GLOSSARY

# Indicators of socioeconomic position (part 2)

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This is the second part of a glossary on indicators of socioeconomic position used in health research (the first part was published in the January issue of the journal).

## OCCUPATIONAL BASED MEASURES (CONTINUED FROM FIRST PART OF THE GLOSSARY)

### British occupational based social class (prior to 1990 known as the registrar general's social class)

#### Theoretical basis

The practice of classifying the population in Britain according to occupation and industry began as early as 1851 but it was not until the registrar's general's annual report for 1911 that occupation and industry were differentiated with a summary of occupations representing ''social grades'' separately presented. The main initial purpose was the analysis of fertility data, although mortality was also analysed; indeed there is evidence suggesting that revisions to the classification were constructed ''in the light of knowledge of mortality rates''.[1]

This scale is based on the prestige or social standing that a given occupation has in society. After revisions in 1990 this measure was more explicitly related to the skills needed to perform a particular occupation.[1] It is widely used in Britain and in other European countries.

#### Measurement

Occupations are categorised into six levels or classes (table 1), ranked from higher to lower prestige, which can also be reduced to two broad categories of manual and non-manual occupations; a seventh category includes all people in the armed forces irrespective of their rank therein, which is generally excluded in health studies.

#### Strengths and limitations

A key strength of this measure is its past official status in Britain and hence its widespread use in vital statistics, as well as many population censuses and surveys over a long time period. Adaptations have been extensively used in other countries, making comparability between studies easier. However, a key limitation is the subjectivity of its theoretical basis. In addition, it does not account for recent changes in the occupational structure, such as the increase in service jobs and the decrease in unskilled and semi-skilled manual occupations, or the increasing number of women in the labour market. Based on these criticisms, the Office for National Statistics in the UK has since 2000 used the new UK National Statistics socioeconomic classification as its official occupation classification (see below). Despite limitations the registrar general's social class system has been widely used to describe the socioeconomic gradient of health outcomes.

#### Interpretation

As (theoretically) a measure of prestige or social standing, it could be argued that the relation of this classification to health should be interpreted as due to the advantages bestowed by elevated social standing and increased prestige. In practice it is often interpreted as an indicator of both social standing and material reward and resources.

### The Cambridge scale (or CAMSIS, the Cambridge social interaction and stratification scale)

#### Theoretical basis

This scale uses patterns of social interaction to determine the nature of social structure and a person's position within it; it is a hierarchical measure of social distance. The distance is defined by similarities in the lifestyles, social interactions, and resources that occupational groups share and is thus based on Weberian notions of what is important about social stratification.[2 3] The scale was originally constructed by grouping occupations according to friendship, which gave a numerical indication of how similar (socially close) or dissimilar (socially distant) any two occupations were.[2]

#### Measurement

The Cambridge scale provides a continuous measure that can be categorised into groups from the most to least advantaged (table 1). Although this classification bears resemblance to the registrar general's, its derivation (based on actual social networks rather than perceived status) means that some occupations will be differently classified by the two systems.[2]

#### Interpretation

The scale reflects general social and material advantage, and because it is based on social interaction it is also considered to represent lifestyles and health behaviours.[2 4]

### Erikson and Goldthorpe class schema (also known as the Goldthorpe schema)

#### Theoretical basis

This classification is based on employment relations, classifying occupations that entail relations based on high levels of trust and independent working practices combined with delegated authority, to occupations based on a labour contract with very little job control.[4 5]

