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Céline Ribet, Maria Melchior, Thierry Lang, Marie Zins, Marcel Goldberg, Annette Leclerc

CARACTERISATION ET MESURE DE LA SITUATION SOCIALE DANS LES ETUDES EPIDEMIOLOGIQUES

Characterization and measurement of social position in epidemiologic studies

C. Ribet[1,2], M. Melchior[1], T. Lang[3], M. Zins[1,2], M. Goldberg[1], A. Leclerc[1]

1 : Inserm, U687, Saint Maurice, F-94410 France ; IFR69, Villejuif, F-94807 France

2 : Equipe RPPC du Cetaf, Saint Maurice, F-94410 France

3 : Inserm, U558, Toulouse, F- France ; IFR126, Toulouse, F-31073 France

Auteur responsable de la correspondance : C. Ribet, Unité Mixte 687 Inserm-Cmants, 14 Rue du Val d'Osne, 94410 Saint-Maurice, Tel : 01 58 64 15 55, Fax : 01 58 64 15 51, mail : celine.ribet@st-maurice.inserm.fr

Abstract

Background: The terms "socioeconomic status", "socioeconomic position", "social classes," etc. are widely used in epidemiology. They refer to various aspects of social position that is associated with many aspects of health. The position of individuals in the social hierarchy is multidimensional, i.e., defined by various socioeconomic factors. They can be individual (for example, educational level, employment status, and occupation), household-related (for example, household income) or neighborhood-related (for example, the unemployment rate in the neighborhood of residence). These various factors can be associated with health at different periods during the individual's lifetime, via a number of mechanisms, and they can possibly interact with one another. No socioeconomic indicator is better than the others or adequate in all study contexts.

Aim and methods: This paper presents a description of various socioeconomic indicators and describes what they measure as well as the advantages and limits of each of them.

Conclusion: No single indicator can be recommended over others. Within the limits of the variables available, the most relevant measurement depends on many elements, such as the study population and the aspect of health being investigated.

Key words: socioeconomic status, education, occupation, income, social inequalities

Résumé en français

Position du problème : Les termes "statut socio-économique", "situation socio-économique", "catégories sociales" … sont largement utilisés en épidémiologie. Ils font référence à divers aspects de la situation sociale, situation qui est associée à de nombreuses dimensions de la santé. La position des individus dans la hiérarchie sociale est reconnue comme étant multidimensionnelle, c'est-à-dire définie par des facteurs socio-économiques divers, tant individuels (par exemple : niveau d'études, situation vis-à-vis de l'emploi, profession) que caractérisant le foyer (par exemple : revenus du ménage) ou le voisinage (par exemple : taux de

chômage dans le quartier de résidence). Ces différents facteurs peuvent être associés à la santé à différentes périodes de la vie, par l'intermédiaire de différents mécanismes, et possiblement interagir les uns avec les autres. Aucun indicateur socio-économique n'est ni meilleur que les autres ni adéquat dans tous les contextes d'étude.

Objectif et méthodes : Cet article présente une description de différents indicateurs socio-économiques, de ce qu'ils mesurent, et les avantages et limites de chacun d'entre eux.

Conclusion : Aucun indicateur n'est à recommander en particulier. Le choix de la mesure la plus pertinente dépend, dans la limite des variables disponibles, de nombreux éléments, dont la population étudiée et le trouble de santé d'intérêt.

Mots-clef : statut socio-économique, niveau d'études, profession, revenus, inégalités sociales

Introduction

In France, as in many industrialized countries, a great many aspects of health are related to social position, whether they be behavior, risk factors and the healthcare to treat them, the incidence of certain diseases, or mortality (1, 2). In epidemiological studies, many measures or approaches are used to describe individuals' social position, with the choice of the measure in part determined by the data available. Each of these indicators covers a particular dimension of the social position, which partly explains the variations in the magnitude of the health-related differences reported in the epidemiological literature. The description of the social hierarchy characterizing an individual's position within a society is generally organized around three dimensions: power (or the capacity for action), prestige, and economic resources. The three indicators that were the most often used to describe an individual's position in contemporary societies are occupation, educational level, and income level, because in social hierarchy, individuals reach differentiated positions based on each of these indicators, among others. This position is generally designated by the term "socioeconomic status," which covers many dimensions of an individual's place in society and refers to many indicators (3-7).

