.493**	-.091**	.264
B. Controlling other variables[a]			
Ideational flexibility	.573**	.060**	.334
Authoritarian-conservatism	-.493**	-.066**	.260
the United States (1974)			
A. Without controlling other variables			
Ideational flexibility	.545**	.032**	.320
Authoritarian-conservatism	-.400**	-.118**	.185
B. Controlling other variables[a]			
Ideational flexibility	.486**	.111**	.319
Authoritarian-conservatism	-.350**	-.102*	.124

Note: (a) Includes: age, father's occupation, and the urbanness of the place of origin.
** $p < .01$, * $p < .05$

statistically significant effects of status-inconsistency on ideational flexibility are found. In Poland and the United States there are statistically significant effects of status-inconsistency on authoritarian-conservatism, confirming our hypothesis. In Japan, the effect of status-inconsistency on authoritarian-conservatism becomes statistically insignificant if other variables are used for control purposes; still, however, the value of the coefficient is negative as would be expected.

Discussion and conclusion

We have conceptualized and indexed status and status-inconsistency on the basis of three stratification variables: formal education, occupational rank and job income. We have modeled social status as a "vertical dimension," which "captures" most of the variance of the stratification variables. Status-inconsistency has been treated orthogonally, that is as the "non-vertical dimension" of social stratification. We found that the internal structure of status and status-inconsistency, expressed in terms of the loadings of both constructs, is remarkably similar in Poland, Japan, and the United States.

Status-inconsistency identifies an unbalanced reward process. Highly educated persons working in prestigious occupations but earning little money may be considered "under-rewarded." Persons with high earnings but little education and working in non-prestigious occupations may be considered "over-rewarded." Thus, the non-vertical dimension of social stratification is a continuum from "under-rewarding" (high status-inconsistency) to "over-rewarding" (low status-inconsistency). The main finding of this chapter is that persons who are "under-rewarded" are more

intellectually flexible and open-minded than are those who are "over-rewarded". We interpret this finding as an indication that "under-rewarded" persons adjust to their lack of financial success and view it in relative terms while "over-rewarded" persons accept the *status quo*.

These status-inconsistency effects occur over and above the impact of status or the impact of occupational self-direction. With minor exceptions, the results of our analysis are consistent for Poland, Japan, and the United States. A minor exception involves authoritarian-conservatism in Japan where the status-inconsistency effect proved to be statistically insignificant, although the effect has the same direction as in other countries. Thus, we claim that the psychological effects of status-inconsistency are, in their essence, cross-nationally invariant, at least in a socialist country (Poland), a non-Western capitalist country (Japan), and a Western capitalist country (the United States).

In the tradition of status-inconsistency research, it has been assumed that "[t]hose individuals whose positions on the different dimensions are not crystallized — those whose status membership gives rise to conflicting values and expectations — are likely to experience more strain and tension than people whose status sets are crystallized" (Treiman, 1966: 652). However, there are two possible reactions to strain and tension. First, experiencing strain and tension may be accompanied by stress and frustration leading to intellectual rigidity and a lack of tolerance. Second, some strain and tension can lead to more positive psychological functioning in the sense of broadening perception and enhancing ambivalence. Our analysis suggests that this second possibility -- overlooked in previous research — is plausible. On the basis of what we know about the psychological effects of a complex environment (Schooler,

1984) one can expect that status-inconsistency results in ideational flexibility and a non-authoritarian orientation. This expectation has been confirmed for three industrialized countries that nevertheless are diverse in their organization of economic, political, and cultural sub- systems. Generalizing the results of this chapter, we advance the hypothesis that the effects of status-inconsistency on both ideational flexibility and authoritarian-conservatism would be similar (in their direction and magnitude) in all industrialized countries.

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