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**Table 1** Occupational based socioeconomic indicators: theoretical basis and group allocation

| Prestige, skills | Working relations | Social distance (in lifestyle, social interactions, resources) | Property of means of production and class relations—social class |
|---|---|---|---|
| **Registrar general's social class** | **Erikson and Goldthorpe class scheme** | **Cambridge Scale** | **Wright** |
| I Professional | I Higher grade professionals, administrators and officials; managers in large industrial establishments; large proprietors | Continuous scale, can be arbitrarily grouped | 1 Capitalist |
| II Intermediate | | | 2 Small employer |
| III-N Skilled non-manual | II Lower grade professionals, administrators and officials; higher grade technicians; managers in small industrial establishments; supervisors of non-manual employees | | 3 Petty bourgeoisie |
| III-M Skilled manual | | | 4 Expert manager |
| IV Partly skilled | | | 5 Skilled manager |
| V Unskilled | IIIa Routine non-manual: higher | | 6 Non-skilled manager |
| VI Armed forces | IIIb Routine non-manual: lower | | 7 Expert supervisor |
| | IVa Small proprietors with employees | I Least advantaged | 8 Skilled supervisor |
| | IVb Self employed without employees | II | 9 Non-skilled supervisor |
| | IVc Farmers/smallholders | III | 10 Experts |
| | V Foremen and technicians | IV | 11 Skilled workers |
| | VI Skilled manual | … Most advantaged | 12 Non-skilled workers |
| | VIIa Semi and unskilled manual | | |
| | VIIb Agricultural workers | | |
| **Education and income** | | | |
| **American census classification** | **UK National Statistics classification (NS-SEC)** | | **Lombardi, *et al*** |
| I Managerial and professional | 1 Higher managerial and professional employers | | Underproletariat (unemployed and seasonal workers) |
| II Technical, sales and administrative support | 2 Lower managerial and professional | | Typical proletariat (unskilled and semiskilled workers in manual occupations) |
| III Service occupations | 3 Intermediate employees | | Atypical proletariat (unskilled and semiskilled in commerce and services) |
| IV Farming, forestry, fishing | 4 Small employers and own account workers | | Traditional small bourgeoisie (self employed, small business owners) |
| V Precision production, craft, repair | 5 Lower supervisory, craft and related employees | | New small bourgeoisie (university-trained professionals) |
| | | | Bourgeoisie (large business owners) |
| VI | 6 Employees in semi-routine occupations | | |
| | 7 Employees in routine occupations | | |
| | 8 Never worked and long term unemployed | | |

This scheme does not have an implicit hierarchical rank and therefore it does not necessarily capture a gradient in health across its groups. It has been used as an indicator of scioeconomic position in international comparisons of socio-economic inequalities in health across Europe.[6–8]

### Measurement
Occupations are classified into 11 groups. This classification is not a hierarchy (despite the numbering that is used to refer to each group) (table 1).

### Interpretation
Differences in health outcomes between groups can be mainly attributed to differences in working relations and work autonomy; different contract and reward system terms of remuneration; and different job promotion prospects.[4] However, the scheme also inherently reflects material resources as aspects of employment relations such as decision latitude are often co-terminus with material rewards accorded to different types of jobs.[9]

### Strengths and limitations
This classification has a clear theoretical basis and it has been used in international comparisons. In addition, several studies have been conducted that permit assessment of its construct and criterion validity. However, working relations are likely to change over time and, therefore this scheme will also require continuous updating.[10]

## Marxist based social class classifications
### Theoretical basis
These indicators are based on Marx's theory of class and therefore categorise people as to whether they are exploited workers or those who own the means of production. Strictly speaking, this is the correct interpretation of *social class* as first coined by Marx. However, in practice the terms socio-economic position and social class are frequently used interchangeably in the epidemiological literature and the British registrar general's occupation based classification (although not based on Marxist theory) is referred to as social class.[11]

### Interpretation
The results reported using these classifications in relation to health outcomes are explained in terms of exploitation between classes and in terms of the conflict generated by contradictory locations within this class system.[12]

To our knowledge there have been two explicit adaptations of Marx's theory of social class that take into account contemporary employment and social circumstances.