This article aims to describe several of the measures and approaches generally used to account for socioeconomic status (or position) in epidemiological studies. First of all, the three most generally used indicators: occupation, educational level, and income level, will be described. Then other measures – substitution (proxy), compound (indexes), subjective (social ladder), and derived (social mobility and status inconsistency) – will be presented. Next, the methodological questions raised by comparisons in space and time will also be discussed so as to present other measures. Finally, different indicators taking into account the individual's family – and/or contextual - environment will be detailed. These different measures are summarized in a table in the annex.

Before describing the measures, certain points should be clarified. First of all, the hypothesis that these factors may be related to health, in the sense that the socioeconomic variable may be a risk factor for at least one dimension of the health status, underlies the description of the different measures retained in this article. For this reason, this article discusses certain indicators that are not strictly speaking social position measures. It should be noted that if the social position can explain the health condition, the inverse hypothesis is also true. Second, even if certain sociological concepts on social position are referred to, this article does not claim to report on all of the theories developed on this subject in the social sciences. It should also be noted that different aspects related to health are not discussed directly in this article: the notions of precariousness, poverty, social exclusion, as well as life events, social networks, social support, migratory histories, and cultural factors. Finally, this article's primary objective is to specify the characteristics, advantages, and limits of the indicators; the question of recommendations in this domain can only be very partially touched on here.

The main indicators used to describe social stratification

The most widely used indicators

Occupation and socioprofessional category

Many measures of socioeconomic position are based on an occupational classification. Indeed, occupation is a simple, relevant, and reliable indicator of social position relative to individuals in industrialized societies. It is related to educational level and income level, and therefore to access to certain goods and services. In addition, it reflects exposures, both physical and psychological, encountered in the occupational environment (3, 4, 8).

In the sociological literature, occupation is a notion that is somewhat different from the notion of trade or from that of employment status (see Box no. 1).

To classify individuals in the social hierarchy according to their occupation, two approaches have been distinguished: the categorical approach and the hierarchical approach (1).

The categorical approach

This approach consists in classifying individuals according to their position on the labor market in categories that are usually designated as "occupational categories," through a series of detailed rules that use information such as the occupation's title, the qualifications required, the characteristics of the work, the remuneration, and management functions (1).

Many countries have elaborated and used their own nomenclatures for occupational categories (for example, in Great Britain: National Statistics Socio-economic Classification (NS-SEC) (9)). In France, the Classification of Occupations and Socioprofessional Categories[1], designed by INSEE[2], classes individuals according to their occupational position taking into account a variety of characteristics: the trade, the economic activity sector, the qualifications required, the hierarchical position, the wage-earner's status, and the categories stemming from union collective agreements. The last version of the nomenclature dates from 2003. The 486 jobs and

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[1] Genrally noted PCS for "Professions et catégories socioprofessionnelles"
[2] French national institute for statistics and economic studies

11 positions for people with no occupational activity are grouped into 42 detailed socioprofessional categories or 24 general socioprofessional categories. The most aggregated classification includes eight categories (including one category for retired persons and one category for those with no occupational activity). The six Classifications of Occupations and Socioprofessional Categories for working individuals are: 1) working farmer; 2) self-employed, merchants, company directors; 3) senior executives and intellectual professions; 4) intermediate professions; 5) employees; 6) and workers. A detailed presentation of the French nomenclature can be found in Desrosières and Théveno 2002 (10).

A disadvantage to this approach is that the occupational categories do not all have a clear hierarchical relation to each other. The French nomenclature cannot be reduced to a one-dimensional scale: even if certain groups of wage-earners can be considered at a higher level on the social scale according to their educational level or income level (e.g., executives compared to employees), it is nonetheless difficult to find a criterion that makes an overall order possible for the six groups (it is particularly difficult to classify farmers, a heterogenous group, as well as the "self-employed, merchants, and company directors" group, which is even more heterogenous).

The hierarchical approach
Strictly hierarchical classifications place individuals in a socioeconomic position in a continuous and unambiguous fashion according to their occupation. Two scales of this type are commonly used: social prestige scales and scales based on educational and income levels.
The social prestige scales such as the Duncan Index used in the United States (11) reflect how occupations are considered (their reputation); they are generally based on how individuals perceive the prestige associated with different professions. Their main disadvantage stems from the subjective aspect of judgment, which makes them difficult to validate. In addition, the prestige of different occupations changes over time, requiring regular updating of this type of scale.