### (a) Wright's social class classification
In this scheme people are classified according to the interplay of three forms of exploitation: (a) ownership of capital assets, (b) control of organisational assets, and (c) possession of skills or credential assets. This defines 12 locations (see figure 1) where cells 1 and 2 represent the capitalist class, cell 3 the petty bourgeoisie or self employed, cells 4 to 10 include contradictory class locations, and cells 11 and 12 the working class. People in the contradictory class locations belong simultaneously to the capitalist and the working class (capitalist in terms of controlling skills and credentials and exploiting workers; workers because they do not own capital assets and are controlled by capitalists).[13 14] In his later book, Wright uses variations of this classification. For example, in analysing time trends of the American class structure he used an eight location classification: employers, petty bourgeoisie, managers, supervisors, expert managers, experts, skilled workers, and workers. In a permeability analysis (analysis of friendship ties, family composition, and intergenerational

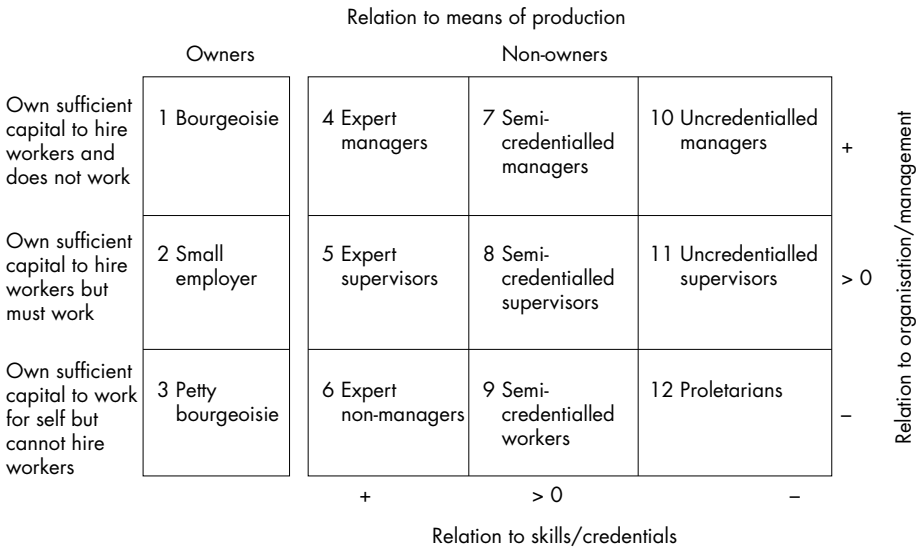


**Figure 1** Wright's social class classification.

class mobility) Wright operationalises the social class classification in employers, petty bourgeoisie, experts managers, managers/supervisors, professionals, skilled workers, and workers.[15] Some of these variations were driven by data availability and by theoretical reasons, as was the case for a different operationalisation of the skill dimension in the permeability analysis.[15]

In the USA, Muntaner *et al*,[16 17] Schwalbe and Staples,[18] and Krieger *et al*[11] have used Wright's classification in epidemiological research. Among others, Wright's social class scheme has also been used in studies conducted in Spain[12] and in Israel.[19 20] Macleod *et al*, in the UK, have applied Wright's notion of contradictory class location to investigate the role of material circumstances versus perceived social status on health.[21]

### (b) Lombardi *et al* social class classification

The other social class indicator based on Marx's theories originated in Brazil.[22 23] Similar to Wright's classification, it highlights new contradictory categories of skilled people working for a salary but being in the position to exploit other workers, as well as the increasing proportion of people working in the commerce or service sector who may also be both exploiters and exploited. It classifies occupations into six groups (table 1).

## Other occupation based classifications

There are a number of country specific occupation based classifications based on combinations of occupation, education and/or income information, or of adaptations of the UK registrar social class classification.[24] They have often been developed in national statistical offices and are used in census and survey information originating within each country.[25–27] As an example, the Edwards' socioeconomic scheme is used in the US census and in North American studies.[28] It is based on the educational and income level required for each occupation and is thus similar (at least in terms of interpretation) to the British registrar general's scale (table 1). It classifies occupations into 13 categories that are often collapsed into a smaller number of major socioeconomic groups.[29 30]

In addition, readers are directed to earlier reviews for more complete descriptions of measures that are less commonly used in contemporary epidemiological research, for example, the Nam-Powers classification, Siegel's prestige scale, and Treiman's standard international occupational prestige scale.[28]

## UK National Statistics socioeconomic classification (NS-SEC)

From 2000 the UK NS-SEC has replaced the registrar general's social class and another official classification, socioeconomic groups SEG (for details on the history, process, and conversion between these schemes consult the UK National Statistics web page http://www.statistics.gov.uk/methods_quality/ns_sec/default.asp). The NS-SEC is now used in all official statistics and surveys in the UK.

### Theoretical basis

The NS-SEC is explicitly based on differences between employment conditions and relations, similar to the Erikson and Goldthorpe class schema.[31] People are placed in groups according to occupations with different employment relations and conditions—such as whether they have a wage rather than a salary, their prospects for promotion, and levels of autonomy.

### Measurement

Occupations are usually grouped into 7, 5, or 3 (plus an additional category of ''never worked and long term unemployed'') (table 1). Only the grouping that collapses into three categories can be considered as hierarchical.

### Interpretation

The direct interpretation of this association would be that the conditions and relations of employment have an effect upon health; although, again, differences in material resources will exist between the groups. This classification is related to health outcomes and life expectancy.[32]

### Strengths and limitations

Similar to the Erikson and Goldthorpe classification (see above)

# PROXY INDICATORS

## Theoretical basis

When direct measures of SEP are not available, some researchers use proxy indicators. These indicators can be strongly correlated with SEP and in some cases may provide insight into the mechanism that explains the underlying association of SEP and a particular health outcome (for example the association of number of siblings and respiratory infection).

### Measurement

*Number of siblings* has been used on the basis that in some contemporary industrialised societies larger numbers of children are associated with poorer SEP.[33 34] This is not necessarily the case in other populations or societies. Number of siblings may have a direct effect on health outcomes as it may increase the risk of early life infection. However, it may also reflect other mechanisms through which family size can affect health outcomes in individuals and family members. For example, the positive association between parity and coronary heart disease among women may in part reflect family lifestyle resulting in obesity in all family members and in part reflect pathophysiological processes related to large numbers of pregnancies.[35]

*Infant* and *maternal mortality* rates have been used as ecological measures of an area or country SEP.[36] Other characteristics such as *maternal marital status*, having a *single mother* or being an *orphan*, *illegitimacy*, *broken family*, and *death of father or mother* at an early age, are circumstances that often result in low SEP (for example, unemployment due to the inability of obtaining a flexible job and economic hardship can be associated with single motherhood). Several studies report worse health in these subgroups.[37–40] However, adverse health outcomes could also be caused by other factors associated with these circumstances but unrelated to SEP. For example, infant and maternal mortality may reflect climate factors leading to infection diseases (for example, malaria infection) in addition to reflecting SEP; broken family, or death of mother/father at an early age, could lead to ill health due to depression.

### Strength and limitations

These are not indicators of SEP in itself but because of their strong correlation they may provide valuable information when direct measures are not available. It is important to always consider alternative explanations of their association with health outcomes. In addition, their association with socioeconomic circumstances can differ depending on the context. For example, number of siblings may be a marker of lower SEP in some, although not all, industrialised societies and may not be related at all with SEP in other settings.

## WEALTH

Wealth is a continuous measure that combines total assets and income (see housing and income in part 1 of the glossary). Its relation to health assumes that income in combination with total assets is a better measure of someone's socioeconomic circumstances and therefore a better predictor of health than income alone. In addition to income, wealth includes financial and physical assets such as the value of housing, cars, investments, inheritance or pension rights.[16] The relative importance of wealth compared with income may change over the life course (wealth being more important in older age due to the accumulation of wealth and the impact of retirement on income[41]) or in population subgroups (for example, for a given level of income, African American and Hispanic households have less wealth than white households[42]).