The scales based on educational and income levels attribute to each profession a score based on a weighted sum of the mean levels of socioeconomic statuses, such as New Zealand's Socio-Economic Index (12).

Several of these scales have been applied in epidemiological studies, mainly in the United States, but rarely in France (3, 6, 13, 14).

Whatever approach is used, a disadvantage to using occupation as an indicator of socioeconomic status is that the majority of the classifications used were developed and validated based on data gathered for the most part on middle-aged men. Therefore, these classifications account poorly for the hierarchy of jobs that are predominately held by women (e.g., secretary) and do not take into account the differences in working conditions between men and women. Furthermore, classing certain groups into these classifications remains difficult, notably housewives, students, retirees, adolescents and children, people with no occupational activity, the unemployed, etc.

One response to this problem is to use the last socioprofessional category occupied or the socioprofessional category occupied the longest for individuals who have already exercised an occupation such as the retired or the unemployed; or for those who have never worked, the socioprofessional category of another household member (e.g., for housewives the spouse's category is used, for children the mother's or father's socioprofessional category) (1, 3, 4, 6, 8, 14-16).

Box no. 1

Source: Gresle 1994 (17)

- Profession / Trade

Profession: This concept was constructed, at the beginning of the century (*), based on the "liberal professions" that have multiplied within the cracks of industrial capitalism. In any case, profession assumes:

1) the existence of particular knowledge;

2) the presence of high-level schools that monopolize education;

3) the instauration of common rules for an activity that is exercised autonomously;

4) the recognition of a deontology that is accepted by all members produced by the group of peers.

The impact of the occupational values on the entire social body is incontestable. However, the profession is not a model that any trade can tend toward. The professionalization of salaried activities, even at high levels – with the demand for autonomy that this implies – is often contradicted by bureaucratization that seeks to codify and even circumscribe skills. The profession is therefore not an ideal type of activity; in a more modest way, it attempts to qualify true occupational groups.

Trade: This term, etymologically related to "ministry", brings to mind a particular capacity to act, acquired in action through practical initiation. A trade is thus transmitted from one generation to another but cannot be the subject of discursive teaching. This last characteristic makes the distinction with the notion of profession. In contemporary usage, this contrast is becoming less pronounced – as indicated by the title: *The Sociologist's Trade* (18) – or is taking on an institutional consistency in which trade is being confused with the crafts, whose representatives are grouped in Chambers of Trade.

(*) at the beginning of the 20th century

Source: Chenu A., 2002 (6)

- Socioprofessional status in terms of employment

Socioprofessional status in terms of employment (stable employment/job insecurity/unemployment/inactivity) is sought out more by researchers in times of economic crisis: at the beginning of the 1930s, Paul Lazarsfeld provided a remarkable analysis of the effects of long-term unemployment on Austrian workers' health in Marienthal (19). Since the 1970s, the rise in unemployment rates and the multiplication of fixed-term contracts as well as training programs and other programs designed to integrate the unemployed into the working

population have increased the interest of taking employment status into account. Since it is closely related to the occupational status (workers with few skills are more exposed to unemployment and job insecurity), both types of nomenclatures must be crossed. A nomenclature that favors occupation as an indicator of social status is not the best adapted instrument to define the status of either those who have very high incomes, in large part independent of their personal work, or those who live in at a high level of insecurity and remain on the sidelines of employment.

Educational level

Educational level can be a good indicator of the position in the social hierarchy for two reasons: first, the intellectual and cultural resources acquired through education can influence lifestyle, the ability to work out problems and social networks; second, education generally secures qualifications providing access to certain occupations and therefore to certain levels of income (3, 4, 8, 20).

The education level can be either qualitative, using the highest degree obtained, or quantitative, using the number of years of education. The main advantage of the qualitative approach is that it takes into account the type and level of education: general education versus technical and occupational education, full-time versus part-time education and postsecondary education. Nevertheless, this approach has the disadvantage of not allowing a totally hierarchical classification (1, 3).

In epidemiological studies, educational level is a widely used indicator of socioeconomic position. It is simple to collect and results in few non-responses, making it quite precise and reliable. In addition, contrary to profession and income level, educational level is generally fixed at the beginning of adulthood and is stable throughout life. This makes it little affected by poor health in adulthood (even if it is likely that poor health in childhood can lead to receiving a

poorer education in qualitative and quantitative terms) (3, 4, 6, 8, 16). This relative stability can become a disadvantage in comparisons over time. For people who have been relatively mobile during their occupational career, educational level may be a relatively poor indicator of their socioeconomic status. Furthermore, even if collected at several times during the life course, this indicator cannot convey possible periods of unemployment, job changes, or variations in standard of living (14, 16).