## WORKING LIFE INDICATORS AND EXCLUSION FROM THE LABOUR MARKET

People that cannot be classified in occupation based classifications can constitute a separate category. *Unemployment* can be used as an indicator based on exclusion from the workforce. Other work related indicators that can be used to measure SEP are *job insecurity* and *type of employement*.[43] These conditions are associated with worse objective and subjective health through a variety of mechanisms, for example, lack of material resources for those who are unemployed, as well as social isolation, loss of self esteem, and the stress of potential job loss in conditions of job insecurity.

## COMPOSITE INDICATORS

A number of composite measures have been used to assess SEP at the individual level. However, the increasing interest in determining more specific mechanisms for—rather than merely describing—socioeconomic inequalities in health, has lead to these measures being less frequently used.[28 44] On the other hand, composite indicators may be efficient when SEP is measured as a confounding factor rather than as the main exposure of interest, as these composite measures incorporate, and therefore, adjust for different aspects of SEP.

Individual studies have designed and used specific composite indices, often dependent on the data available to that particular study. This is most appropriate when SEP is a confounding variable of the association of interest or when the specific mechanisms determining inequalities are not the main focus of the study. Standard composite indicators are the following: *Hollingshead index of social position*,[45] *Duncan index, Nam-Powers socioeconomic status, Warner's index of status characteristics*.[28] They have not been updated with current changes in the occupational structure and have not often been used in recent years. For more detailed explanations of these indicators we refer the reader to earlier reviews.[28]

## AREA LEVEL MEASURES (INDICES OF DEPRIVATION)

Ecological, or area level, indicators are also used as measures of SEP. Most commonly these are aggregated from individual level or small area data, usually from census or other administrative databases. They can be used to characterise areas on a continuum from deprived to affluent (and are important for the allocation of public resources to areas) as well as a proxy for the SEP of the people living in those areas. In many studies one or more aggregate area measures, for example proportion of unemployed, proportion in blue collar or manual occupations, proportion with higher education in an area, are used with no attempt to combine measures into a composite score. In Britain a number of composite area level measures of SEP (referred to as indicators or indices of deprivation) have been developed for use in health related research and are increasingly used in other countries. The *Townsend deprivation index* is a measure of multiple deprivation using four variables from the (British) 1991 census: unemployment (defined as the proportion of economically active residents aged 16–64 who are unemployed), the proportion of households with no car, the proportion of households that are not owner occupied, and the proportion of households with overcrowding (>1 person per room).[46] The Townsend score for each area is a summation of the standardised scores (z scores) for each variable; a greater score indicates higher levels of material deprivation. Other similar indices are the *Carstairs deprivation index*[47] and the *Jarman or underprivileged area (UPA)* score.[48]

The *Breadline Britain index* has different conceptual origins.[49] This is a consensual measure of poverty, based on what people themselves understand and experience as the minimum acceptable standard of living in contemporary Britain. Combining survey data with census data, and using weights to account for the different probability subgroups in the population have of suffering from a particular type of deprivation,[50] this indicator is based on the proportions of: unemployment, people with no car, households non-owner occupied, lone parent households, households with persons with long term illness, unskilled and semi-skilled manual occupations (social class IV and V) in an area.[11] The Breadline Britain index thus includes a measure of health, and explorations of associations with health must take this into

account (a version of the index without this component can be derived). The Breadline Britain index (modified version) has been found to have a close relation with the geography of mortality in Britain.[51]

Recently, Krieger and colleagues evaluated the performance of different area socioeconomic measures in capturing the association with cause specific mortality and cancer incidence in the USA.[52] Interestingly, this work showed that among 11 single variable and eight composite measures it was ''percentage of persons living below the US poverty line'' that was best for use in surveillance of US socioeconomic differentials in mortality and cancer incidence.[52] The authors reached similar conclusions regarding other health outcomes such as low birth weight, childhood lead poisoning,[53] incidence of sexually transmitted diseases, tuberculosis, and non-fatal weapon related injuries.[54]