The problems related to comparing degrees over time will be discussed below.

Income level

Income level is used as an indicator of the socioeconomic position, both because it is generally indicative of the position on the labor market (for example, a high income level generally indicates a high position on the labor market) and because it measures the standard of living and the material conditions more precisely than educational level. Indeed, income level can influence lifestyle and the opportunities for access to goods and services, including education and access to healthcare, which can protect from disease. On the contrary, low incomes can also reflect the consequences of poor health (4, 8).

Income level can be measured and used in several ways. Individual income or family income can be used by totaling the income of all the household members, with this measure possibly adjusted to family size (this adjustment makes comparing households of different sizes possible) (1, 6, 21). These two measures can include different sources of income such as salaries, basic welfare benefits, and pensions or be extended to the notion of property. Individual and family measures cover partially different dimensions: the individual level refers more to a sense of security, decisional power, and self-esteem, and household income refers more to material resources and living conditions (22).

In the international literature, income information is for the most part used in ordered categories, which are created depending on the population studied. The main advantage of this indicator is

that all individuals can be classified, including the unemployed, the non-working, and students (16).

However, using income presents several disadvantages. Questioning people on their income very often leads to a high level of non-response, at least in France, because they are highly sensitive to this subject. This is why responses are usually proposed in categories, i.e., people are asked to classify their income into different income categories: for example, <10,000 euros per year, 10,000–20,000 euros per year, 20,000–30,000 euros per year, etc.). Another disadvantage is that measuring income exactly requires a large battery of questions that most health interviews and surveys cannot include.

Moreover, income can vary considerably with time, even during a short period, because of changes in household composition, employment, or family history. Income can be affected by divorce or the loss of a spouse, resuming studies, a new job, a promotion, or a temporary inability to work. All of these changes in personal situations can have an important effect on income, resulting in an imprecise measure of long-term income. Retirement is one of these important changes: generally income tends to increase throughout the occupational career and then to decrease at retirement. Finally, income level does not reflect either financial resources or property, which are usually higher for the oldest individuals (1, 3, 4, 8, 14-16, 23).

Other indicators

Proxy measures

Of the many individual proxy measures possible, the most widely used are measures related to material living conditions. These measures include different indicators related to the long-term standard of living such as owning a vehicle or a home (generally the main home), two measures that are widely used in the United Kingdom, and, more globally, owning lasting consumer goods (such as a television or a dishwasher) or comfort and home quality indicators (number of people living in the home or per room, number of bathrooms, absence of indoor toilet or bathtub). In

certain countries, Social Security or life insurance rights, which depend on an individual's position on the labor market and income level, are also used (1, 4, 8, 15, 20).

These proxy measures cannot be considered valid indicators of socioeconomic position in all circumstances. Certain authors interpret them in a restricted sense, i.e., as indicators of the material standard of living, with no reference made to the broader concept of socioeconomic status (1, 8, 14).

Indexes (or compound measures)

Socioeconomic indexes take some of the above-mentioned indicators into account simultaneously: occupation, educational level, and income level. The use of indexes has been attractive because occupation, educational level, and income level measure different aspects of the socioeconomic position and together determine an individual's position in the social hierarchy, although these measures have many overlapping features.

These measures all present disadvantages associated with their components as well as the additional problems related to their design such as the choice of how they will be weighted to combine the different indicators. Furthermore, the use of these indexes has not been systematically validated, which makes comparisons between studies difficult. Finally, when an association between a health dimension and an index is observed, one must often break the index down into its component parts to facilitate the interpretation of the results. This has led several authors to recommend using several indicators rather than an index (3, 4, 13, 14, 16, 21, 23). This type of measure is rarely used in France.

Subjective measure

The above-described measures are considered objective measures of an individual's position in the social hierarchy. In relation with health, recent studies have used so-called subjective measures because they refer to the perception a person has of his or her place in the socioeconomic structure. The social ladder is an example of a subjective measure (see box no.