Area based indicators can be theorized as measures of the socioeconomic conditions of an area, and as such can have an independent influence on health. This idea is not new and in Britain has existed at least since Chadwick's time in the mid-1800s.[55] Increasing attention has been paid to the possibility that over and above individual characteristics, the place where a person lives can affect their health; ''where'' a person lives can be categorised as a neighbourhood, city, higher administrative areas (for example, health authority in the UK), region, or country.[56 57] Various indicators presented in this glossary can be used to capture the characteristics of these different levels. Studies investigating ''area effects'' tend to find small associations relative to the size of individual SEP effects, and it remains unclear whether the associations between area level measures of socioeconomic circumstances and health outcomes are related to the socioeconomic characteristics of where people live, independently of the (lifetime) characteristics of the people living in these areas.[57–60] This conceptual and empirical problem is especially pertinent when SEP is considered within a life course framework (see life course socioeconomic position below) and suggests historical information on both areas and individuals is required. The argument here is that adjustment for one single measure, which captures SEP at one point in time, is insufficient for capturing the full extent of individual effects.[61] An additional problem is that few area level indicators were conceptualised to measure area characteristics, and as we have noted above, they are usually formed from aggregates of individual level data.

Area measures are also used as proxies for individual level indicators when these are not available. In this case, given the misclassification of individual socioeconomic circumstances when measured by area characteristics, the association with health outcomes is likely to be underestimated.[62] The larger the areas the greater the misclassification will be. In addition, the variability in SEP picked up by the area level indicators will always be smaller than that of the individual level indicator, that is, the lowest value in area income will always be higher than the lowest individual income, and the other way around for the highest income.[63] However, if area characteristics have an independent effect on health outcomes, the association of individual SEP will be overestimated when area level indicators are used instead to predict individual level effects. Whether under or overestimation affects a given study will depend on the health outcomes under study, the area measures, and area size of every specific context.[44 62]

## LIFE COURSE SOCIOECONOMIC POSITION

Socioeconomic circumstances are a changing but ever present backdrop to all stages of the life course and thus it is important to think about SEP as a time varying exposure. There is increasing evidence that adverse SEP in early life, independently of adult SEP, is a strong predictor of adult illness.[61 64 65] The indicators presented in the first part of this glossary, in addition to measuring different conceptual dimensions of SEP, can also capture information on SEP at different points in a person's life.[66] Therefore, a combination of these can be used to measure SEP at different times over the life course (see figure 1 in the first part of the glossary).

Several prospective studies report higher mortality among those who experience adverse socioeconomic position at different periods of the life course. A variety of mechanisms may explain these associations.[67] For example, infection with *Helicobacter pylori* during childhood plausibly explains the association between childhood deprivation and stomach cancer,[68] and suggests a critical period model for this health outcome.[67] On the other hand, coronary heart disease, ischaemic stroke, and chronic obstructive pulmonary disease seem to be influenced by factors acting across the entire life course and therefore may conform more to a cumulative risk model.[69–73] There is however an intrinsic problem in disentangling different life course processes (similar to differentiating age, cohort, and period effects).[74] Whether critical period, social mobility, accumulation of risks or combinations of these underlie the association between SEP and a given health outcome requires prior knowledge of the specific causal mechanisms.[74]

As the cumulative life course effect of adverse SEP on adult disease outcomes become more apparent, the need to adjust for different measures of SEP from across the life course in observational studies of exposures and outcomes that are strongly socially patterned is increasingly acknowledged.[75] It is unlikely that residual socioeconomic confounding can be ruled out by simple adjustment for one or perhaps two measures of SEP at a single point in time.[76]