2). These studies have shown that the subjective social position is inversely related to the different physical and psychological dimensions of health, independently of the more conventional measures such as occupation, educational level, and income level (24-26).
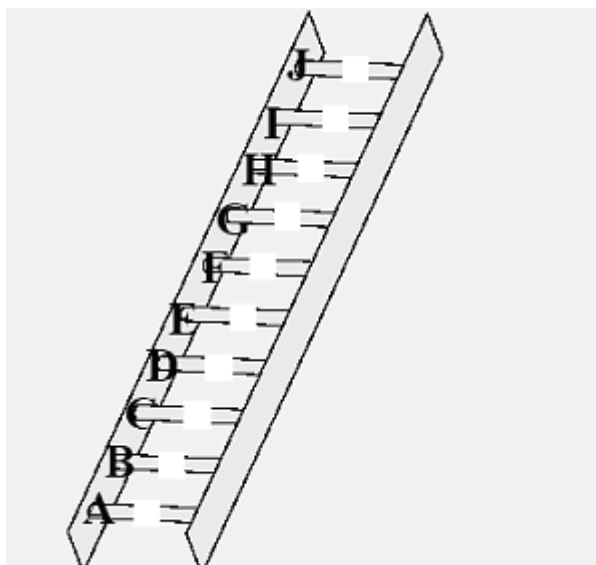
What individuals themselves take into account to determine their subjective social position correspond to past, present, and future socioeconomic indicators (socioprofessional category, educational level, household income level, satisfaction with living conditions, and the feeling of future financial security) (26).

Box no. 2

Source: Self-administered questionnaire, GAZEL cohort, January 2004

The ladder below represents the place occupied by individuals in society. At the top of the ladder (J) are people who have the best position (those with the highest income, the highest educational level, and the best job). At the bottom of the ladder (A) are the people who are in the least favorable position (the lowest income, the lowest educational level, and the lowest job or no employment at all).

Where do you place yourself on this ladder? Put a check on the rung where you consider yourself to be (do not use the spaces between the rungs).

Derived measures: status inconsistency, social mobility

The term "derived measures" herein refers to measures based on the comparison of two or more measures of those cited above or on a difference over time for a single measure (13, 27).

Status inconsistency is a concept based on the combination of diverse attributes of the socioeconomic position (such as occupation, educational level, and income level) either for a single individual or between two individuals. Although initially the concept reflected status inconsistencies of one individual (status incongruence), for example, a low educational level and a high-level occupation, it was later generalized to status inconsistencies between two individuals (status discrepancy). For example, a married man and woman can be "inconsistent" in terms of their educational level if one of them does not have a high school diploma and the other has a university degree (27).

Social mobility refers to movements within a social stratification system either between generations (the difference between a person's category and his or her parents' category), either during adulthood for a single person (5). It can be upward or downward, i.e., toward the top or the bottom of the social hierarchy.

More broadly, social mobility can make reference to a change in socioeconomic position, culture, or place of residence, as well as a passage in or out of the labor market (13, 28).

Measure of social position taking space and time into account

The use of the above-described measures can raise problems when countries or periods of time are compared. This has resulted in the development of specific methods of analysis as well as in the selection of better adapted measures.

Problems related to comparisons in space

As far profession is concerned, whatever approach was used (categorical or hierarchical), comparisons between countries are difficult because the nomenclatures in use often differ. For example, France is the only country to use the INSEE's occupations and socioprofessional

categories classification. As for the prestige scales, classifying professions according to a subjective judgment can be very different from one country to another (1, 8).

This problem of comparability has sometimes led to comparing the "nonmanual" (or "high") categories with "manual" (or "low") categories. The limits of this approach are twofold: first, it does not allow to reveal a gradient that reflects the whole range of social diversity; and second, leds to the hypothesis that a manual profession is systematically less high than a nonmanual profession from the social hierarchy point of view (1), which is not necessarily the case.

Educational level is the best adapted indicator for comparisons between countries, at least between industrialized countries (3, 29).

Using income level leads to a somewhat limited comparability because, in different regions or countries, the cost of living is not always identical. At a given income level, it is possible to associate different living standards according to geographical zone. In the case of income categorization, a substantial problem remains since the categories can vary considerably from one study to another, because they are determined on the basis of income levels of the study's geographical zone, the targeted population, and the time when the study was conducted. Additional problems stem from the definition of income, with income taxes in some countries deducted directly from wages (3, 8, 15).

Similar problems arise when using proxy measures. For example, the proportion of people who own their homes or who own a car may vary depending on the geographical region and depend on whether the individual lives in an urban or rural zone (8, 14).

Problems related to comparisons over time

Comparisons over time on occupation are difficult because occupational requirements evolve and new economic needs can create new occupations, with others disappearing. In addition, over

time a profession can grow or decline in status because of its content, the number of people working in the profession, and/or an imbalance between the sexes in the profession (8, 14-16).

As for educational level, depending on the birth cohort, a degree may have a variable value and signification and lead to different professions and income levels. This makes comparisons between different cohorts of different generations difficult (1, 3, 4, 6, 8, 14-16, 20).

Finally, the comparability of income levels at different periods of time is also somewhat limited because these levels vary in absolute terms; comparisons of relative measures (taking into account income distribution proper to the period in question) are a priori easier.

Approaches developed to resolve the problems of comparisons in space and time

The EGP classification

Erikson, Goldthorpe, and Portocarrero's classification denoted by EGP, was developed within a comparative study on social mobility in industrial societies (30). This classification is based on four dimensions of work: being an employee or employer, doing manual or nonmanual work, and working in agriculture or not; the fourth dimension takes into account the type of contract (characterized by its degrees of job security and autonomy as well as perspectives for promotion). This makes it possible to distinguish 11 categories (versions in seven, five, or three categories have also been proposed) (6, 23, 31, 32).

Widely used in political and social sciences, this classification was also used as a measure of the socioeconomic position in a wide study on the social differences in the health domain in diverse European countries (33-36).

Absolute measure / relative measure - Relative index of inequality (RII)

One response to comparison problems is to retain an indicator that reflects not an absolute position, for example, having a particular degree, but rather a relative position such as belonging

to the most educated 10% of the population (37). This approach can be implemented from a quantitative variable, such as income, or a variable in classes, on the condition that an order can be defined and that the proportion of the population in each class be known. For each subject, the relative social position will therefore be a value between 0 (the best position) and 1 (the worst position), indicating the share of the population whose social position is better than the subject's. For example, if 10% of the population is classified in the highest educational level, the relative social position of people having this educational level is between 0 and 0.10, or 0.05. If the following category groups 24% of the population, a person in this category will be attributed with a score equal to $0.05 + (0.24)/2 = 0.17$.

This approach makes it possible to dispose of the difficulties inherent to the differences in classification between countries, as well as take into account the variations over time resulting from changes in the distribution of the population between categories.

Defining the social position as an ordinal variable ranging from 0 to 1 is one way to quantify the association between the social position and a health variable using regression models, with the health variable "to be explained" and the social position the "explicative" variable; the terms "to be explained" and "explicative" are used here for purposes of simplification, but it must be remembered that social position can also be the consequence of the health status. These models allow the quantification of social inequalities with a single figure, and in particular the computation of a relative index of inequality (RII), the latter term being specific for estimations associated with a relative measure of social position. This index is interpreted as a relative risk: mortality or morbidity in the most underprivileged social position compared to mortality (or morbidity) in the most privileged position (37-39)

Using these models has immensely facilitated comparisons between periods and between countries (33, 36, 40). The explains the popularity of the "relative social position" and its extensive use even in situations where ordering categories is not self-evident: for example, for France the Classification of Occupations and Socioprofessional Categories or the categories describing social position at census time (41).

For some social position dimensions, retaining an absolute measure rather than a relative measure is a realistic alternative. In particular, the educational level can be quantified in the number of years for education (this does not mean the number of years spent in school, but the number of years required to obtain a given degree, without repeating a year); the unit (the year of education) is therefore assumed to have the same meaning from one country to another, from one period to another. The models used with a relative measure as the explicative variable can also be applied if the measure is absolute, but the interpretation of the coefficients differs: with educational level, what is quantified is therefore the "gain" in mortality or morbidity associated with an additional year of education and not the gain associated with a movement (e.g., of a decile) on the social scale defined by educational level.

For comparisons between periods or between countries, the choice between an absolute measure and a relative measure should always be discussed; however, in practice feasibility often dictates that the relative measure be retained, since a common unit cannot be defined, as can be done for educational level.

When in life should the socioeconomic position be measured?