## CONCLUDING REMARKS

SEP is key to understanding inequalities in health and is best considered as an umbrella term for a range of indicators and interconnected concepts. Individually and in aggregate, across the life course, time and place, a vast number of studies have shown how socioeconomic disadvantage is related to poorer health. A descriptive approach to considering this body of research emphasises the consistency of the associations and invokes ideas of ''fundamental cause''[77 78] and the ''general susceptibility''[79] of the disadvantaged. However, an aetiological framework needs to focus on the specificity of these associations.[73] The departure point for a more complete aetiological understanding of socioeconomic health differentials should be based on mechanistic specificity of links between particular SEP indicators (as described above) and different health outcomes. This approach seems fruitful in developing greater insights into the mechanisms that generate socioeconomic inequalities in health, in different places and times.[73 80]

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# THE *JECH* GALLERY

## Love pounds, tons of inequities

News[1] alerted to El Salvador in 2004: in four decades young people died for the first time by hunger. It was an announced death: the undernutrition, re-emergent disease is a direct consequence of the neoliberal era, and has deepened. The suppression of the agricultural subsidies annihilated food security and the subsistence cultures of poor farmers. The minimum wage was frozen to compete with low production costs, in the globalised market of the textile manufacturing. An economy dominated by dollars and an increasing cost of the basic basket, especially foods, completed the picture. These factors featured heavily in a report of the Office of the Judge Advocate General for the Defence of the Human Rights.[2] The answer: an assisted programme of nutritional consultation and food distribution called ''Pounds of love''.[3] But the inequities, exacerbated by unequal international trade relations, unjust distribution of the wealth, unemployment, payments in the public health system, and poor social investment continue to grow and generate poverty, social violence, and insanity to a rate that soon will end in the inability to govern.

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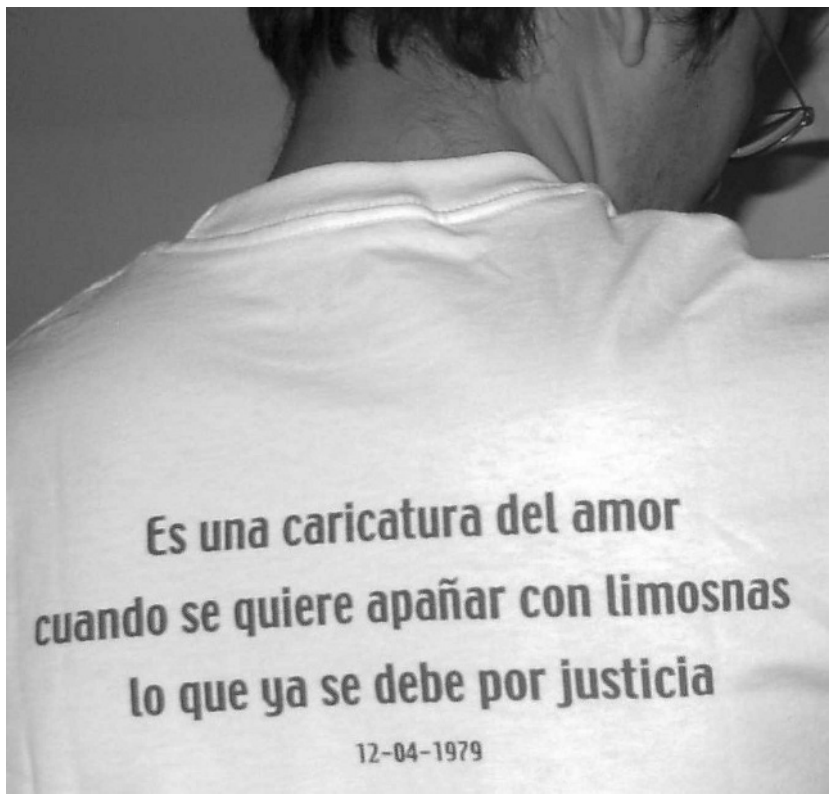


A tee shirt legend on the 25 year anniversary of the murder of Archbishop Oscar Romero—''It is a cartoon of love when it is wanted to patch up with gifts that which is already owed by justice''. (Taken from the 12 April 1979 homily of the Archbishop Romero whose assassination in 1980 unleashed a civil war of 12 years in El Salvador).

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