Three conceptual models have been identified within the lifecourse framework to explain the "effects" of socioeconomic circumstances over the lifecourse on health. These are: critical periods or the latent effects model, accumulation model and pathways model. The critical periods model views specific biological (e.g. low birth weight) or developmental factors at sensitive periods of development, usually early life, to have a lifelong impact on health, independently of adult circumstances. The accumulation model proposes that disadvantage at different points in the lifecourse has a cumulative dose-response relationship with health. The pathway model views early environment to be important, but only because it shapes and influences the socioeconomic trajectories of individuals [16,23,42–48].

It may therefore be important to investigate the different periods of life (infancy and childhood, adolescence and adulthood) and describe them in socioeconomic terms, so as to study the

different aspects such as material living conditions, the age at first employment, unemployment, occupational mobility, the passage to retirement, etc. on the health status, and thus to attempt to understand the dynamics of how socioeconomic differences in health are created, related to the complex processes of the number of positions during a lifetime and how they overlap or follow one another. Investigating the life course requires being able to work with large samples from longitudinal data sets over a long period of time and having a sufficiently broad spectrum of data available, because most indicators of socioeconomic position, considered by themselves, do not account for the history of individuals and do not reflect the possible impact of their health status on their socioeconomic position (4). For example, to study the occupational life course, information on the occupational career must be available, i.e., concerning all the work episodes as well as any inactive episodes (and their reasons).

Indicators taking into account the family or geographical environment

The different indicators presented above can all be used to describe the socioeconomic position at the individual level. Two other levels of analysis can be utilized: an individual has his own personal socioeconomic characteristics, but his family and geographical environments (a neighborhood, a region) can have an influence on him. These latter can themselves be characterized by their socioeconomic composition.

The household

In this case, the unit of analysis is the household in which the person lives and in which he or she shares resources and lifestyle with the other members of the household.

Several approaches can be used to account for this environment. The so-called conventional approach has been particularly used to determine the socioeconomic position of married women: whatever their employment status, their socioeconomic characteristics were replaced with those

of their partner. This usage was first based on the fact that before the 1970s, a large proportion of women had no occupational activity; it was therefore very difficult to describe the socioeconomic position in this heterogeneous group that included a variety of women with very different living conditions varying essentially in relation to the socioeconomic position of their partner. Furthermore, certain studies showed that the socioeconomic position of married women with a profession was a less powerful predictor of their mortality than their husband's profession (1, 3, 14, 16, 27, 49-52). The validity of this approach was challenged by the massive integration of women into the labor market over the last few decades, resulting in an increase in the number of households with a double income and, to a lesser extent, the increase in the number of households where the woman's socioprofessional category was equivalent to or higher than her spouse's (3, 14, 16, 27, 49, 52). Other approaches have therefore been proposed: the two partners can be characterized by the higher socioeconomic position of the two, by their mean socioeconomic position, or by an indicator combining the positions of each of them but weighted differently (6, 52, 53). The above-mentioned concept of status discrepancy between the two members of the same household is part of this frame of reflexion.

The geographical context

In this case, the unit of analysis is the geographical zone of a variable size: census zone, neighborhood, or department (in France) in which the person resides and in which the environmental characteristics and the community resources, whether or not they are aggregated, can augment certain disadvantages and risks such as a poor health status or themselves be risk factors.

As in cases where the household is used as the unit of analysis, different approaches can be implemented.

This information can therefore describe the socioeconomic position when no individual data are available. It is used as a proxy measure of individual social characteristics. Some problems are inherent to the use of this type of data because it is difficult to admit that all the individuals

within a zone have homogenous characteristics (particularly in urban zones where even very small segments can be heterogeneous) and therefore that the associations observed at the area level between health and socioeconomic indicators reflect valid associations at the individual level (1, 3, 4, 13, 15). However, it should be noted that the utility of geographic zones as a unit of measure depends on their precision level, and at a high precision level this approach is very effective.

Information on geographic zones can also be used in ecological analyses relating a zone's socioeconomic characteristics (considered collective factors) with mortality or morbidity levels in this same zone (1, 15).

Finally, in contextual analyses, this information serves to study the role of socioeconomic characteristics of the place of residence; the area characteristics can interact with the individual characteristics and thus add predictive power to the models – called multilevel models – used to study individual health behaviors and the risks for disease (1, 14-16, 54-56).

The socioeconomic position of the geographical units can be defined on several different levels: microscopic, mesoscopic, and macroscopic, by all the indicators cited above: occupation, educational level, income level, as well as by sociodemographic proxy measures such as unemployment rates, population density, the proportion of immigrants or ethnic minorities, housing conditions, the value of real estate or rental prices, and access to recreational facilities, transportation, medical care, education, etc. (57).

Compound indexes can also be used. Two examples are the Townsend Index and the Carstairs Index, developed and applied in the United Kingdom. The first integrates the percentages of unemployed individuals, those who do not own a car, those living in overcrowded housing, and renters in the zone considered (58). The second is based on the proportions of individuals living in housing where there is more than one person per room, who are unemployed, who live in a home where the head of the household is a worker, and who do not own a car (59). These two

indexes are relatively strongly correlated with mortality in the United Kingdom (60). Similar approaches have been used in other countries (61).

Contextual data can be unavailable in a given country or difficult to obtain because they come from organizations responsible for public statistics. Also, researchers must use the data accessible in their country rather than data that they may consider conceptually more appropriate. To this can be added statistics problems, which will not be discussed here (55).

The use of information on the context refers to different concepts developed in the literature on the role of social factors. These concepts will only be mentioned here.

The concepts of social capital and social networks define resources in terms of social relations available to individuals in a society: social capital refers more to the collective resources of a society (independent of individuals), contrary to the notion of social networks and social support that vary for each individual (47, 62).

The concept of income inequality has been the subject of many studies, some of which have shown a relation with a population's health status. Measures of income inequality can be used to describe the relative equity in the distribution of wealth or income within a society or a group and then related to different health dimensions. Different studies have shown a relation between the level of equity in a geographic zone (country, region), measured through income inequity, and total mortality. This relation between income inequity and health continues to be debated (63).

Conclusion, advantages and limits of the various measures

The different indicators and levels of analysis described herein underscore just how complex it is to describe the socioeconomic position and its components: the many indicators available each describe a different facet of social stratification and therefore are not interchangeable. Furthermore, the most relevant dimensions of social position may not be the same depending on

the groups studied: men, women, children, people with no occupational activity, the elderly, etc. Finally, the role of these socioeconomic indicators may vary widely depending on the health dimension studied (48). Within the limits of the variables available, the choice of the most relevant measure depends on many elements such as the population, the health problem, and the spatiotemporal context of the study.

The indicators presented in the table in the annex each have, according to different criteria, their advantages and limits. However, excluding the very specific research on the role of social position, feasibility and the possibility of comparison are essential dimensions, which brings our attention first and foremost to the most widely used measures. For these reasons and for the studies currently being conducted in France, educational level and the Classification of Occupations and Socioprofessional Categories remain the preferential measures. These two measures can be considered at the individual level or the household level (educational level of each of the household members, the highest educational level in the household, etc.). As for the Classification of Occupations and Socioprofessional Categories, an additional choice is required: should one favor the last occupation, or the occupation exercised for the longest period of time, or the current occupation, with this last option requiring that it be completed for people with no occupational activity by information on the employment status (unemployed, retired, etc.).

In conclusion, better knowledge of the possibilities for measuring the social position should result in more systematically accounting for this dimension in studies on various health problems as well as a better understanding of the mechanisms by which the social position influences the health status.

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Summary table of the different measures presented

Most widely used indicators	Occupation and socioprofessional category	INSEE classification of occupations and socioprofessional categories
	Educational level	▪ Highest degree obtained ▪ Number of years of education corresponding to degree
	Income level	▪ Individual income ▪ Family income (± adjusted to family size)
Other indicators	Proxy measures	▪ Material living conditions (owns a vehicle, owns home, indicators of comfort and housing quality, etc.) ▪ Characteristics of the geographical zone (unemployment rate, population density, access to recreational facilities, transportation, medical care, education, etc.)
	Indexes	Composite measures built from several socioeconomic indicators
	Subjective measure	Social ladder
	Derived measures	▪ Status inconsistency ▪ Social mobility
Approaches developed to remedy the problems of comparisons in space and time		▪ EGP classification ▪ Absolute measure / Relative measure – Relative inequality index (RII)
Indicators taking into account family or geographical environment	Household	Characterization of socioeconomic position of family members: ▪ through position of family member considered head of the household ▪ through the highest socioeconomic position of the two members of a couple ▪ through their mean socioeconomic position ▪ through an indicator combining the positions of each member (weighted)
	Geographical context	Multilevel analyses taking into account area and individual characteristics